

Technical Program

SPIE 
Photonics West

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Conferences and Courses: 23 – 28 January 2010

BiOS Exhibition: 23 – 24 January 2010

Photonics West Exhibition: 26 – 28 January 2010

The Moscone Center
San Francisco, California, USA



SPIE

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GREETINGS FROM THE MAYOR

On behalf of the City and County of San Francisco, it is with great pleasure that I welcome you to SPIE Photonics West, the world's leading photonics, laser, and biomedical optics event, being held at the Moscone Center on January 23-28, 2010.

SPIE Photonics West convenes approximately 18,000 international scientists, researchers, and developers working in optics and photonics, in fields such as lasers, biomedical optics, sensors, and fiber-optic communications. This year, the Photonics West symposium will include conferences with 3,600 technical presentations, an exhibition of 1,100 companies, and a welcome reception with entertainment including a troupe of acrobats from the San Francisco Circus Center and a laser show by Bay Area native Greg Makhov, who pioneered laser-show technology.

This year, the City and County of San Francisco joins the world science community in celebrating the 50th anniversary of the laser. This important milestone highlights the many benefits that laser technology provides to our society, and recognizes the many contributions by Bay Area researchers and companies that have pioneered in this field.

Welcome to San Francisco, where innovation and entrepreneurialism are hallmarks which make our City so unique.

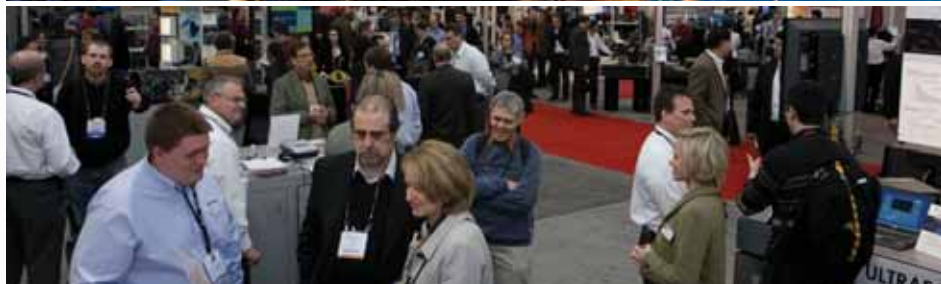
With warmest regards,

A handwritten signature in black ink, appearing to read "Gavin Newsom", written over a horizontal line.

Gavin Newsom
Mayor

SPIE Photonics West

Conferences and Courses: 23 – 28 January 2010
 BiOS Exhibition: 23 – 24 January 2010
 Photonics West Exhibition: 26 – 28 January 2010
 The Moscone Center
 San Francisco, California, USA



CONTENTS

Facility Maps 2–5

Special Events

Daily Schedule..... 14–15

Plenary Sessions

BiOS.....16
 LASE18
 MOEMS-MEMS.....20
 OPTO.....22

Industry Events 24–27

Executive Sessions | Panels | Workshops

Professional Development 28–30

Speaker Series | Workshops | Women in Optics |
 Job Fair | Panels

Social and Networking Events 33–34

Receptions | Student and Early Career Events

Exhibition Overviews..... 38–43

**SPIE Photonics West | SPIE BiOS |
 Product Demonstrations | Sponsors**

Technical Conferences

Conference Index 6–12
 BiOS.....52–141
 LASE142–180
 MOEMS-MEMS.....181–195
 OPTO.....196–266
 Index of Authors, Chairs, and Committee Members...267–318

Professional Development

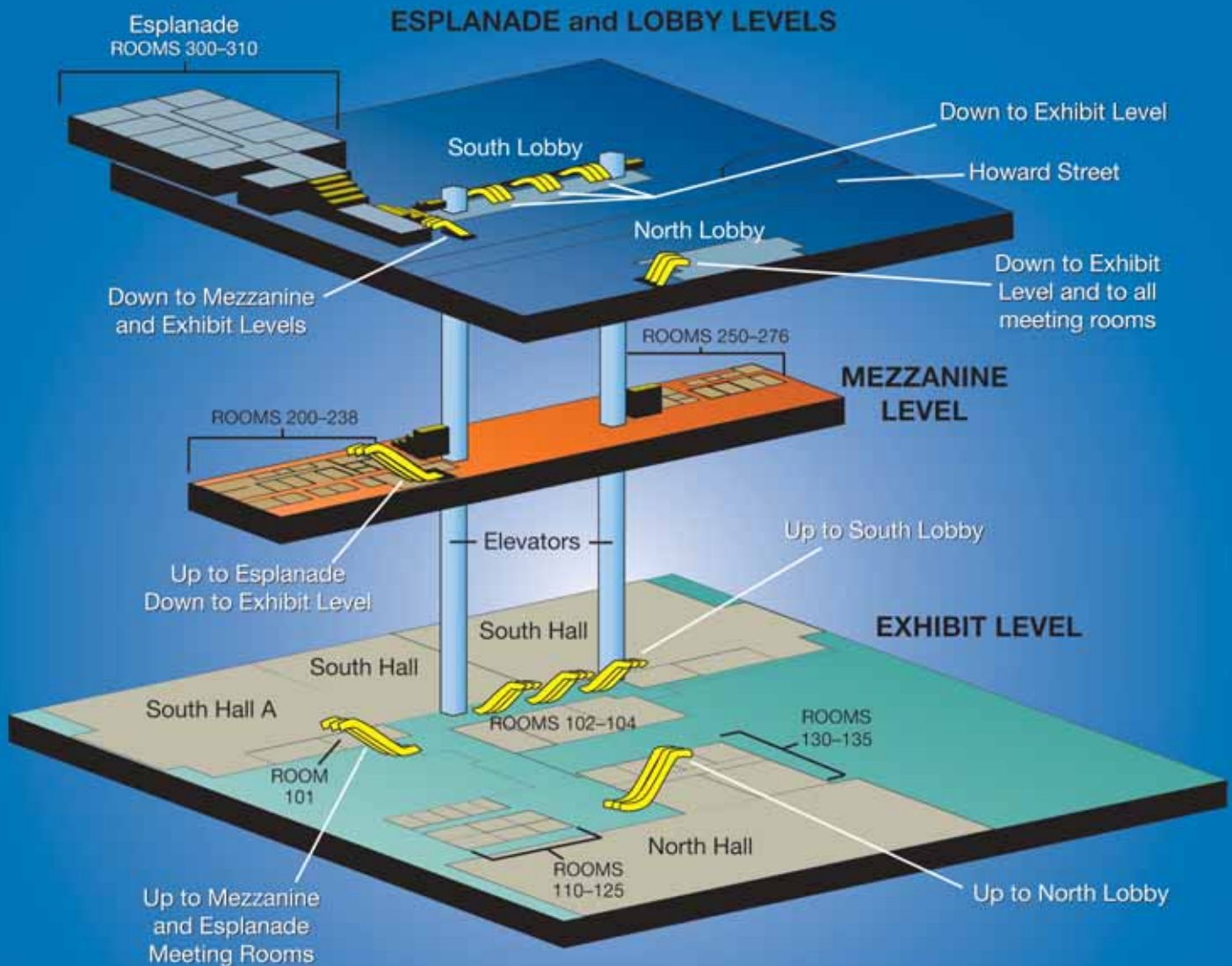
Daily Course Schedule 44–51

General Information.....319–322
 San Francisco Hotel Area Map.....322
 Proceedings of SPIE.....324–325



SPIE is the international society for optics and photonics founded in 1955 to advance light-based technologies. Serving more than 188,000 constituents from 138 countries, the Society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent, and career and professional growth.

The Moscone Center



-  STAIRS and ESCALATORS
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-  MEZZANINE LEVEL
-  EXHIBIT LEVEL

BIOS
SPIE Photonics West

Esplanade Level
Mezzanine Level

OPTO
SPIE Photonics West

Esplanade Level
Mezzanine Level

LASE
SPIE Photonics West

Exhibit Level

**MOEMS-
MEMS**
SPIE Photonics West

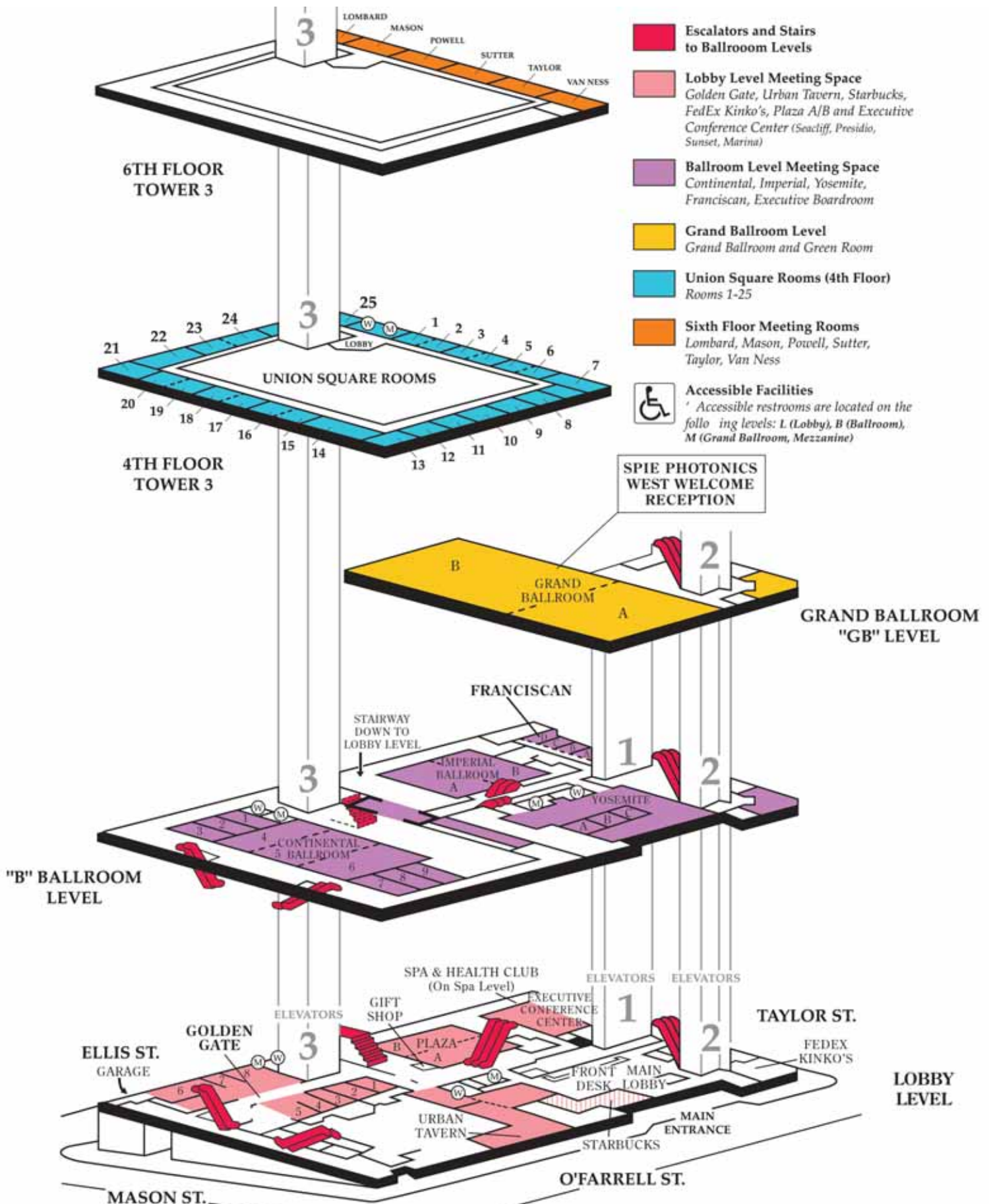
Exhibit Level

BIOS Hot Topics Room 102
Posters Room 103
Plenaries Room 102
Industry Sessions Room 101

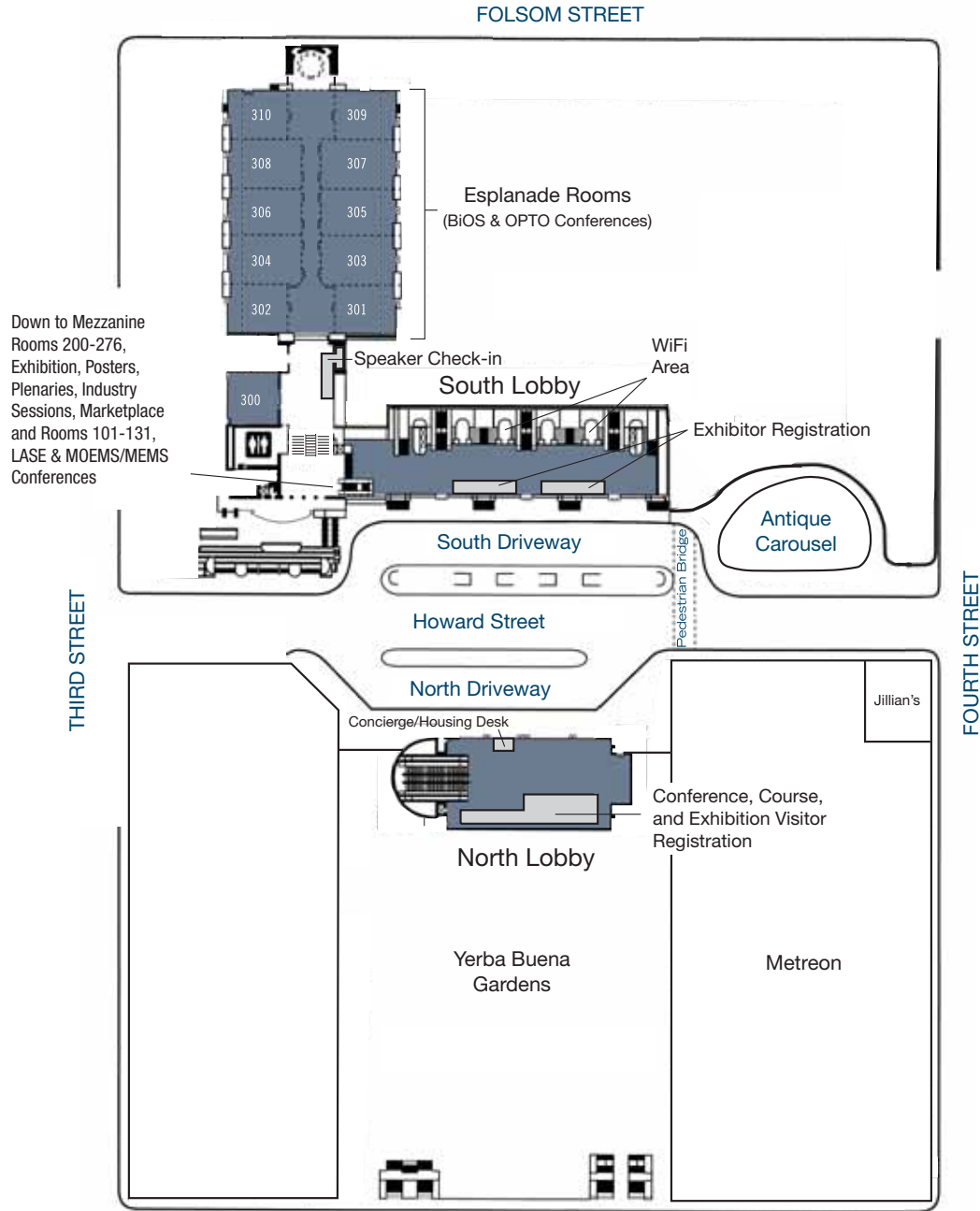
Exhibit Level

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333 O'Farrell Street



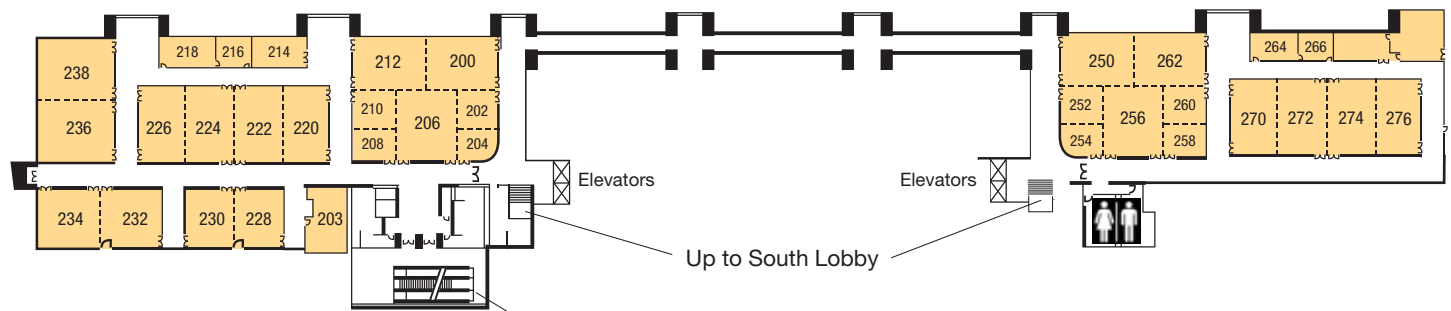
ESPLANADE and LOBBY LEVELS



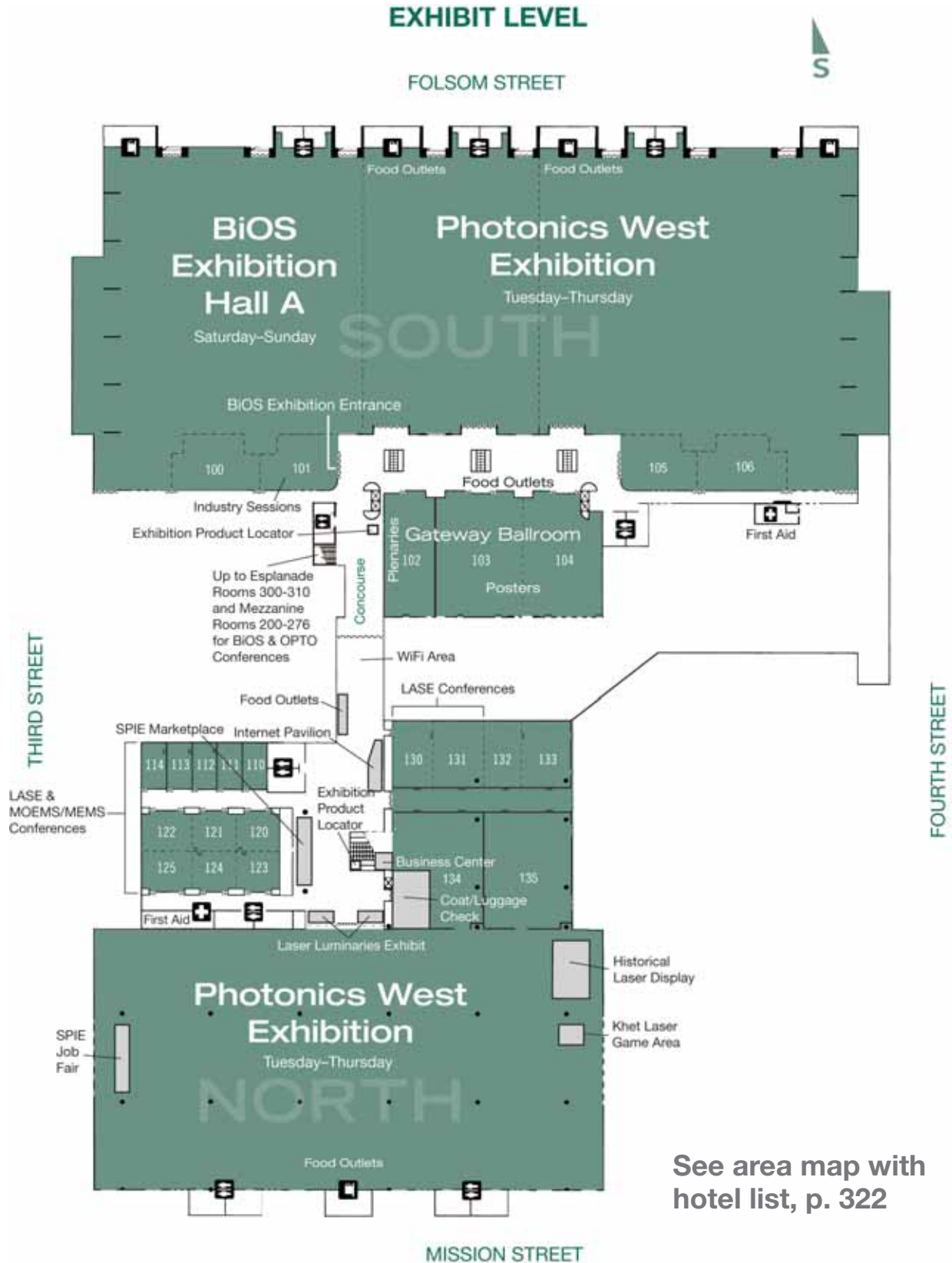
(BIOS & OPTO Conferences)
EAST

MEZZANINE LEVEL

WEST



Down to Exhibition Level and Rooms 102-131 LASE & MOEMS/MEMS Conferences



See area map with hotel list, p. 322

Technical Conferences



Photonic Therapeutics and Diagnostics

Program Chair: **Reza S. Malek, M.D.**, Mayo Clinic (USA)

7548A	Room 310	Photonics in Dermatology and Plastic Surgery (<i>Kollias, Choi, Zeng</i>)	56
7548B	Room 302	Urology: Diagnostics, Therapeutics, Robotics, Minimally Invasive, and Photodynamic Therapy (<i>Malek</i>)	58
7548C	Room 232	Advanced Technology and Instrumentation in Otolaryngology: Lasers, Optics, Radio Frequency, and Related Technology (<i>Wong, Ilgner</i>)	60
7548D	Room 308	Diagnostic and Therapeutic Applications of Light in Cardiology (<i>Gregory, Tearney, Marcu</i>)	63
7548E	Room 226	Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology (<i>Hirschberg, Madsen</i>)	64
7548F	Room 218	Optics in Bone Biology and Diagnostics (<i>Mandelis</i>)	65
7548G	Room 234	Photons and Neurons (<i>Mahadevan- Jansen, Jansen</i>)	66
7549	Room 218	Lasers in Dentistry XVI (<i>Rechmann, Fried</i>)	67
7550	Room 306	Ophthalmic Technologies XX (<i>Manns, Söderberg, Ho</i>)	69
7551	Room 208/210	Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XIX (<i>Kessel</i>)	74
7552	Room 300	Mechanisms for Low-Light Therapy V (<i>Hamblin, Waynant, Anders</i>)	76
7553	Room 309	Frontiers in Pathogen Detection: From Nanosensors to Systems (<i>Fauchet</i>)	78

Clinical Technologies and Systems

Program Chairs: **Tuan Vo-Dinh**, Duke Univ. (USA); **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

7554	Room 303	Coherence Domain Optical Methods and Optical Coherence Tomography in Biomedicine XIV (<i>Izatt, Fujimoto, Tuchin</i>)	80
7555	Room 220	Advanced Biomedical and Clinical Diagnostic Systems VIII (<i>Mahadevan-Jansen, Vo-Dinh, Grundfest</i>)	85
7556	Room 307	Design and Quality for Biomedical Technologies III (<i>Raghavachari, Liang</i>)	88
7557	Room 305	Multimodal Biomedical Imaging V (<i>Azar, Intes</i>)	90
7558	Room 304	Endoscopic Microscopy V (<i>Tearney, Wang</i>)	92
7559	Room 222	Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications X (<i>Gannot</i>)	94
7560	Room 303	Biomedical Vibrational Spectroscopy VI: Advances in Research and Industry (<i>Mahadevan-Jansen, Petrich</i>)	96
7561	Room 307	Optical Biopsy VIII (<i>Alfano</i>)	98

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **William P. Roach**, Air Force Research Lab. (USA)

7562	Room 306	Optical Interactions with Tissue and Cells XXI (<i>Jansen, Thomas</i>)	100
7563	Room 206	Dynamics and Fluctuations in Biomedical Photonics V (<i>Tuchin, Duncan, Larin</i>)	102
7564	Room 305	Photons Plus Ultrasound: Imaging and Sensing 2010 (<i>Oraevsky, Wang</i>)	104
7565	Room 208/210	Biophotonics and Immune Responses V (<i>Chen</i>)	109
7566	Room 234	Optics in Tissue Engineering and Regenerative Medicine IV (<i>Kirkpatrick, Wang</i>)	111
7567	Room 234	Design and Performance Validation of Phantoms used in Conjunction with Optical Measurement of Tissue (<i>Nordstrom</i>)	112
7548G	Room 234	Photons and Neurons (<i>Mahadevan-Jansen, Jansen</i>)	66

Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: **Ammasi Periasamy**, Univ. of Virginia (USA);
Daniel L. Farkas, Cedars-Sinai Medical Ctr. (USA)

7568	Room 200	Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues VIII <i>(Farkas, Nicolau, Leif)</i>	113
7569	Room 308	Multiphoton Microscopy in the Biomedical Sciences X <i>(Periasamy, So)</i>	116
7570	Room 308	Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVII <i>(Conchello, Cogswell, Wilson, Brown)</i>	121
7571	Room 307	Single Molecule Spectroscopy and Imaging III <i>(Enderlein, Gryczynski, Erdmann)</i> . .	123
7572	Room 208/ 210	Optical Diagnostics and Sensing X: Toward Point-of-Care Diagnostics <i>(Coté)</i> . . .	126
7573	Room 301	Biomedical Applications of Light Scattering IV <i>(Wax, Backman)</i>	128
7561	Room 307	Optical Biopsy VIII <i>(Alfano)</i>	98

Nano/Biophotonics

Program Chairs: **Paras Prasad**, SUNY/Buffalo (USA); **Dan V. Nicolau**, The Univ. of Liverpool (UK)

7574	Room 305	Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VII <i>(Cartwright, Nicolau)</i>	131
7575	Room 212	Colloidal Quantum Dots for Biomedical Applications V <i>(Osirski, Parak, Jovin, Yamamoto)</i>	133
7576	Room 300	Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications <i>(Achilefu, Raghavachari)</i>	136
7577	Room 301	Plasmonics in Biology and Medicine VII <i>(Vo-Dinh, Lakowicz)</i>	140

SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.



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Laser Source Engineering

Program Chair: **Gregory J. Quarles**, VLOC (USA)

7578	Room 120	Solid State Lasers XIX: Technology and Devices (<i>Clarkson/Hodgson/Shori</i>)	146
7579	Room 110	Laser Resonators and Beam Control XII (<i>Kudryashov/Paxton/Ilchenko</i>)	151
7580	Room 131	Fiber Lasers VII: Technology, Systems, and Applications (<i>Tankala</i>)	154
7581	Room 121	High Energy/Average Power Lasers and Intense Beam Applications V (<i>Davis/Heaven/Schriempf</i>)	159

Nonlinear Optics

7582	Room 123	Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications IX (<i>Powers</i>)	161
7599	Room 212	Organic Photonic Materials and Devices XII (<i>Nelson/Kajzar/Kaino</i>)	207
7600	Room 250	Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIV (<i>Song/Tsen</i>)	210

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM Opto Semiconductors GmbH (Germany)

7583	Room 130	High-Power Diode Laser Technology and Applications VIII (<i>Zediker</i>)	164
7597	Room 302	Physics and Simulation of Optoelectronic Devices XVIII (<i>Witzigmann/Henneberger/Arakawa/Osin'ski</i>)	200
7602	Room 310	Gallium Nitride Materials and Devices V (<i>Chyi/Nanishi/Morkoç</i>)	215
7615	Room 220	Vertical-Cavity Surface-Emitting Lasers XIV (<i>Guenter/Choquette</i>)	250
7616	Room 206	Novel In-Plane Semiconductor Lasers IX (<i>Belyanin/Smowton</i>)	252
7617	Room 304	LEDs: Materials, Devices, and Applications for Solid State Lighting XIV (<i>Streubel/Jeon</i>)	256

Laser Micro-/Nanoengineering

Program Chairs: **Henry Helvajian**, The Aerospace Corp. (USA); **James S. Horwitz**, U.S. Dept. of Energy (USA)

7584	Room 122	Laser Applications in Microelectronic and Optoelectronic Manufacturing XV (<i>Niino/Meunier/Gu/Hennig</i>)	166
7585	Room 121	Laser-based Micro- and Nanopackaging and Assembly IV (<i>Pfleging/Lu/Washio</i>)	169
7586	Room 110	Synthesis and Photonics of Nanoscale Materials VII (<i>Dubowski/Geohegan/Träger</i>)	171
7590	Room 121	Micromachining and Microfabrication Process Technology XV (<i>Maher/Chiao/Resnick</i>)	183
7591	Room 112	Advanced Fabrication Technologies for Micro/Nano Optics and Photonics III (<i>Schoenfeld/Wang/Loncar/Suleski</i>)	184
7592	Room 111	Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices IX (<i>Kullberg/Ramesham</i>)	186

Laser Applications

7587	Room 112	Free-Space Laser Communication Technologies XXII (<i>Hemmati</i>)	173
7588	Room 123	Atmospheric and Oceanic Propagation of Electromagnetic Waves IV (<i>Korotkova</i>)	175
7589	Sun Rm 300 Mon Rm 124 Tues Rm 122 Wed Rm 130	Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications X (<i>Heisterkamp/Neev/Nolte/Trebino</i>)	177
7613	Room 226	Complex Light and Optical Forces IV (<i>Galvez</i>)	247
7614	Room 232	Laser Refrigeration of Solids III (<i>Epstein/Sheik-Bahae</i>)	249

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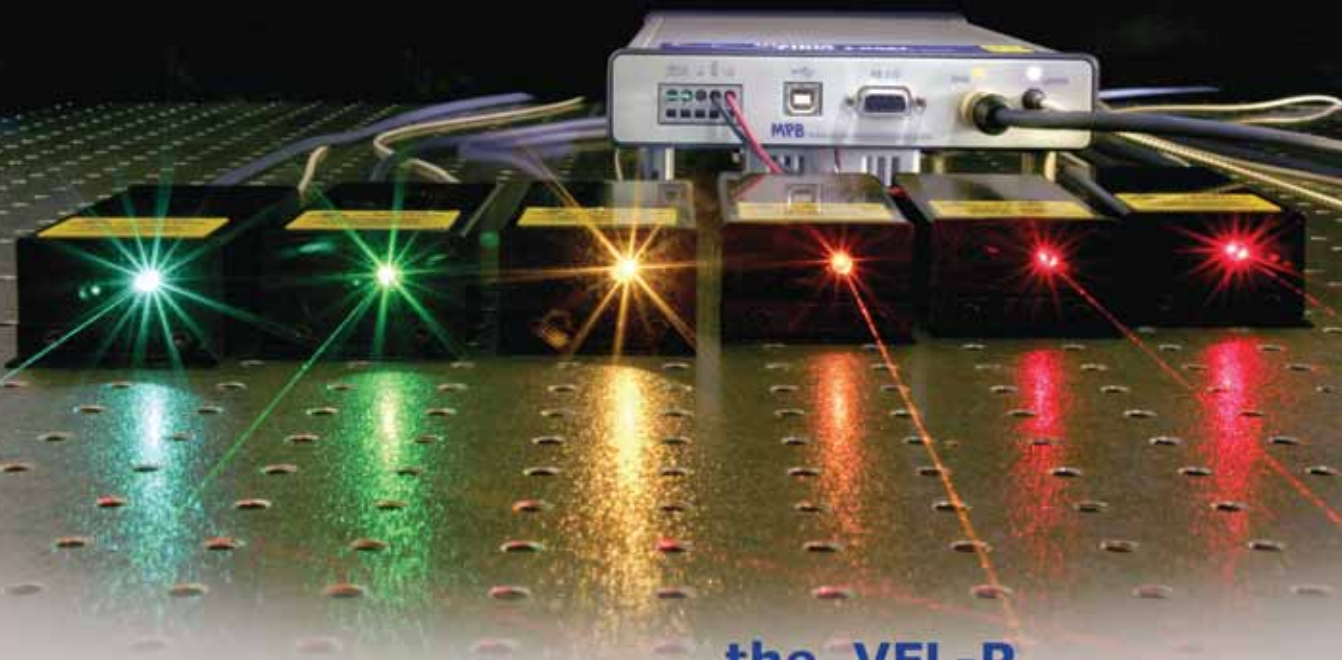


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Micro/Nanofabrication

7590 Room 121 **Micromachining and Microfabrication Process Technology XV** (Maher/Chiao/Resnick) 183

7591 Room 112 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics III** (Schoenfeld/Wang/Loncar/Suleski) 184

7584 Room 122 **Laser Applications in Microelectronic and Optoelectronic Manufacturing XV** (Niino/Meunier/Gu/Hennig) 166

7585 Room 121 **Laser-based Micro- and Nanopackaging and Assembly IV** (Pflieger/Lu/Washio) 169

Devices/Applications/Reliability

7592 Room 111 **Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices IX** (Kullberg/Ramesham) 186

7593 Room 125 **Microfluidics, BioMEMS, and Medical Microsystems VIII** (Becker) 188

7594 Room 124 **MOEMS and Miniaturized Systems IX** (Schenk/Piyawattanametha) 191

7595 Room 111 **MEMS Adaptive Optics IV** (Olivier/Bifano/Kubby) 194

7596 Room 110 **Emerging Digital Micromirror Device Based Systems and Applications II** (Douglass/Hornbeck) 195

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What? When?
Find anything happening at the conference.

Who?
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Who's exhibiting?
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Final Program
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Photonics West maps:

- Moscone Maps pp. 2–5
- Hilton Hotel Map p. 3
- Area Map p. 322



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Optoelectronic Materials and Devices

Program Chair: **James G. Grote**, Air Force Research Lab. (USA)

7597	Room 302	Physics and Simulation of Optoelectronic Devices XVIII (<i>Witzigmann/Henneberger/Arakawa/Osiriński</i>)	200
7598	Room 224	Optical Components and Materials VII (<i>Jiang/Digonnet/Glesener/Dries</i>)	204
7599	Room 212	Organic Photonic Materials and Devices XII (<i>Nelson/Kajzar/Kaino</i>)	207
7600	Room 250	Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIV (<i>Song/Tsen</i>)	210
7601	Room 222	Terahertz Technology and Applications III (<i>Sadwick/O'Sullivan</i>)	214
7602	Room 310	Gallium Nitride Materials and Devices V (<i>Chyi/Nanishi/Morkoç</i>)	215
7603	Room 238	Oxide-based Materials and Devices (<i>Teherani/Look/Litton/Rogers</i>)	219

Photonic Integration

Program Chair: **Yakov Sidorin**, Quarles Brady LLP (USA)

7604	Room 309	Integrated Optics: Devices, Materials, and Technologies XIV (<i>Broquin/Greiner</i>)	222
7605	Room 208/210	Optoelectronic Integrated Circuits XII (<i>Eldada/Lee</i>)	225
7606	Room 226	Silicon Photonics V (<i>Kubby/Reed</i>)	227
7607	Room 222	Optoelectronic Interconnects and Component Integration X (<i>Glebov/Chen</i>)	230

Nanotechnologies in Photonics

Program Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

7608	Room 236	Quantum Sensing and Nanophotonic Devices VII (<i>Razeghi</i>)	233
7609	Room 234	Photonic and Phononic Crystal Materials and Devices IX (<i>Adibi/Lin/Scherer</i>)	238
7610	Room 224	Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling VII (<i>Eyink/Szmulowicz/Huffaker</i>)	241
7591	Room 112	Advanced Fabrication Technologies for Micro/Nano Optics, and Photonics III (<i>Schoenfeld/Wang/ Loncar/Suleski</i>)	184

Advanced Quantum and Optoelectronic Applications

Program Chair: **Zameer U. Hasan**, Temple Univ. (USA)

7611	Room 238	Advances in Photonics of Quantum Computing, Memory, and Communication III (<i>Hasan/Craig/Hemmer/Santori</i>)	243
7612	Room 232	Advances in Slow and Fast Light III (<i>Shahriar/Hemmer</i>)	245

7613	Room 226	Complex Light and Optical Forces IV (<i>Galvez</i>)	247
7614	Room 232	Laser Refrigeration of Solids III (<i>Epstein/Sheik-Bahae</i>)	249
7608	Room 236	Quantum Sensing and Nanophotonic Devices VII (<i>Razeghi</i>)	233
7610	Room 224	Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling VII (<i>Eyink/Szmulowicz/ Huffaker</i>)	241

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM Opto Semiconductors GmbH (Germany)

7615	Room 220	Vertical-Cavity Surface-Emitting Lasers XIV (<i>Guenther/Choquette</i>)	250
7616	Room 206	Novel In-Plane Semiconductor Lasers IX (<i>Belyanin/Smowton</i>)	252
7617	Room 304	Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIV (<i>Streubel/Jeon/Tu</i>)	256
7597	Room 302	Physics and Simulation of Optoelectronic Devices XVIII (<i>Witzigmann/Henneberger/Arakawa/Osiriński</i>)	200
7602	Room 310	Gallium Nitride Materials and Devices V (<i>Chyi/Nanishi/Morkoç</i>)	215
7583	Room 130	High-Power Diode Laser Technology and Applications VIII (<i>Zediker</i>)	164

Displays and Holography

Program Chair: **Liang-Chy Chien**, Kent State Univ. (USA)

7618	Room 202	Emerging Liquid Crystal Technologies V (<i>Chien</i>)	259
7619	Room 202/204	Practical Holography XXIV: Materials and Applications (<i>Bjelkhagen/Kostuk</i>)	262

Optical Communications: Systems and Sub-systems

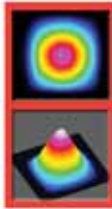
Program Chair: **Benjamin Dingel**, Nasfinc Photonics, Inc. (USA)

7620	Room 232	Broadband Access Communication Technologies IV (<i>Dingel/Jain/Tsukamoto</i>)	264
7621	Room 200	Optical Metro Networks and Short-Haul Systems II (<i>Weiershausen/Dingel/Dutta/ Srivastava</i>)	265
7607	Room 222	Optoelectronic Interconnects and Component Integration X (<i>Glebov/Chen</i>)	230
7587	Room 112	Free-Space Laser Communication Technologies XXII (<i>Hemmati</i>)	173

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Special Events Daily Schedule

Saturday 23 January	Sunday 24 January	Monday 25 January
	<p>SPIE BIOS Exhibition The world's largest biophotonics and biomedical optics show</p> <p>Exhibition Dates and Hours: Saturday 23 January . . . 12:00 pm to 5:00 pm Sunday 24 January. . . . 10:00 am to 5:00 pm</p>	<p>INDUSTRY WORKSHOP: Project Management for Rapid Product Development (<i>Instructor: Hinkle</i>), 8:30 am to 12:30 pm, p. 27</p> <p>PROFESSIONAL DEVELOPMENT WORKSHOP: Effective Technical Presentations (<i>Instructor: Doumont</i>), 8:30 am to 12:30 pm, p. 30</p> <p>MOEMS-MEMS PLENARY SESSION, 9:00 am to 12:00 noon, p.20</p> <ul style="list-style-type: none"> Emerging Research in Microsystems: Opportunities and Challenges in Health-Care and Environmental Sensing Applications (<i>Gianchandani</i>) MEMS Technologies for Artificial Retinas (<i>Mokwa</i>) Shaping Light: MOEMS Deformable Mirrors for Microscopes and Telescopes (<i>Bifano</i>) <p>Ocean Optics Young Investigator Award, Colloidal Quantum Dots for Biomedical Applications V (Conf. 7575), 11:50 am to 12:00 pm, p. 17</p>
<p>BIOS HOT TOPICS, 7:00 to 9:00 pm, p. 16</p> <ul style="list-style-type: none"> Welcome and Introduction (<i>Fujimoto, Anderson</i>) Presentation of Lifetime Achievement Award to Reginald Birngruber Observations on the Past and Future Developments in Biomedical Optics (<i>Birngruber</i>) Hot Topics Moderator (<i>Fantini</i>) Breast Cancer Therapy (<i>Ramanujam</i>) Intravascular OCT Extends Reach to Clinical Practice (<i>Schmitt</i>) Retinal Functional Imaging (<i>Grinvald</i>) Diffuse Molecular Imaging: Detecting Invisible Changes In Vivo (<i>Pogue</i>) Elastic Scattering Spectroscopy (<i>Bigio</i>) Speckle Imaging, Tissue Spectroscopy (<i>Jacques</i>) Differential Multiphoton Microscopy (<i>Squier</i>) Making Light Work in Microscopy (<i>Wilson</i>) 		<p>INDUSTRY WORKSHOP: Semiconductor Optoelectronic Device Fundamentals (<i>Instructor: Linden</i>), 8:30 am to 12:30 pm, p. 26</p> <p>PROFESSIONAL DEVELOPMENT WORKSHOP: Hit-the-Target Laser Activity Workshop (<i>Instructor: Sparks</i>), 8:30 to 11:30 am, p. 30</p> <p>A BIOS Student Networking Event: Lunch with the Experts, 12:30 to 1:30 pm, p. 33</p> <p>Professional Development Speaker Series, 1:30 to 5:00 pm, p. 28</p> <ul style="list-style-type: none"> Peaks and Pitfalls of Professional Communication: Tips from a Technical Entrepreneur (<i>Tongue</i>) Leading a Well-Adjusted Research Group (<i>Armani</i>) Getting Better Results from Your Proposal Writing (<i>Heisterkamp</i>) Scientific Entrepreneurship: So you have a good idea, what's next? (<i>Adebimpe</i>)
<p>Roundtable on Standards for Biophotonics, 5:00 to 6:00 pm, p. 17</p>	<p>Pascal Rol Award Announcement, Ophthalmic Technologies XX (Conf. 7550)—5:45 to 6:00 pm, p. 17</p> <p>PicoQuant Young Investigator Award, Single Molecule Spectroscopy and Imaging III (Conf. 7571) 6:00 to 6:10 pm, p. 17</p>	



SPIE Photonics West Welcome Reception "Cirque du Lasaire"





Hilton Hotel: Grand Ballroom

Monday 25 January. 7:00 to 8:30 pm

Open to All Conference Attendees

All attendees are invited to relax, socialize, and enjoy refreshments. A special celebration of the 50th anniversary of the first working laser will highlight the evening. Please wear your conference registration badges. Dress is casual.



Tuesday	Wednesday	Thursday
26 January	27 January	28 January
	 <h2 style="text-align: center;">SPIE Photonics West Exhibition</h2> <p style="text-align: center;">Walk the floor of the world's hottest photonics marketplace</p> <p style="text-align: center;">Exhibition Dates and Hours: Tuesday 26 January 10:00 am to 5:00 pm Wednesday 27 January . . . 10:00 am to 5:00 pm Thursday 28 January 10:00 am to 4:00 pm</p>	
<p>OPTO PLENARY SESSION, 8:30 to 10:00 am, p. 22</p> <ul style="list-style-type: none"> GaN-based Nonpolar/Semipolar LEDs, Laser diodes and Bulk Crystal Growth (<i>Nakamura</i>) Solid-State Lighting: Science, Technology and Economic Perspectives (<i>Tsao</i>) 	<p>Best Student Paper Competition and Ceremony, Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications X (Conf. 7589) Competition, 8:00 to 9:00 am Award Ceremony, 10:00 to 10:20 am, p. 19</p>	<p>INDUSTRY EVENT: Product Tutorial: Crosslight Software Tutorial on Optoelectronic Device Simulation, 8:30 am to 12:30 pm, p. 25</p>
<p>INDUSTRY WORKSHOP: Valuation of Closely Held Technology Companies, Product Lines and Intellectual Property (<i>Instructor: Smith</i>), 8:30 am to 12:30 pm, p. 27</p>	<p>INDUSTRY WORKSHOP: Basic Laser Technology (<i>Instructor: Sukuta</i>), 8:30 am to 12:30 pm, p. 26</p>	<p>Birth of an Industry: 50 Years of Lasers, Jeff Hecht, Contributing Editor, <i>Laser Focus World</i>, 9:15 to 9:45 am, p. 25</p>
<p>A Student Networking Event: Lunch with the Experts, 12:30 to 1:30 pm, p. 33</p>	<p>LASE PLENARY SESSION, 10:20 am to 12:30 pm, p.18</p> <ul style="list-style-type: none"> Announcement of the LASE Best Student Paper Prize Winners Attosecond-Angstrom Science (<i>Corkum</i>) Ultrafast Fiber Laser Technology: Status and Prospects (<i>Tünnermann</i>) Challenges and Prospects of Ultrafast Lasers in Ophthalmology (<i>Lubatschowski</i>) 	<p>Best Oral Student Paper Competition, Fiber Lasers VI: Technology, Systems, and Applications (Conf. 7580) Award Ceremony, 5:40 to 6:00 pm, p. 19</p>
<p>INDUSTRY WORKSHOP: Pursuing Patents in a Changing World (<i>Instructor: Honeyman</i>), 1:30 to 5:30 pm, p. 27</p>	<p>INDUSTRY WORKSHOP: Complying with the ITAR: A Case Study (<i>Instructor: Scarlott, Moss</i>), 1:30 to 5:30 pm, p. 27</p>	
<p>INDUSTRY EVENT: Silicon Photonics and Optical Interconnects (<i>Moderator: Hallett</i>), 2:00 to 3:00 pm, p. 24</p>	<p>World Khet Tournament, 2:30 to 5:00 pm, p. 34</p>	
<p>PANEL DISCUSSION: Getting Hired in 2010 and Beyond, 3:00 to 4:00 pm, p. 30</p>	<p>INDUSTRY EVENT: Executive Perspectives on the World of Optics and Photonics (<i>Moderator: Hausken</i>), 2:00 to 3:00 pm, p. 25</p>	
<p>INDUSTRY EVENT: Hot Markets in Photonics: Solar, 3:30 to 4:30 pm, p. 24</p>	<p>INDUSTRY EVENT: The Making of an Industry: 50 Years of the Laser and Beyond (<i>Moderator: Brown</i>), 3:30 to 4:30 pm, p. 25</p>	
<p>Fairway Medical Technologies Best Paper Award, Photons Plus Ultrasound: Imaging and Sensing 2010 (Conf. 7564) 5:25 to 5:55 pm, p. 17</p>	<p>OPTO Interactive Poster Session, 6:00 to 7:30 pm, p. 23</p>	
<p>LASE Interactive Poster Session, 6:00 to 7:30 pm, p. 19</p>	<p>Prism Awards Ceremony and Banquet, 6:30 to 10:30 pm, p. 34</p>	
<p>MOEMS-MEMS Interactive Poster Session, 6:00 to 7:30 pm, p. 21</p>	<p>Student Event: "No Ties" Student Social, 8:00 to 9:30 pm, p. 34</p>	
<p>TECHNICAL EVENT: Workshop on The Nature of Light: What Are Photons? (<i>Roychoudhuri, Prasad</i>), 7:30 to 9:30 pm, p. 23</p>		
<p>TECHNICAL EVENT: Laser Communications (<i>Hemmati, Korotkova</i>), 7:30 to 9:00 pm, p. 19</p>		
<p>IBOS—International Biomedical Optics Society (<i>Barton, Wang</i>), 7:30 to 9:00 pm, p. 17</p>		
<p>TECHNICAL EVENT: Holography (<i>Bjelkhagen</i>), 7:30 to 9:00 pm, p. 23</p>		
<p>SPIE Member Reception, 8:00 to 9:30 pm, p. 34</p>		
<p>PANEL DISCUSSION: Progress and Prospects in Microfluidics, 8:00 to 10:00 pm, p. 21</p>		
	<h2 style="text-align: center;">SPIE Job Fair</h2> <p style="text-align: center;">Top employers are coming together to interview and hire candidates at Photonics West</p> <p style="text-align: center;">North Exhibition Hall, see page 32 Tuesday 26 January 10:00 am to 5:00 pm Wednesday 27 January 10:00 am to 5:00 pm</p>	<div style="border: 1px solid red; padding: 10px;"> <p style="text-align: center;">SPIE Exclusive Happy Hour Urban Tavern Bar & Hilton Lobby Bar 5:00 pm to 12:00 am Daily <i>Beer and wine specials including SPIE Laser Martini</i></p> <div style="text-align: center; background-color: black; color: white; padding: 5px; font-weight: bold;"> urban tavern </div> <p style="text-align: center;"><i>Hilton San Francisco Union Square 333 O'Farrell Street</i></p> </div>

Open to all paid
conference attendees



HOT TOPICS

Saturday 23 January | 7:00 to 9:00 pm | Room 102 (Exhibit Level)

7:00 to 7:05 pm
Welcome and Introduction



James Fujimoto
Massachusetts Institute of Technology (USA)
BIOS 2010 Symposium Chair

R. Rox Anderson
Wellman Ctr. for Photomedicine, Massachusetts General Hospital and Harvard School of Medicine (USA)
BIOS 2010 Symposium Chair



7:05 to 7:10 pm
PRESENTATION OF LIFETIME ACHIEVEMENT AWARD TO:

Reginald Birngruber
Medizinisches Laserzentrum Lübeck GmbH (Germany)



7:10 to 7:30 pm
Observations on the Past and Future Developments in Biomedical Optics

Reginald Birngruber
Medizinisches Laserzentrum Lübeck GmbH (Germany)

7:30 to 7:35 pm
Hot Topics Moderator



Sergio Fantini
Tufts Univ. (USA)

7:35 to 7:45 pm
Breast Cancer Therapy



Nirmala Ramanujam
Duke Univ. (USA)

7:45 to 7:55 pm
Intravascular OCT Extends Reach to Clinical Practice



Joseph Schmitt
LightLabs Imaging (USA)

7:55 to 8:05 pm
Retinal Functional Imaging



Amiram Grinvald
Optical Imaging Inc. (Israel)

8:05 to 8:15 pm
Diffuse Molecular Imaging: Detecting Invisible Changes In Vivo



Brian Pogue
Dartmouth Univ. (USA)

8:15 to 8:25 pm
Elastic Scattering Spectroscopy



Irving Bigio
Boston Univ. (USA)

8:25 to 8:35 pm
Speckle Imaging, Tissue Spectroscopy



Steven Jacques
Oregon Health and Science Univ. (USA)

8:35 to 8:45 pm
Differential Multiphoton Microscopy



Jeff Squier
Colorado School of Mines (USA)

8:45 to 8:55 pm
Making Light Work in Microscopy



Tony Wilson
Univ. of Oxford (United Kingdom)

Roundtable on Standards for Biophotonics

Room 112 (Exhibit Level)

Saturday 23 January 2009 . . . 5:00 to 6:00 pm

The next step in bringing Biophotonics into widespread clinical practice is to present a unified front to the clinical community, in which a standard set of nomenclature, dosimetry, calibration and performance evaluations are established for the variety of optical methods and techniques which our field is developing. Such standardization was a key step for the movement of radiation therapy into widespread clinical practice. Our community needs to discuss this next move.

Therefore, a ROUNDTABLE DISCUSSION will be held at Photonics West 2010 on the topic. You are encouraged to attend and participate in the discussion.

To kick off the Roundtable, 3 short perspectives (7 min each) will be presented by:

- **Brian Wilson**, Univ. of Toronto
- **Gary Tearney**, Massachusetts General Hospital, Harvard Medical School
- **Steven Jacques**, Oregon Health and Science University

The Roundtable will involve the audience in discussing the topic.

Please attend. This effort needs your input.

Pascal Rol Award Announcement

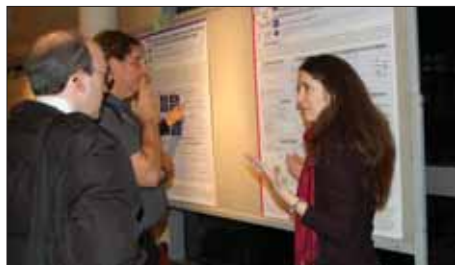
Ophthalmic Technologies XX
(Conf. 7550)

Room 306 (Esplanade)

Sunday 24 January 5:45 to 6:00 pm

The Pascal Rol Award will be given to the Best Paper in Ophthalmic Technologies.

Award Sponsor  **TOPCON**
Topcon Advanced Biomedical Imaging Laboratory, through the Pascal Rol Foundation



PicoQuant Young Investigator Award

Single Molecule Spectroscopy and Imaging III (Conf. 7571)

Room 307 (Esplanade)

Sunday 24 January 6:00 to 6:10 pm

We are pleased to announce that a prize in the amount of \$750.00 US will be awarded to the best oral presentation by a presenter under the age of 35 within conference 7571: Single Molecule Spectroscopy and Imaging III, at SPIE's Photonics West BiOS Symposium taking place in January in San Francisco, California. The prize money has been donated by PicoQuant GmbH Berlin, Germany. To be considered for this award, manuscripts of self-nominating authors must be received by the manuscript due date of 14 December 2008. Nominations must be submitted by email to Rainer Erdmann (erdmann@pq.fta-berlin.de).

Prize donated by



Ocean Optics Young Investigator Award

Colloidal Quantum Dots for Biomedical Applications V
(Conf. 7575)

Room 212 (Mezzanine)

Monday 25 January. 11:50 am to 12:00 pm

Ocean Optics Young Investigator Award will be given for the best paper presented by a leading author who is either a graduate student or has graduated within five years of the paper submission date. The award consists of a \$1,000 cash prize to the Young Investigator and \$1,000 Ocean Optics equipment credit to the laboratory where the work was performed.

Award sponsored by



BiOS Interactive Poster Session

Room 103/104 (Exhibit Level)

Monday 26 January. 5:30 to 7:00 pm

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, see p. 319 for set-up instructions.

Fairway Medical Technologies Best Paper Award

Photons Plus Ultrasound: Imaging and Sensing 2010
(Conf. 7564)

Room 305 (Esplanade)

Tuesday 26 January 5:25 pm to 5:55 pm

The Best Paper Award and Best Poster Award for conference 7564: Photons Plus Ultrasound: Imaging and Sensing 2010 will be announced by Alexander Oraevsky, Fairway Medical Technologies, Inc. and Lihong V. Wang, Washington Univ. in St. Louis.

Award sponsored by 

IBOS—International Biomedical Optics Society

Hilton Hotel, Golden Gate 3

Tuesday 26 January 7:30 to 9:00 pm

Chairs: Jennifer K. Barton, The Univ. of Arizona (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA)

Biomedical optics is a major growth area in modern medicine. The International Biomedical Optics Society is a nonprofit interdisciplinary group that provides a unique channel for communications among physicians and clinicians employing optics in medicine and the scientists and engineers who provide foundations for advancements in this field. The BiOS symposium, where IBOS meets, is the premier annual international forum for discussions and announcements of technical/clinical and educational/pedagogical developments in the use of lasers, optical fibers, spectroscopic diagnostic techniques, and related areas of optical medicine.

The 2010 IBOS meeting will feature a tutorial by renowned expert Tuan Vo-Dinh, Duke Univ. (USA), speaking on "Biosensors and Nanoprobes for Medical Diagnostics"

All registered conference participants are encouraged to attend this evening session. Attendees are requested to wear their conference badges.

LASE Plenary Session

Wednesday 27 January | 10:20 am to 12:30 pm | Room 102 (Exhibit Level)

10:20 to 10:30 am

Announcement of the LASE Best Student Paper Prize Winners

10:30 to 11:10 am

Attosecond-Angstrom Science



Paul B. Corkum

Univ. of Ottawa (Canada) and
Lab. for Attosecond Science,
National Research Council
Canada (Canada)

Abstract: During the past six years the minimum duration of optical (XUV) pulses has fallen from 5 femtoseconds (5×10^{-15} sec) to less than 100 attoseconds - less than the classical period of a ground-state electron in a hydrogen atom. Lasers drove this revolution by forcing electron wave packets to tunnel from the atom or molecules, move under the force of the time dependent electric field and then re-collide with their parent ions. From the ion's perspective, an attosecond electron wave packet (wavelength $\sim 0.5\text{-}3$ Ångstrom) re-collides. Attosecond XUV pulses and the ability to measure Angstrom-scale spatial information are both by-products of this collision.

Dr. Corkum is Canada Research Chair in Attosecond Photonics at the University of Ottawa and Director of Attosecond Science at NRC. He is a member of the National Academy of Sciences and the Royal Societies of London. His awards include the Optical Society's Charles H. Townes award the IEEE's Quantum electronics award, the American Physical Society's Schawlow prize and the American Chemical Society's Ahmed Zewail award.

11:10 to 11:50 am

Ultrafast Fiber Laser Technology: Status and Prospects



Andreas Tünnermann

Friedrich-Schiller-Univ. Jena
(Germany) and Fraunhofer
Institute for Applied Optics and
Precision Engineering (Germany)

Abstract: Solid-state lasers are attractive sources of coherent radiation for various scientific and industrial applications, leading to a substantial growth in photonics industry in the past years. At present a new generation of laser systems - fiber lasers and amplifiers - with advanced parameters have begun to dominate the market. Using novel fiber designs, output powers exceeding the kW level at diffraction limited beam quality have been demonstrated for these systems even in ultrashort pulse operation. According to these unique properties fiber lasers offer the potential to revolutionise laser-based manufacturing technology. In this contribution, novel developments in ultrafast fiber laser technology and their application in production technology are reviewed.

Andreas Tünnermann received the diploma and Ph.D. degrees in physics from the University of Hannover in 1988 and 1992, respectively. In the beginning of 1998 he joined the Friedrich-Schiller-University in Jena, Germany as a Professor and Director of the Institute of Applied Physics. In 2003 he became the Director of the Fraunhofer Institute of Applied Optics and Precision Engineering. His main research interests include scientific and technical aspects associated with the tailoring of light. In particular, his early developments on high power diode pumped solid state lasers and fiber lasers are widely recognized. This work has become already strong impact on novel developments in laser technology and has found applications in basic science, life science and production. He is also known for his pioneering work in utilizing high power femtosecond lasers for materials processing. In collaboration with his coworkers he demonstrated new prospects for a precise microstructure technology.

11:50 am to 12:30 pm

Challenges and Prospects of Ultrafast Lasers in Ophthalmology



Holger Lubatschowski

Laser Zentrum Hannover e.V.
(Germany)

Abstract: Ultrashort laser pulses have become a promising tool for ophthalmic applications. Due to the low energy threshold for optical breakdown, their thermal and mechanical side effects are limited to the micrometer or even sub micrometer range. Moreover, the non linear interaction process offers the opportunity to cut transparent tissue not only on top of a surface but three dimensionally inside the eye. Femtosecond lasers are already established in refractive eye surgery, where they create flaps into the corneal tissue and remodel the curvature of the eye to improve visual acuity. Moreover, ultrashort pulses could be used to influence the biomechanics of the crystalline lens of the eye and improve accommodation on eyes who suffer from presbyopia. Furthermore in cataract, glaucoma and retinal diseases, ultrashort pulses have the potential for new and promising fields of application.

Prof. Dr. Holger Lubatschowski has studied physics at the University of Bonn. After his PhD he moved to Hannover and became Head of Medical Laser Group at the Laser Zentrum Hannover (LZH). In 2001 he made his Habilitation for Physics at the Physics Faculty of the University of Hanover. Holger Lubatschowski is now heading the Biomedical Optics Department at the LZH and, since 2003 he is the CEO of Rowiak GmbH, a spin-off company of the LZH which develops ultrafast laser systems for applications in life sciences.

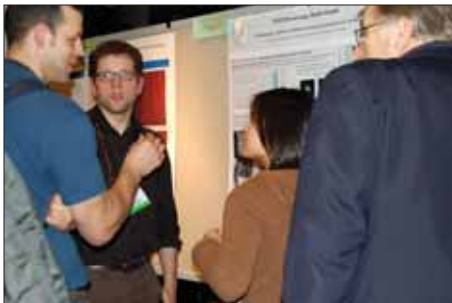
SPIE is a Founding Partner
and Sponsor of LaserFest.

laserfest.org



Advancing the Laser—
an SPIE tribute

spie.org/advancingthelaser



LASE Interactive Poster Session

Room 103/104 (Exhibit Level)

Tuesday 26 January 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, see p. 319 for set-up instructions.

TECHNICAL EVENT

Laser Communications

Hilton Hotel, Golden Gate 2

Tuesday 26 January 7:30 to 9:00 pm

Session Chairs: **Hamid Hemmati**, Jet Propulsion Lab. (United States), **Olga Korotkova**, Univ. of Miami (United States)

This technical event on Laser Communications will hold its annual meeting in conjunction with the Free-Space Laser Communication Technologies XXII and Atmospheric and Oceanic Propagation of Electromagnetic Waves IV conferences. All professionals involved in theory and applications of free-space, atmospheric and oceanic laser communications, remote sensing and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.

Best Student Paper Competition

Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications X (Conf. 7589)

Wednesday 27 January
Room 130 (Exhibit Level)

COMPETITION 8:00 to 9:00 am
AWARD CEREMONY 10:00 to 10:20 am

For conference 7589: Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications X, we are pleased to announce that a cash prize of \$1,000 US will be awarded to the best student presentation in the conference (both poster and oral papers considered).

Papers submitted by graduate and undergraduate students are eligible. In order to ensure a fair evaluation, the conference chairs and the program committee will judge the students during a special student competition session held during the conference. Here the students present a brief 5 minute summary of their original talk or poster presented at the conference. The winner and runner-up will be announced and awarded a cash prize during the Student Competition Award Ceremony.

Award Sponsors:



LASE Best Student Paper Prize

Wednesday 27 January 10:20 to 10:30 am

Room 102 (Exhibit Level)

SPIE will present awards to the best three student papers on the science and application of lasers at the SPIE Photonics West LASE plenary.

See video abstracts from the semi-finalists in the North Exhibition Hall.

Best Oral Student Paper Competition

Fiber Lasers VI: Technology, Systems, and Applications (Conf. 7580)

AWARD CEREMONY

Room 131 (Exhibit Level)

Thursday 28 January 5:40 to 6:00 pm

For conference 7580: Fiber Lasers VII: Technology, Systems, and Applications, we are pleased to announce that a prize in the amount of \$1,000 US will be awarded to the best student oral presentation in the conference. The award money has been donated by Fianium Ltd. The award will be presented by a representative from Fianium Ltd.

Qualifying student presentations will be evaluated by a conference steering committee, led by the 2009 student prize winner, Oliver Schmidt. Student presentations will be judged based on scientific merit, impact, and clarity of the presentation (not the manuscript). While the award is not judged by the manuscript, a manuscript must be submitted.

The winner of the Best Student Presentation Award will be announced during the Student Award Ceremony on Thursday afternoon.

Award Sponsor:  **Fianium**
ultrafast fiber lasers

MOEMS-MEMS Plenary Session

Monday 25 January | 9:00 am to 12:00 pm | Room 102 (Exhibit Level)

9:00 to 9:10 am

Welcome and Opening Remarks



Thomas J. Suleski
Univ. of North Carolina at
Charlotte (USA)



Harald Schenk
Fraunhofer Institute for Photonic
Microsystems (Germany)

9:10 to 10:00 am

Emerging Research in Microsystems: Opportunities and Challenges in Health-Care and Environmental Sensing Applications



Yogesh B. Gianchandani
Univ. of Michigan (USA) and
National Science Foundation
(USA)

Abstract: This presentation will review selected efforts in microsystems research directed at health-care and environmental sensing applications, and explore the opportunities and challenges that lie ahead. In the health-care arena, the effort to create lab-on-a-chip analytical microsystems has driven research in actuation schemes for liquid-phase and cellular samples, as well as scaling of biochemical assays; optical detection schemes are commonly utilized. Another major health-care thrust has been directed at implantable microsystems such as for neural, retinal, and cochlear prostheses, and smart stents. These applications drive research in sensing, stimulation, signal conditioning, and communication methods, microsystems packaging, and power management. Environmental sensing applications have also been the focus of significant effort in the microsystems research community. There has been an impetus to miniaturize gas chromatography and its related components—separation columns, pumps, valves, and detectors. Sensors for pressure and other physical environmental variables are being explored, particularly for harsh environments such as those encountered in petroleum reservoirs. Microsystems for detecting radiation and air-borne pathogens are also active topics, with obvious applications in homeland security. Taken together, the challenges posed by health-

care and environmental sensing applications, which present both high risk and high rewards for microsystems research, and will shape this field for decades to come.

Yogesh B. Gianchandani is a Professor in the EECS Department at the University of Michigan, Ann Arbor, and is affiliated with the Center for Wireless Integrated Microsystems. He is temporarily serving at the National Science Foundation, as a program director within the Electrical, Communication, and Cyber Systems Division (ECCS). More information is available at <http://www.eecs.umich.edu/~yogesh/>

Coffee Break 10:00 to 10:20 am

10:20 to 11:10 am

MEMS Technologies for Artificial Retinas



Wilfried Mokwa
RWTH Aachen Univ. (Germany)

Abstract: The mostly cause of blindness in the developed countries is a degeneration of the retina. For restoring this loss of vision besides pure biological approaches a pure technical one based on MEMS technologies, the substitution of the lost functions by means of an electronic implant, seems to be possible. It has been shown that electrical stimulation of retinal ganglion cells yield visual sensations. This leads to two main technological concepts. In the subretinal approach the degenerated photoreceptors are replaced by a stimulation electrode array. In the epiretinal approach a stimulation electrode array is placed on the inner retina to stimulate the ganglion cells. This talk will concentrate on these two approaches.

Prof. Wilfried Mokwa

- 1977- Dipl.-Phys. degree in physics from RWTH Aachen University, Germany
- 1981- Dr. rer. nat. degree from the RWTH.
- 1981- 1985 Research scientist at the physics department
- 1985- 1996 Group-leader at the Fraunhofer IMS, Duisburg, Germany.
- 1996- until now full professor at the RWTH Aachen University and director of chair 1 of the Institute of Materials in Electrical Engineering (IWE-1).

More than 240 contributions to conference proceedings, scientific papers or books. More than 70 invited talks.

11:10 am to 12:00 pm

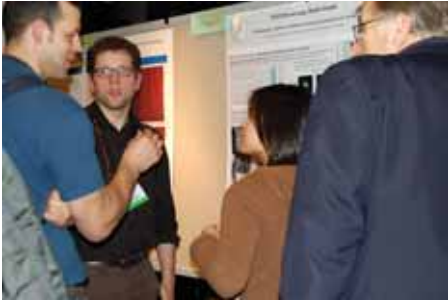
Shaping Light: MOEMS Deformable Mirrors for Microscopes and Telescopes



Thomas Bifano
Boston Univ. Photonics Ctr.
(USA) and Boston Micromachines Corp. (USA)

Abstract: Micromachined deformable mirrors (DMs) have enabled rapid advances in applications ranging from large telescope astronomy and free space laser communication to biological microscopy and retinal imaging over the past decade. In this talk I describe our efforts at Boston University and at Boston Micromachines Corporation to design, fabricate, and control MOEMS DMs for adaptive optics (AO) applications. Integration of the DMs in AO systems is described, along with results demonstrating unprecedented advances in resolution and contrast in microscopes and telescopes challenged by unavoidable wavefront aberrations. MEMS-DM research offers the rare opportunity to introduce technology that is both more economical and more capable than the state-of-the-art.

Dr. Thomas Bifano directs Boston University's Photonics Center, where he leads programs for photonics education, research, and prototype development. He is a professor of mechanical engineering at BU, and co-founder/CTO of Boston Micromachines Corporation. He earned B.S. and M.S. degrees at Duke University, and a Ph.D. at NC State University.



MOEMS-MEMS Interactive Poster Session

Room 103/104 (Exhibit Level)

Tuesday 26 January 6:00 to 7:30 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, see p. 319 for set-up instructions.

PANEL DISCUSSION

Progress and Prospects in Microfluidics

Hilton Hotel, Golden Gate 7

Tuesday 26 January 8:00 to 10:00 pm

Moderator: **Holger Becker**, microfluidic
ChipShop GmbH (Germany)

Panelists to be announced.

In the past decade, Microfluidics has rapidly emerged and become main stream in many areas of the Life Sciences. Some of the microfluidic products have becoming commercially available with many more to come in the near future. Most microfluidic devices today are made of glass and polymer materials. The main reason for this trend is that the biomedical researchers and analytical chemists have been using these materials for many years and accumulated enough know-how and knowledge. As a matter of fact, this rapid development of microfluidics has been driven by compelling applications in analytical chemistry and biomedical sciences, with enormous potential in developing new technologies and reducing costs. While these market potentials have become generally accepted, the commercial uptake of microfluidics however has been much slower than anticipated in previous years. The panel discussion will try to shed some light onto this somewhat inconsistent situation and will focus on identifying obstacles on the way to commercializing microfluidic devices, highlight successful examples and case-studies and will identify most likely areas for applications of microfluidics.

Light refreshments included.

Plan to Attend

- Micro/Nano Technologies
- Disruptive Organic and Bio Photonics
- Highly Integrated and Functional Photonic Components
- Advances in Laser and Amplifier Technologies
- Photonics in Industrial Applications

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OPTO Plenary Session

Tuesday 26 January | 8:30 to 10:00 am | Room 102 (Exhibit Level)

8:30 to 8:40 am

Introduction and Opening Remarks



E. Fred Schubert
Rensselaer Polytechnic Institute
(USA)

8:40 to 9:20 am

GaN-based Nonpolar/ Semipolar LEDs, Laser Diodes and Bulk Crystal Growth



Shuji Nakamura
Univ. of California,
Santa Barbara (USA)

Abstract: Charge separation due to spontaneous and piezoelectric polarization inherent to the wurtzite structure has deleterious effects on the performance of most c-axis oriented devices. To overcome this problem, nonpolar GaN, such as a-plane and m-plane GaN or semipolar GaN substrates have been developed. We reported the fabrication of first violet InGaN/GaN Light Emitting Diodes (LEDs) on the nonpolar m-plane GaN bulk substrates. The first nonpolar m-plane nitride laser diodes (LDs) were realized on low extended defect bulk m-plane GaN substrates. Also, we fabricated high-efficient violet, blue, green and yellow LEDs, and violet laser diodes on semipolar GaN bulk substrates. In order to make a real GaN bulk crystal, we have developed the ammonothermal method. The recent performance of nonpolar, semipolar and polar (c-plane) GaN-based devices, and bulk GaN growth are described.

Shuji Nakamura obtained B.E., M.S., and Ph.D. degrees in Electrical Engineering from the University of Tokushima, Japan in 1977, 1979, and 1994, respectively. He joined Nichia Chemical Industries Ltd in 1979. In 1989 he started the research of blue LEDs using group-III nitride materials. In 1993 and 1995 he developed the first group-III nitride-based blue/green LEDs. He also developed the first group-III nitride-based violet laser diodes (LDs) in 1995. He has received a number of awards, including: the Nishina Memorial Award (1996), MRS Medal Award (1997), IEEE Jack A. Morton Award, the British Rank Prize (1998) and Benjamin Franklin Medal Award (2002). He received the Millennium Technology Prize in 2006. Since 2000, he is a professor of Materials Department of University of California Santa Barbara.

9:20 to 10:00 am

Solid-State Lighting: Science, Technology and Economic Perspectives



Jeffrey Y. Tsao
Sandia National Labs. (USA)

Abstract: Throughout its history, lighting technology has made tremendous progress: the efficiency with which power is converted into usable light has increased 2.8 orders of magnitude over three centuries. This progress has, in turn, fueled large increases in the consumption of light and productivity of human society. In this talk, we review an emerging new technology, solid-state lighting: the underlying advances in physics and materials that have enabled its current performance; its frontier performance potential; the energy consumption and human productivity benefits associated with achieving this performance potential; and scientific challenges that lie enroute.

Jeffrey Y. Tsao is a Principal Member of Technical Staff at Sandia National Laboratories, where he studies the integrated science, technology and economics of energy technologies. Jeff has co-authored over 150 publications, is author of the monograph "Materials Fundamentals of Molecular Beam Epitaxy," and is Fellow of the APS and the AAAS.

TECHNICAL EVENT

Holography

Hilton Hotel, Golden Gate 1

Tuesday 26 January 7:30 to 9:00 pm

Chair: **Hans I. Bjelkhagen**,
Centre for Modern Optics, OpTIC (United Kingdom)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNDT), computer-generated holography (CGH), electro- and digital holography, holographic microscopy, and holographic data storage (HDS). This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

TECHNICAL EVENT

**Workshop on The Nature of Light:
What Are Photons?**

Hilton Hotel, Golden Gate 4

Tuesday 26 January 7:30 to 9:30 pm

Chair: **Narasimha S. Prasad**, NASA Langley Research Ctr. (USA)

Workshop Facilitator: **Chandrasekhar Roychoudhuri**, Univ. of Connecticut (USA)

SPIE has been holding a very successful conference series [Vol. 5866 (2005), 6664 (2007) and 7421 (2009)] at SPIE Optics+Photonics, San Diego to promote a deeper understanding of the nature of light that can enhance the new innovation potential in all branches of optical physics. This conference series has also led to the publication of a book, "The nature of light: What is a photon?" by CRC (2008). This workshop will explain the NIW principle of physics - Non-Interference of Waves. This NIW principle, in reality, is already hidden in the Huygens-Fresnel principle since the complex amplitudes of the original secondary wavelets can be summed at any forward-plane disregarding the energy distribution in any of the preceding planes. The NIW principle is also hidden behind the quantum mechanical assumption that photons are non-interacting Bosons. A careful analysis of the light-matter physical interaction processes behind the manifestation of the superposition effects (measurable fringes as physical transformation in detecting molecules) helps us resolve the three hundred year old wave-particle (or, wave-corpuscule) duality. Applications of this NIW principle will be illustrated using basic classical phenomena like Interference, Diffraction, Spectrometry, Coherence, Material Dispersion, Polarization, etc., by propagating the carrier frequency of a pulse, instead of the Fourier monochromatic frequencies, which are non-causal as per the principle of conservation of energy. Appreciation of the NIW principle will open up paths to many new inventions in optical physics. Attendees to this workshop are encouraged to participate actively in discussions.

OPTO Interactive Poster Session

Room 103/104 (Exhibit Level)

Wednesday 27 January 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, see p. 319 for set-up instructions.

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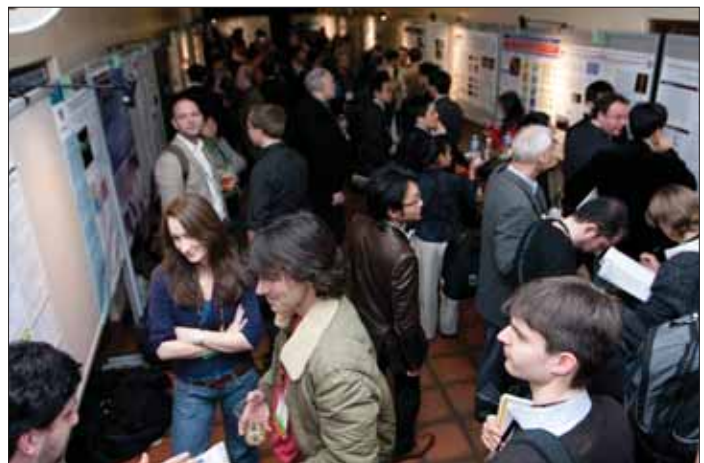
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Photonics West maps:

Moscone Maps	pp. 2-5
Hilton Hotel Map	p. 3
Area Map	p. 322



Industry Events



Don't miss these **FREE SESSIONS.** Hear from industry leaders on some of the biggest challenges and most promising areas of the optics and photonics marketplace. Understand market trends and lessons learned.

Silicon Photonics and Optical Interconnects

Room 101 (Exhibit Level)

Tuesday 26 January 2:00 to 3:00 pm

Panel Moderator: **Peter Hallett**, SPIE

Panel Members:

HEWLETT-PACKARD LABS.

Ray Beausoleil, HP Fellow

IBM ZÜRICH RESEARCH LAB.

Bert-Jan Offrein, Science and Technology Group

SUN CORP.

Ashok Krishnamoorthy, Distinguished Engineer

LUXTERA

Marek Tlalka, Vice President of Marketing

ONECHIP PHOTONICS

Andy Weirich, Vice President of Product Line Management

Demand for smaller and cheaper optical interconnections inside computers is a main driver for silicon photonics, which will create a new market of miniaturized, low-cost photonic components that can leverage the scale of CMOS manufacturing. Learn what industry leaders have discovered at the frontier of silicon photonics and hear how this will revolutionize industries from computing and communication, to biomedicine and imaging.

Hot Markets in Photonics: Solar

Room 101 (Exhibit Level)

Tuesday 26 January 3:30 to 4:30 pm

Industry Speakers:

NAVIGANT CONSULTING

Paula Mints, Associate Director, Energy Practice

CLEAN TECHNOLOGY and SUSTAINABLE INDUSTRIES ORGANIZATION
Patricia Glaza, Executive Director/CEO

Even with severe market challenges in 2009, new solar energy technology and market development are unstoppable. For makers of lasers, optical coatings, thin-film materials and metrology equipment, this represents opportunity. From core optical engineering to nanotechnology, materials science to funding and economic policy, there is always more to learn and game-changing developments are happening every month. These speakers bring a forward-looking understanding of market and technology trends on path to widespread commercialization. Join this session to gain a better sense of the direction of solar technology, worldwide markets, and opportunities for business.

Open to All Attendees

EXHIBITION VISITORS,
EXHIBITORS, AND TECHNICAL
CONFERENCE ATTENDEES

Executive Perspectives on the World of Optics and Photonics

Room 101 (Exhibit Level)

Wednesday 27 January 2:00 to 3:00 pm

Panel Moderator:

Tom Hausken, Director, Components Practice at Strategies Unlimited

Panel Members:

HAMAMATSU CORP.

Kenneth Kaufmann, Vice President

TRUMPF INC.

Timothy Morris, Managing Director

CVI MELLEIS GRIOT

Stuart Schoenmann, President and CEO

EDMUND OPTICS INC.

Robert Edmund, CEO and Chairman of the Board

COHERENT

Mark Sobey, Senior Vice President of Specialty Laser Systems

NEWPORT CORP.

Dennis Werth, Vice President, Precision Components and Systems Business

These top executives, representing different aspects of the marketplace, will share their insight and hard-fought lessons regarding trends and opportunities in optics and photonics. Weathering 2009 has required extraordinary skills and experience to successfully reset goals and allocate resources. Listening to and questioning these executives will help you understand the current environment better and to set priorities for your business.

The Making of an Industry: 50 Years of the Laser and Beyond

Room 103/104 (Exhibit Level)

Wednesday 27 January 3:30 to 4:30 pm

Panel Moderator:

Andrew Brown, SPIE Senior Director, Global Business Development

Panel Members:

JDSU-LASERS

Will Grossman, Chief Technical Officer

COHERENT

Allan Ashmead, Director Strategic Marketing

NEWPORT SPECTRA-PHYSICS

James Kafka, Director Research and Development

NORTHROP GRUMMAN

Jackie Gish, Special Assistant and Liaison, Emerging Technology and Systems

With the operation of Ted Maiman's ruby laser on May 16, 1960, the race to demonstrate the first laser was over, but the race to build an industry based on the laser had only just begun. In the short, 50 years since that demonstration, the laser has proven to be an essential tool in a plethora of applications in industries, including manufacturing, energy, medicine, communications, research, and more. Join us to hear from technology leaders about milestones in their company evolution, the people that made it happen, and where the industry is heading in the next 50 years.

Birth of an Industry: 50 Years of Lasers

Room 102

Thursday 28 January 9:15 to 9:45 am



Jeff Hecht, Contributing Editor, *Laser Focus World*

Jeff Hecht is a contributing editor to *Laser Focus World* and author of several books including *Beam: The Race to Make the Laser*, *City of Light: The Story of Fiber Optics*, *Understanding Lasers*, *Understanding Fiber Optics and Laser: Light of a Million Uses*. In this session open to all technical attendees, exhibitors and exhibition visitors, Hecht will describe important events, companies and technologies that have led to the creation of the global laser industry – with insights about what's over the horizon.

Crosslight Software Tutorial on Optoelectronic Device Simulation

Thursday 28 January . 8:30 am to 12:30 pm

To register for the tutorial and receive a free Crosslight Software software training license, please e-mail your contact information to pipek@nusod.org. More information on the tutorial is available at <http://www.nusod.org/crosslight10pw.html>.

The tutorial gives an introduction to high-end simulation tools for electronic and optoelectronic devices (APSYS, LAS-TIP, PICS3D by Crosslight Software Inc., see www.crosslight.com.) These software packages combine electrical, thermal, optical, and quantum-mechanical models in two or three dimensions. They can be applied to a large variety of semiconductor devices such as laser diodes, light-emitting diodes, solar cells, photodetectors, modulators, amplifiers, and transistors. The tutorial explains and demonstrates the basic operation of these software tools. Model options and material parameters are discussed, and strategies for obtaining realistic simulation results are outlined. Deep insight into micro- and nano-scale physical processes is provided using realistic device examples.

INTENDED AUDIENCE: Students, device engineers, and researchers who are interested in using advanced simulation software for designing and analyzing modern optoelectronic devices.

INSTRUCTOR: Joachim Piprek has been using Crosslight Software tools for more than 10 years in design and analysis of practical devices. He has published three books on semiconductor device simulation, co-chairs the annual conference on Numerical Simulation of Optoelectronic Devices, and gives device simulation courses at universities and companies worldwide. Dr. Piprek is currently president of the NUSOD Institute (www.nusod.org).

To register for the tutorial and receive a free Crosslight Software software training license, please e-mail your contact information to pipek@nusod.org. More information on the tutorial is available at:

<http://www.nusod.org/crosslight10pw.html>



Schedule your week with your iPhone.

See p. 10



Industry Workshops

Come hear leaders in the industry discuss challenges and opportunities. Receive technical training from the brightest minds in the photonics industry.

Fundamental Optics

Semiconductor Optoelectronic Device Fundamentals

SC747

Course level: Introductory
CEU .65 \$575 / \$685 USD
Sunday 8:30 am to 5:30 pm

This provides a review of the basics of semiconductor materials, with primary emphasis on their optoelectronic properties. The motion of electrons and holes is discussed, and photon absorption and generation mechanisms are presented. The course examines basic device structures such as quantum wells and quantum dots, Bragg reflectors, cascade devices, distributed feedback devices, avalanching, tunneling, and various electro-optic effects..

Instructor: **Kurt Linden** has over 35 years of practical experience in the design, development, manufacture, testing, and application of a broad range of semiconductor optoelectronic devices, he is a pioneer in the development of visible, infrared, and far-infrared devices, and has recently been involved with their incorporation into operational systems. He is currently a senior scientist at the Spire Corporation.

Basic Optics for Non-Optics Personnel

WS609

Course level: Introductory
CEU .20 \$150 / \$200 USD
Monday 1:30 to 4:00 pm

This course will provide the technical manager, sales engineering, marketing staff, or other non-optics personnel with a basic understanding of the terms, specifications, and measurements used in optical technology to facilitate effective communication with optics professionals on a functional level. Topics to be covered include basic concepts such as interference, diffraction, polarization and aberrations, definitions relating to color and optical quality, and an overview of the basic measures of optical performance such as MTF and wavefront error.

Instructor: **Kevin Harding** has been active in the optics industry for over 30 years, and has taught machine vision and optical methods for over 25 years in over 70 workshops and tutorials, including engineering workshops on machine vision, metrology, NDT, and interferometry used by vendors and system houses to train their own engineers.

Basic Laser Technology

WS972



Course level: Introductory
CEU .35 \$300 / \$355 USD
Wednesday 8:30 am to 12:30 pm

If you are uncomfortable working with lasers as "black boxes" and would like to have a basic understanding of their inner workings, this introductory course will be of benefit to you. The workshop will cover the basic principles common to the operation of any laser/laser system. Next, we will discuss laser components and their functionality. Components covered will include laser pumps energy sources, mirrors, active media, and Q-switches.

Instructor: **Sydney Sukuta** is currently a Laser Technology professor at San Jose City College.



Registration Required
See SPIE Cashier, North Lobby,
to register

Business, Patents + IP

Project Management for Rapid Product Development

WS936

Course level: Intermediate
CEU .35 \$300 / \$355 USD
Monday 8:30 am to 12:30 pm

Product development by its very nature is tumultuous. It is affected by changing technologies and customer requirements, global competitiveness, multi-site development teams and other factors. This half-day course is designed to meet the specific needs of engineering leads who must deliver results in challenging environments. You'll learn the most important aspects of project management for reducing cycle time by applying proven methods and tools to your product development process.

Instructor: **Gary Hinkle** is president and founder of Auxilium, Inc. His experience includes a broad variety of management and staff assignments with small, medium, and large companies involved in the development and manufacturing of high-tech products.

Valuation of Closely Held Technology Companies, Product Lines and Intellectual Property

WS973

Course level: Introductory
CEU .35 \$300 / \$355 USD
Tuesday 8:30 am to 12:30 pm

This course focuses on the strategies and process that business leaders employ in acquisitions and divestitures and in raising capital financing. The course is centered on closely held, small and middle market technology companies (< \$200 million revenue). An overview of business and intellectual property valuation methods will be provided. The course will focus on positioning strategies to maximize the valuation in sale, divestiture, capital financing, or licensing.

Instructor: **Linda Smith**, through Ceres Technology Advisors, provides strategic planning, business development, marketing, and M&A advisory services to buyers and sellers of small and middle market firms and to entrepreneurs and investors financing and building early stage ventures. She is an Associate Member of the American Society of Appraisers.

Pursuing Patents In a Changing World

WS971



Course level: Introductory
CEU .35 \$300 / \$355 USD
Tuesday 1:30 to 5:30 pm

The global recession, a more conservative USPTO (in terms of granting patents), and looming patent reform are changing the way patents should be pursued. For example, cost effectiveness is becoming more important than what may be ideal from a legal standpoint.

This course tackles these challenges by first presenting a checklist of questions a business should consider before investing resources in a patent. For example, is the invention something that lends itself to useful patent coverage? Have you or others engaged in conduct that will bar patenting? Can your business establish ownership of the patent rights? Do other appropriate IP alternatives, i.e., Trade Secrets, exist which are better from a business standpoint? Does the possible scope of the patent (determined after engaging in patentability research) make its filing cost effective?

Instructor: **Marshall Honeyman** is a patent attorney in Overland Park, Kansas (Kansas City metro) where he is Of Counsel to the law firm of Lathrop and Gage, L.L.P.

Complying with the ITAR: A Case Study

WS933

Course level: Introductory
CEU .35 \$300 / \$355 USD
Wednesday 1:30 to 5:30 pm

In the world of international trade, it's what you don't know that can hurt you. With the U.S. government's focus on homeland security and its increasing reliance on photonics for the development and production of defense-related products and services, your activities may well be subject to the ITAR. This workshop will begin with a brief contextual overview of U.S. export controls, then transition into a case study focused on the ITAR. Real world situations and lessons learned will be shared. You will also learn about current enforcement trends and best practices for avoiding violations.

Instructor: **Kerry Scarlott** is a partner at Posternak Blankstein & Lund LLP, where he focuses his practice on business law and international trade. He is an expert in advising technology-based companies on how to effectively and efficiently navigate U.S. export control laws and regulations.



Professional Development

Professional Development Speaker Series

Room 112 (Exhibit Level)

Sunday 24 January 1:30 to 5:00 pm

Open to All Attendees

Students and Early Career Professionals - attend this series of talks covering a range of topics you won't find in your school's course catalog. Be successful both inside and outside the laboratory with this professional skills tune-up exploring issues of communication, management, and entrepreneurship.

Spend some time focusing on your career development while you're at SPIE Photonics West. Workshops and presentations will help you be more successful.

1:40 to 2:30 pm

Peaks and Pitfalls of Professional Communication: Tips from a Technical Entrepreneur



Thomas Tongue

CEO, Zomega Terahertz Corp.

Effective communication is often the dividing line between recognized brilliance and inspired obscurity, both in the academic and business world. Offered from the entrepreneurs perspective, this talk covers techniques and tips that can help

you communicate your thoughts, ideas and enthusiasm to people who will form an integral part of your professional network. Topics will include elevator pitches, avoiding the presentation death march, and do's and don'ts of professional communication.

Thomas Tongue a serial entrepreneur with over 14 years of experience in the both the software and photonics industries. His background in physics, combined with an MBA concentration in technical entrepreneurship lead him to found Zomega Terahertz Corp. to commercialize Terahertz technology.

2:35 to 3:20 pm

Leading a Well-Adjusted Research Group



Andrea M. Armani

Dept. of Chemical Engineering and Materials Science, University of Southern California

A research group is like a small business, with the professor as the CEO, CTO and COO, all rolled into one. This presentation will discuss managing and growing a research group, including how to get funding and negotiating for more space.

Andrea Armani is an assistant professor of chemical engineering and materials at the University of Southern California and winner of the 2009 Technology Review TR35 - Young Innovator Award. She has developed a toroidal optical sensor that can work in liquids to detect single molecules. She received her PhD in Applied Physics from CalTech in 2007.

3:25 to 4:10 pm

Getting Better Results from Your Proposal Writing



Alexander Heisterkamp

Laser Zentrum Hannover e.V.

Proposal writing is a fine art, blending both science and persuasion. Find out how to get better results from your proposal writing efforts with this set of skills and tips.

After a postdoc working on nanosurgery with femtosecond lasers with Eric Mazur's group at Harvard, **Alex Heisterkamp** joined the Laser Zentrum e.V. in Hannover, Germany as a researcher and professor. He is now head of the Biophotonics Group.

4:15 to 5:00 pm

Scientific Entrepreneurship: So you have a good idea, what's next?



David B. Adebimpe

Owner/CEO Polymath Interscience, LLC

This talk details the adventures and growth of a research scientist as he evolved through the conceptualization of a product idea, to its development and the subsequent commercialization and marketing of the product to become #1 in its product class...with no financial backing. We will discuss the main challenges that confront the freshly-minted (and not-too-freshly minted) graduate who has an idea that he/she wants to develop into a marketable product: how to protect the idea, secure funding, overcome challenges, and use available resources to grow ideas into successfully commercialized products.

David Adebimpe is a scientist and inventor with over 20 years of academic and private sector experience, with an interdisciplinary Ph.D. in Synthetic Organic Chemistry, Materials Science and Chemical Engineering, and an M.Phil. in Synthetic Organic Chemistry. David was Center Administrator of the NSF-CREST Center for Analysis of Structures and Interfaces based at the City College of New York, and was integral in the establishment of CUNY's Ph.D. program in Nanoscale Science and Engineering. In late 2007, David left his place of employment to establish his own scientific R&D company. ScentLogix™, aimed at biological and analytical detection of explosives, narcotics and other hazardous materials, is his latest invention.

The most powerful source of photonics information

Photonics Spectra is today's leading source of technological solutions and of news and information about photonics. It is the magazine referred to worldwide by the largest audience of photonics engineers, scientists and end users. Integrating all segments of photonics, Photonics Spectra is unique in that it provides both technical and practical information for every aspect of the global industry. For a free subscription, please go to www.PhotonicsSpectra.com. Circulation: 97,500 qualified recipients as of June 2009.

BioPhotonics is designed to present the latest global developments and techniques from the photonics industry to those involved in the medical and biotechnological disciplines. BioPhotonics' buying audience is made up of people who use photonics technology in biotechnological or medical products and procedures, plus key researchers looking for new photonics techniques and products to improve methodology and solve problems. Circulation: 32,875 qualified recipients as of June 2009.

EuroPhotonics covers news and technology updates on the growing market for photonics in Europe. This bimonthly supplement to Photonics Spectra has a guaranteed distribution of 22,500 to important buyers and users of photonics products and services in Europe. Featured sections include Euro News, Product Previews and EcoPhotonics. Circulation: 22,375 qualified recipients as of June 2009.

AsiaPhotonics is a new biannual supplement to Photonics Spectra offering specialized features and news items of interest to the Asian market. Coverage includes a broad spectrum of photonics technologies, applications and components.

The Photonics Directory • Two-Volume Set

The Photonics Corporate Guide provides complete company profiles of more than 4200 international manufacturers — addresses, telecommunications numbers, company sizes, personnel and products.

The Photonics Buyers' Guide lists these companies in 2300 categories — over 600 pages of products and services. Circulation: 25,000.

PhotonicsDirectory.com and CD-ROM

Redesigned and redeveloped in 2009, the online and CD editions include enhanced listings, intuitive searching, filtering features, and digital editions of the Photonics Handbook and Photonics Dictionary.

Photonics.com

You will find a world of information about photonics on the premier photonics Web site. Photonics.com reports on what's timely and of interest to the photonics community: news, technology advances, research, company changes and profiles, new products, feature articles and major industry events. 3.5 million page views.

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Workshops

Registration required for the workshops below.
See SPIE Cashier, North Lobby, to register.

Hit-the-Target Laser Activity Workshop

WS985

Course level: Introductory

\$20 / \$40 USD

Sunday, 8:30 to 11:30 am

This workshop will train attendees on the use of a Hit-the-Target Laser activity, a hands-on education outreach kit using lasers and mirrors. The activity is intended to engage and enrich the math/science learning experience for students in the middle grades. It was developed as part of Hands-On Optics (HOO), a \$1.7 million dollar grant from the U.S. National Science Foundation (NSF) to design and implement a science enrichment program for children aged 11 to 14 years old.

Instructor: **Robert T. Sparks** is a Science Education Specialist at the National Optical Astronomy Observatory (NOAO) in Tucson, AZ.

Effective Technical Presentations

WS897

Course level: Introductory

CEU .35 \$75 / \$125 USD

Monday 8:30 am to 12:30 pm

Oral presentation skills are a key to success for researchers. This course proposes a five-step methodology that will take you from scratch to an effective technical presentation. It also offers tips on how to manage the nervousness associated with speaking in public.

Instructor: **Jean-luc Doumont** runs lectures, workshops, and training programs in oral, written, and graphical communication for engineers, scientists, and managers worldwide.

This workshop is free to SPIE Student Members. You must register to attend.

Effective Scientific Papers

WS908

Course level: Introductory

CEU .35 \$75 / \$125 USD

Monday 1:30 to 5:30 pm

Strong writing skills are a key to success for researchers. This course proposes a methodology that will take you from scratch to an effective scientific or technical document—a question of structure, not style. The approach is applicable across languages and for a wide range of document types beyond scientific papers, too.

Instructor: **Jean-luc Doumont** runs lectures, workshops, and training programs in oral, written, and graphical communication for engineers, scientists, and managers worldwide.

This workshop is free to SPIE Student Members. You must register to attend.

Women in Optics Presentation and Reception

Open to all conference attendees.

Hilton Hotel: Golden Gate 8

Monday 25 January 4:30 to 6:00 pm

Join us for an evening of networking and inspiration. Connect with others in our industry while enjoying wine and cheese refreshments.

Educating Girls and Physics Teachers in Developing Countries—A Key to Sustainability



Priscilla Laws

Dickinson College

Laws received her bachelor's degree from Reed College and her doctorate from Bryn Mawr College where she studied nuclear physics. She joined the faculty at Dickinson in 1965 and began focusing her efforts on the health effects of radiation. This led to the publication of two consumer books on medical X-rays. She is a research professor for Dickinson College and is promoting ways to use physics research and education to enhance sustainable development in Africa, Asia and Latin America.

SPIE Job Fair

Open to all attendees. All career services are free to individuals seeking employment.

North Hall

Tuesday 26 January 10:00 am to 5:00 pm

Wednesday 27 January 10:00 am to 5:00 pm

Whether you're looking for a better job, re-entering the workforce or just starting your career, visit the Job Fair at SPIE Photonics West—come prepared to discuss your skills and talents with industry leaders.

- Discuss career options with employers
- Build your network
- Gain visibility with hiring companies
- Post your resume today!

Visit the Career Center on SPIE.org

PANEL DISCUSSION

Getting Hired in 2010 and Beyond

Open to all conference attendees.

Westin Hotel: Stanford

Tuesday 26 January 3:00 to 4:00 pm

Join us for a panel discussion on careers in optics and photonics outside the academic world. Learn about getting hired at tech-based companies and non-academic jobs directly from human resource professionals in the optics and photonics sector.

Photonics West maps:

Moscone Maps	pp. 2–5
Hilton Hotel Map	p. 3
Area Map	p. 322



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Job Fair

Two Days Only

North Hall, The Moscone Center

Tuesday 26 January · 10:00 am to 5:00 pm

Wednesday 27 January · 10:00 am to 5:00 pm

Whether you are looking for a better job, re-entering the workforce or just starting your career, the SPIE Career Center and Photonics West Job Fair are both great places to start!

- Meet with employers and interview on the spot
- Learn more about opportunities in our industry

These companies will be on hand to discuss career opportunities

Raytheon



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SPIE Career Center



spie.org/careercenter



Network

Networking Receptions · Student Social Events · SPIE Member Events



Join your colleagues and develop new relationships at these relaxed-atmosphere events; enjoy light refreshments as you continue the day's discussions.



Lunch with the Experts

A BIOS Student Networking Event
Room 133 (Exhibit Level)

Sunday 24 January 12:30 to 1:30 pm

Seating Limited. Ticket Required.
Ticket Provided with BIOS Student Registration.

Enjoy a casual meal with colleagues at this engaging networking opportunity, hosted by SPIE Student Services. This event features experts willing to share their experience and wisdom on career paths in biomedical optics and an awards presentation for Newport Spectra-Physics travel grant winners. Lunch is complimentary to all BIOS students.

SPIE Fellows Luncheon

Westin Hotel: Franciscan Ballroom

Monday 25 January 12:00 to 1:30 pm

SPIE Fellows: please join your colleagues for an SPIE hosted luncheon. The new SPIE Fellows attending Photonics West will be introduced and recognized. This is an informal gathering and a chance to interact with other Fellows.



Jeff Hecht, Contributing Editor,
Laser Focus World

Jeff Hecht will be the guest speaker at this luncheon, and he will deliver the presentation "How Theodore Maiman Made the First Laser." Mr. Hecht has been writing about lasers since 1974. He is the author of *Beam: The Race to Make the Laser* (Oxford, 2005), *City of Light: The Story of Fiber Optics* (Oxford 1999), and *Laser Pioneers* (Academic, 1991).

Early Career Networking Social

Westin Hotel: Franciscan Ballroom

Monday 25 January 5:00 to 6:00 pm

Open to All Early Career Professionals

Meet distinguished SPIE contributors for a casual Pre-Dinner social. This event promises one-on-one networking with some of SPIE's most influential volunteers from committees and leadership.

SPIE Photonics West Welcome Reception "Cirque du Lasaire"

Hilton Hotel: Grand Ballroom

Monday 25 January 7:00 to 8:30 pm

Open to All Conference Attendees

All attendees are invited to relax, socialize, and enjoy refreshments. A special celebration of the 50th anniversary of the first working laser will highlight the evening. Please wear your conference registration badges. Dress is casual.



Lunch with the Experts

A Student Networking Event

Tuesday 26 January 12:30 to 1:30 pm

Advance Sign-up Required by 5:00 pm on Monday at the SPIE Marketplace. Seating Limited.

Enjoy a casual meal with colleagues at this engaging networking opportunity. This event features experts willing to share their experience and wisdom on career paths in optics and photonics and an awards presentation for Newport Spectra-Physics travel grant winners. Lunch is complimentary to all students.

Sponsored by:



Newport and Spectra-Physics Research Excellence Travel Awards

The Newport Spectra-Physics Research Excellence Travel Awards Program provides financial support for university students to attend the two largest SPIE meetings in order to present their research. These travel grants are open to any student who has an accepted paper for presentation at SPIE Photonics West or SPIE Optics + Photonics. Recipients will be selected based on both the quality of the original research described in the submitted paper(s) and financial need.

For application information for this and other SPIE travel grants visit Scholarships and Grants online at spie.org/scholarships

Social and Networking Events

SPIE Member Reception

Hilton San Francisco Union Square
Hotel, 333 O'Farrell Street
46th Floor Cityscape

Tuesday 26 January 8:00 to 9:30 pm
SPIE Members Only

SPIE Members are invited to the Cityscape Room at the top of the Hilton for an after-dinner reception in their honor. Come relax and talk with your colleagues while enjoying dessert, coffee, and unparalleled views of downtown San Francisco.

Membership cards or invitations will be requested at the entrance. If you become an SPIE member while at the meeting, please bring your registration receipt. Dress is casual or business attire.

World Khet Tournament

Exhibition North Hall, Booth 4012

Wednesday 27 January 2:30 to 5:00 pm

Khet—The Laser Game helps teach basic optics while playing an enjoyable chess-like game. Meet the members of Invention Toys, an independent game maker.

Prizes and glory for the winners. Sign-up to play the tournament or play casually.

- Special offers for SPIE Student Chapter members
- Get supplemental educational materials for using Khet in the classroom
- Khet games available at a special discount in the SPIE Marketplace.

“No Ties” Student Social

Wednesday 27 January 8:00 to 9:30 pm

Student Conference Attendees Only

Relax and hang out with new friends and peers while enjoying the atmosphere of a great off-site venue. No ties required but please bring photo ID.

Jillian's Billiards Club

101 4th Street

From the Moscone Center:

Head Southwest on Howard St toward 4th St

Turn right on 4th St

Jillian's is at the end of the block

Innovative New Products Recognized at SPIE Photonics West

The Prism Awards for Photonics Innovation Banquet & Award Ceremony

Honoring the most innovative products and companies in our industry

Wednesday, the 27th of January 2010

Hilton San Francisco Union Square

6:30 pm Cocktail Reception

7:00 pm Dinner and Awards Ceremony

Seating Limited · Tickets required · Business Attire

Attend the Gala Event This event brings together industry leaders, top executives and scientists in a once-a-year opportunity to discover what's new and exciting in the photonics industry.

Which Finalists will be Winners? Attend the banquet and find out.

- Aerotech
- Agilent Technologies
- BaySpec Inc.
- Electronic Housekeeper
- GE Healthcare
- General Resonance LLC
- Hamamatsu Corp.
- High Q Laser Innovation GmbH
- InfraTec Infrared LLC
- Innovations in Optics Inc.
- IRphotonics
- Laser Operations LLC – QPC Lasers
- Lasers
- Leighton Electronics Inc.
- LightLab Imaging Inc
- Linden Photonics
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Tickets Pricing

Tickets may be purchased at the SPIE cashier, North Lobby.

Individual seats: \$75

Table of ten: \$750 per table

Table of eight: \$600 per table

Table of six: \$450 per table

Northern Lights at Your Service

Photonics Industry & Technology in Canada



Visit the Canada Pavilion at Photonics West and BiOS and meet great Canadian companies, regional clusters and the Canadian Photonics Fabrication Centre. Together they offer world class products prototyping services and leading technologies.

Members of the Canada Pavilion at Photonics West (booth #4407) are:

- BMV Optical Technologies Inc.
- Bo Xin Optics Ltd.
- Canadian Institute for Photonic Innovations
- Canadian Photonics Consortium
- Doric Lenses Inc.
- Genia Photonics
- GiGa Concept Inc.
- IRphotonics Inc.
- Novacam Technologies Inc.
- O-M6 Technologies Inc.
- Ontario Photonics Industry Network
- P&P Optica
- Photon etc. Inc.
- Quebec Photonic Network
- WT&T Inc.

Members of the Canada Pavilion at BiOS (booth #8833) are:

- Genia Photonics
- Novacam Technologies Inc.
- Photon etc. Inc.
- Quebec Photonic Network

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www.photonics.ca

Celebrate the
GOLDEN ANNIVERSARY
OF THE **LASER**

at SPIE Photonics West.

50 years ago, on 16 May 1960, the first laser was fired by Theodore Maiman. Since that time the laser has enabled some of the greatest innovations of our time. Join SPIE in paying tribute to the laser.

YOU ARE INVITED

Dream the next 50 years of the laser at a Welcome Reception unlike any other.

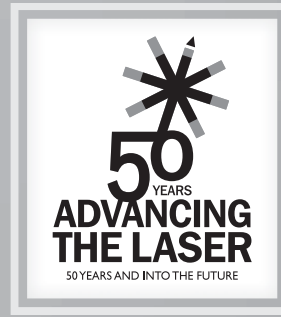
"Cirque du Lasaire"

Date: Monday 25 January · Time: 7:00 to 8:30 pm
Hilton San Francisco Union Square Hotel
333 O'Farrell Street

Enjoy a night of laser infused magic, conversation, acrobatics, and laser displays.

Dress is casual.





Laser Luminary Display

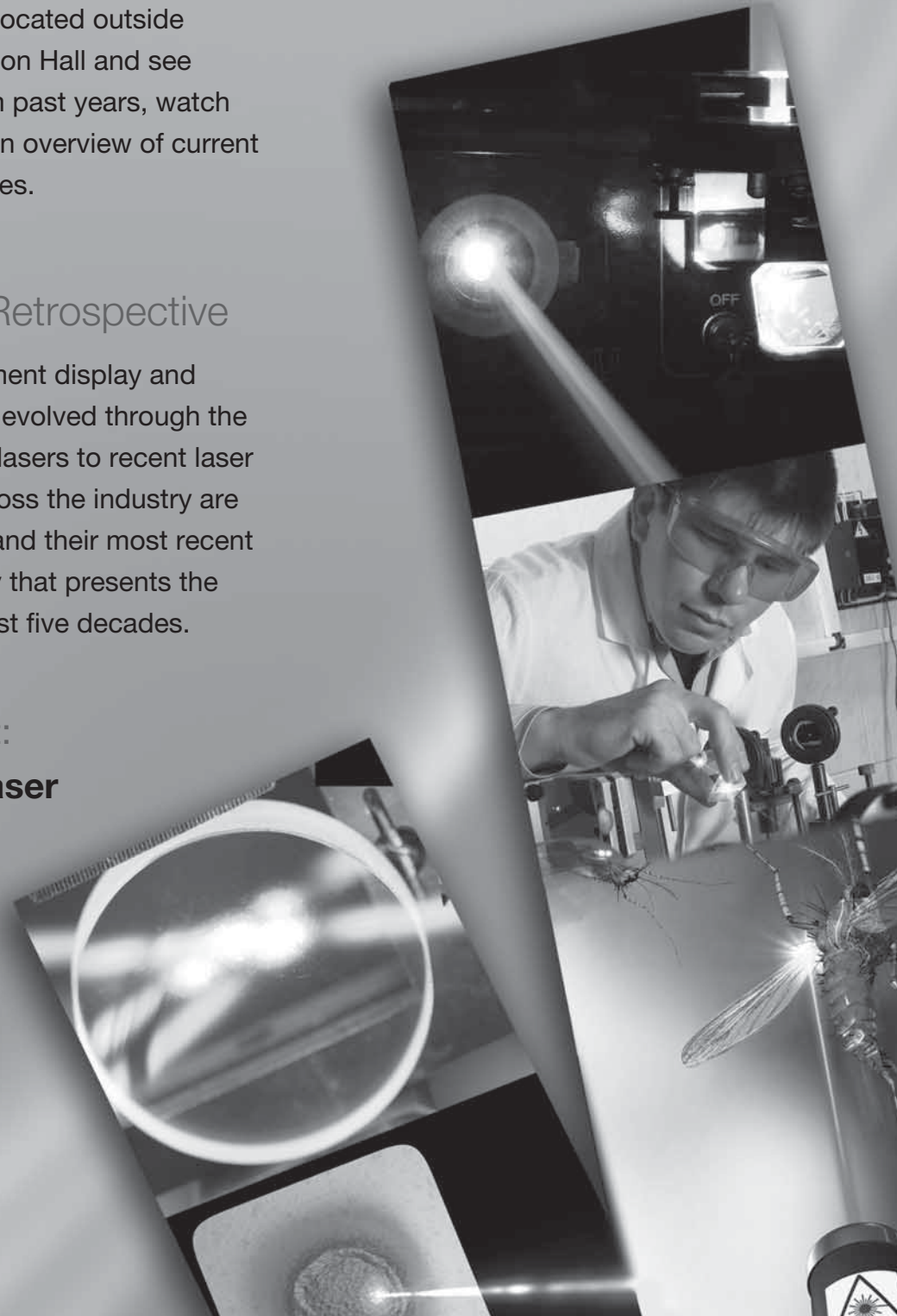
Visit the Laser Luminary Display located outside the entrance to the North Exhibition Hall and see historic images and artifacts from past years, watch archival video footage, and see an overview of current applications and future possibilities.

The Laser: A 50-Year Retrospective

Walk the floor of the laser equipment display and see how laser technologies have evolved through the years. From some of the earliest lasers to recent laser innovations, companies from across the industry are contributing archival equipment and their most recent developments to create a display that presents the evolution of the laser over the past five decades.

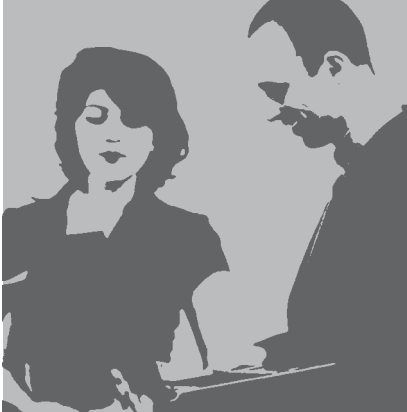
For more information visit:

spie.org/advancingthelaser





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 160 companies



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- 1,120 companies—talk face-to-face with suppliers
- More product roll-outs than any other exhibition in the industry
- See the latest technology—from giants to startups

Visit Two Technology-Packed Exhibitions

SPIE 
 Photonics West

Tuesday 26 January 10:00 am to 5:00 pm
 Wednesday 27 January . . 10:00 am to 5:00 pm
 Thursday 28 January 10:00 am to 4:00 pm

BIOS 

Saturday 23 January 12:00 to 5:00 pm
 Sunday 24 January. 10:00 am to 5:00 pm

BiOS Product Demonstrations - South Hall A – Demo Area I

	Saturday 23 January	Sunday 24 January
10:30 am	EXHIBITION CLOSED	Advances in Lasers for Biological Imaging David Armstrong , Coherent Inc.
11:30 am	EXHIBITION CLOSED	Silicon Photomultipliers for Large Area Detection Dr. Carl Jackson , SensL
12:30 pm	High Performance Optical Filters and Components for Biotechnology Bryan Herbst , SCHOTT North America, Inc.	Ultrafast Ultracompact System for Life Science Applications Robert Braunschweig , Amplitude Laser Inc.
1:30 pm	Thermal Spot Curing at Your Fingertips Ruben Burga , IRphotonics	
2:30 pm		Lumencor Light Engines Claudia Jaffe , Lumencor, Inc.

BiOS

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Photonics West Product Demonstrations - South Hall – Demo Area I

	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
10:30 am	Novel Materials for Laser Components Dr. Angela Hohl-AbiChedid , SCHOTT North America, Inc.	Tiny 2.8V Piezo Motor Enable High Performance Phone Cameras David A. Henderson , New Scale Technologies, Inc.	Selecting Optimum Off-the-Shelf Lenses and Accessories for Machine Vision Applications Thomas Thöniß (Thoeniss) , Qioptiq
11:30 am	OPS Lasers: State and Application of a Pioneering Technology Dr. Volker Pfeufer , Coherent Inc.	Inspection of Photovoltaics with SWIR Imaging Don Pancza or Doug Malchow , Goodrich ISR Systems, formerly Sensors Unlimited, Inc.	Micro-Optics for LED Collimation Steffen Reichel , SCHOTT North America, Inc.
12:30 pm	High Powered Fused Fiber Laser Components Dr. Baishi Wang , Vytran LLC	Structural Chemical Nanocharacterization/Raman AFM Interface Aaron Lewis , Nanonics Imaging Ltd.	
1:30 pm	IR Subsystem for Gas Analysis Brian C. Elias , Cal Sensors, Inc.	Laser Microprocessing Using Ultrafast Diode Pumped Lasers Robert Braunschweig , Amplitude Laser Inc.	
2:30 pm	Silicon Photomultipliers for Large Area Detection Dr. Carl Jackson , SensL	BeamGage, Laser Beam Analysis Software Dr. Kevin Kirkham , Ophir-Spiricon	
3:30 pm	ZERODUR Dr. Thomas Westerhoff , SCHOTT North America, Inc.	Solarization Resistant N-BK7 for CPV Dr. Steffen Reichel , SCHOTT North America, Inc.	
4:30 pm	LINOS Microbench: Build Your Experiment on High-Performance Optomechanics Andreas Hädrich , Qioptiq		

Product Demonstrations - South Hall – Demo Area II

	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
10:30 am	Novel g2T-Scan-System Improves Structuring of Solar Cells Dr. Oliver Homburg , LIMO Lissotschenko Mikrooptik GmbH	Economical Picosecond Laser Material Processing Antoine Kevorkian , Teem Photonics	Requirements of Optical Systems and Camera Modules for Industrial and Medical Applications Dr. Rainer Schuhmann , Berliner Glas KGaA
11:30 am	Thermal LED Measurements, That are Fast and Easy Yang Wang , Labsphere	New Compact Colorimeter Thierry Berthou , Silios Technologies	What's New in Image-Pro Plus Version 7.0 Nick Beavers , Media Cybernetics
12:30 pm	The Optometronic 4000™ Photonics Workstation David Lewis , Nanonics Imaging Ltd.	Advances in Laser, Solar-Cell, and Tera-hertz Simulations by RSoft Matthew Frank , RSoft Design Group	
1:30 pm	mini-Z: Applied THz Spectroscopy Thomas Tongue , Zomega Terahertz Corp.	Lumencor Light Engines Claudia Jaffe , Lumencor, Inc.	
2:30 pm	Cost-effective and Large Stroke Deformable Mirror Frederic Rooms , ALPAO	MICAO Jerome Ballesta , Imagine Optic	Precise Optical Component Assembly Stefan Krey , TRIOPTICS GmbH
3:30 pm	Short Pulse Fiber Lasers for Micro-Processing Philippe Metivier , EOLITE Systems	New, Novel CCD and EMCCD Technology Ravi Guntupalli , Princeton Instruments	
4:30 pm	Electro- and Magneto-optic Products and Applications Dr. Stefan Balle , Qioptiq	Phoenix Swept Tunable Lasers by Luna: From Photonic Metrology to Optical Sensing Dr. Brian Soller , Luna Technologies	

Product Demonstrations - North Hall – Demo Area III

	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
10:30 am	Advanced Splicing Applications Doug Duke , AFL Telecommunications	Advanced MEMS Scanning Mirror Modules: MicroScan and LAMDA Dr. Thilo Sandner , Fraunhofer IPMS	Accelerate Your Innovation in Compound Semiconductor Devices John Reid , Cedova Photonics, MiPlaza, Philips Research
11:30 am	All-Silica Er-Yb Dual-Clad Fiber for High Power Amplifiers Dr. Chris Emslie , Fibercore Ltd.	New Generation Solarization Resistant Fiber “j-Ultrasol” Developed by j-fiber GmbH Dr. Ralitsa Rosenow , j-fiber GmbH	Zing! - Broadband Single Polarization Fiber Reborn Dr. Chris Emslie , Fibercore Ltd.
12:30 pm	Thermal Spot Curing at Your Fingertips Ruben Burga , IRphotonics	Advances in Laser, Solar-Cell, and Tera-hertz Simulations by RSoft Matthew Frank , RSoft Design Group	Compact, Slitless, Lensless, Alignment Free Spectrometer Dr. Ali Adibi , ProSpect Photonics, Inc.
1:30 pm	Design Features Allow Laser Diodes In Critical Applications Doug Wilner , Vortran Laser Technology	Gas Cells, Properties and Applications Stephen Blazo , Wavelength References	6W CW Diodes at 14xx and 15xx David Bean , SemiNex Corporation
2:30 pm	Fiber Optical Switches single-/ multimode Lars Leininger , Ph.D., LEONI Fiber Optics	Innovations in Light Paul Blackborow , Energetiq Technology	
3:30 pm	Fly-cutter, Optical and Functional Surfaces Meinrad Schirmeister , Kugler of America LTD	3D Tactile Scanning of Aspheric Lenses Patrick Nugent , Mahr Federal Inc.	
4:30 pm	How to Build High Power UV Lasers at LOW COST Dr. Santanu Basu , Sparkle Optics Corporation		

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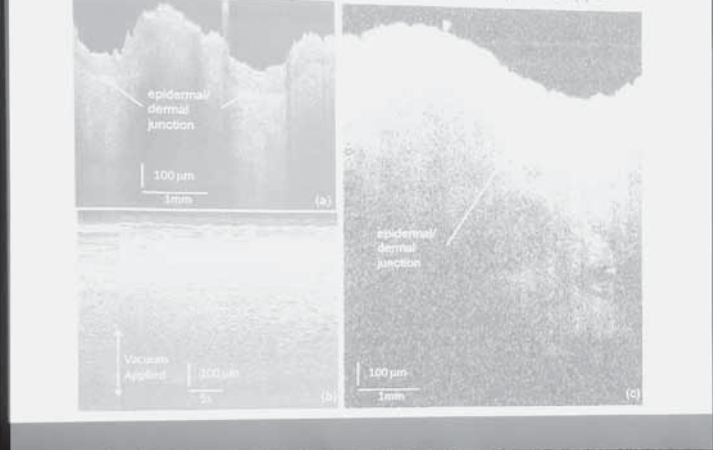
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SPIE reserves the right to cancel courses due to insufficient pre-registration.

Saturday 23 January	Sunday 24 January	Monday 25 January	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
Nano/Biophotonics					
	<p>SC463 Biophotonics (Prasad) 8:30 am to 5:30 pm, \$650 / \$760</p>		<p>SC727 Nano-plasmonics (Stockman) 8:30 am to 5:30 pm, \$575 / \$685</p>		
	<p>SC309 Fluorescent Markers: Usage and Optical System Optimization (Levi) 8:30 am to 12:30 pm, \$350 / \$405</p>				
	<p>SC461 Bio-Optical Detection Systems (Levi) 1:30 to 5:30 pm, \$350 / \$405</p>				
	<p>SC982 NEW Fluorescent Detection: System Design and Tradeoffs (Beach, Flowers) 1:30 to 5:30 pm, \$350 / \$405</p>				
Biomedical Spectroscopy, Microscopy, and Imaging					
	<p>SC981 NEW Biomedical Fiber Optic Sensors and Applications (Mendez, McLaughlin) 1:30 to 5:30 pm, \$350 / \$405</p>	<p>SC865 Microscope Design (Seward) 8:30 am to 12:30 pm, \$350 / \$405</p>	<p>SC979 NEW Fundamentals of Three-Dimensional Optical Microscopy (Javidi, Martinez-Corral) 8:30 am to 5:30 pm, \$575 / \$685</p>		
		<p>SC978 NEW Light Microscopy (Tkaczyk) 1:30 to 5:30 pm, \$380 / \$440</p>	<p>SC868 Optical Design for Biomedical Imaging (Liang) 8:30 am to 12:30 pm, \$350 / \$405</p>		
Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering					
	<p>SC029 Tissue Optics (Jacques) 1:30 to 5:30 pm, \$350 / \$405</p>				

Daily Course Schedule

Saturday 23 January	Sunday 24 January	Monday 25 January	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
Clinical Technologies and Systems					
	<p>SC981 NEW Biomedical Fiber Optic Sensors and Applications (Mendez, McLaughlin) 1:30 to 5:30 pm, \$350 / \$405</p> <p>SC312 Principles and Applications of Optical Coherence Tomography (Fujimoto) 1:30 to 5:30 pm, \$350 / \$405</p>				
Photonic Therapeutics and Diagnostics					
		<p>SC702 Optics and Optical Quality of the Human Eye (Roorda) 1:30 to 5:30 pm, \$350 / \$405</p>			
Laser Micro-/Nanoengineering					
		<p>SC689 Introduction to Micro-Machining Using Lasers (Schaeffer) 8:30 am to 12:30 pm, \$350 / \$405</p> <p>SC743 Micromachining with Femtosecond Lasers (Nolte) 1:30 to 5:30 pm, \$350 / \$405</p>			
Laser Applications					
			<p>SC188 Laser Beam Propagation for Applications in Laser Communications, Laser Radar, and Active Imaging (Phillips, Andrews) 8:30 am to 5:30 pm, \$695 / \$805</p>		

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
23 January	24 January	25 January	26 January	27 January	28 January

Semiconductor Lasers and LEDs

<p>SC877 Introduction to High Power Diode Laser Technology (Roh) 8:30 am to 12:30 pm, \$350 / \$405</p>	<p>SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) 8:30 am to 12:30 pm, \$350 / \$405 NEW</p>	<p>SC053 Testing and Reliability of Semiconductor Lasers (Lear) 1:30 to 5:30 pm, \$350 / \$405</p>	<p>SC011 Design of Efficient Illumination Systems (Cassarly) 8:30 am to 12:30 pm, \$350 / \$405</p>
<p>SC747 Semiconductor Optoelectronic Device Fundamentals (Linden) 8:30 am to 5:30 pm, \$575 / \$685</p>	<p>SC052 Light-Emitting Diodes (Schubert) 8:30 am to 12:30 pm, \$415 / \$470</p>		<p>SC974 Interconnection and Splicing of High-Power Optical Fibers (Yablon) 8:30 am to 12:30 pm, \$350 / \$405 NEW</p>
			<p>SC448 Diode Lasers: How to Select the Best Laser for Your Application (Linden) 1:30 to 5:30 pm, \$350 / \$405 NEW</p>
			<p>SC958 LED & Solid-State Lighting Standardization (Jiao) 1:30 to 5:30 pm, \$350 / \$405</p>

Nonlinear Optics

<p>SC931 Applied Nonlinear Frequency Conversion (Paschotta) 8:30 am to 5:30 pm, \$575 / \$685</p>	<p>SC974 Interconnection and Splicing of High-Power Optical Fibers (Yablon) 8:30 am to 12:30 pm, \$350 / \$405 NEW</p>
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Registration Required
See SPIE Cashier, North Lobby,
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Daily Course Schedule

Saturday 23 January	Sunday 24 January	Monday 25 January	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
Laser Source Engineering					
SC752 Solid State Laser Technology (Hodgson) 8:30 am to 5:30 pm, \$575 / \$685	SC744 Ultrafast Fiber Lasers (Fermann) 8:30 am to 12:30 pm, \$350 / \$405	SC931 Applied Nonlinear Frequency Conversion (Paschotta) 8:30 am to 5:30 pm, \$575 / \$685	SC818 Laser Beam Quality (Paschotta) 8:30 am to 12:30 pm, \$350 / \$405	WS972 Basic Laser Technology (Sukuta) 8:30 am to 12:30 pm, \$350 / \$405	
	SC748 High-Power Fiber Sources (Nilsson) 1:30 to 5:30 pm, \$350 / \$405	SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) 8:30 am to 12:30 pm, \$350 / \$405	SC746 Introduction to Ultrafast Technology (Trebino) 1:30 to 5:30 pm, \$350 / \$405, p. 206	SC974 Interconnection and Splicing of High- Power Optical Fibers (Yablon) 8:30 am to 12:30 pm, \$350 / \$405	
		SC861 The Basics of Physics and Engineering of Lasers (Kalisky) 8:30 am to 5:30 pm, \$575 / \$685		SC860 Resonator Design for Solid State Lasers (Paschotta) 8:30 am to 5:30 pm, \$575 / \$685	
		SC984 Fiber Amplifiers (Digonnet) 1:30 to 5:30 pm, \$350 / \$405			
Devices/Applications/Reliability					
		SC976 Building Robust MEMS/MOEMS Reliability Systems (McKillop) 8:30 am to 12:30 pm, \$350 / \$405			
Micro/Nanofabrication					
		SC689 Introduction to Micro- Machining Using Lasers (Schaeffer) 8:30 am to 12:30 pm, \$350 / \$405			SC532 Micro- and Nanofluidics - Technology and Applications (Gärtner) 8:30 am to 12:30 pm, \$350 / \$405
		SC743 Micromachining with Femtosecond Lasers (Nolte) 1:30 to 5:30 pm, \$350 / \$405			

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
23 January	24 January	25 January	26 January	27 January	28 January

Optical Communications: Systems and Sub-systems

SC188
Laser Beam Propagation for Applications in Laser Communications, Laser Radar, and Active Imaging
 (Phillips, Andrews) 8:30 am to 5:30 pm, \$695 / \$805

Nanotechnologies in Photonics

SC608
Photonic Crystals: A Crash Course, from Bandgaps to Fibers
 (Johnson) 1:30 to 5:30 pm, \$395 / \$450


Photonic Integration

SC747
Semiconductor Optoelectronic Device Fundamentals (Linden)
 8:30 am to 5:30 pm, \$575 / \$685

SC817
Silicon Photonics
 (Michel, Saini) 8:30 am to 12:30 pm, \$350 / \$405

Optoelectronic Materials and Devices

SC747
Semiconductor Optoelectronic Device Fundamentals (Linden)
 8:30 am to 5:30 pm, \$575 / \$685




SC984 
Fiber Amplifiers
 (Digonnet) 1:30 to 5:30 pm, \$350 / \$405

SC547
Terahertz Wave Technology and Applications (Zhang)
 8:30 am to 12:30 pm, \$350 / \$405



Registration Required
 See SPIE Cashier, North Lobby,
 to register

Daily Course Schedule

Saturday 23 January	Sunday 24 January	Monday 25 January	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
Optics and Optical Engineering					
	<p>SC935 Introduction to Lens Design (Bentley) 8:30 am to 12:30 pm, \$350 / \$405</p> <p>SC212 Modern Optical Testing (Wyant) 8:30 am to 12:30 pm, \$430 / \$455</p>	<p>SC003 Practical Optical System Design - EXPANDED 2-Day Format (Fischer) 8:30 am to 5:30 pm, \$1135 / \$1390</p> <p>SC156 Basic Optics for Engineers (Ducharme) 8:30 am to 5:30 pm, \$610 / \$720</p> <p>SC983  Integration of Optical and Mechanical Design (Doushkina) 8:30 am to 5:30 pm, \$575 / \$685</p> <p>SC321 Thin Film Optical Coatings (Macleod) 8:30 am to 5:30 pm, \$575 / \$685</p> <p>SC702 Optics and Optical Quality of the Human Eye (Roorda) 1:30 to 5:30 pm, \$350 / \$405</p>	<p>SC690 Optical System Design: Layout Principles and Practice (Greivenkamp) 8:30 am to 5:30 pm, \$680 / \$790</p> <p>SC206 Polarized Light: A Practical Hands-on Introduction (Fisher) 8:30 am to 5:30 pm, \$575 / \$685</p> <p>SC017 Principles of Fourier Optics and Diffraction (Gaskill) 8:30 am to 5:30 pm, \$700 / \$810</p> <p>SC384 The Design of Plastic Optical Systems (Schaub) 1:30 to 5:30 pm, \$350 / \$405</p>	<p>WS972  Basic Laser Technology (Sukuta) 8:30 am to 12:30 pm, \$300 / \$355</p> <p>SC011 Design of Efficient Illumination Systems (Cassarly) 8:30 am to 12:30 pm, \$350 / \$405</p> <p>SC552 Aspheric Optics: Design, Fabrication, and Test (Fischer) 1:30 to 5:30 pm, \$435 / \$490</p>	
Optomechanics					
		<p>SC983  Integration of Optical and Mechanical Design (Doushkina) 8:30 am to 5:30 pm, \$575 / \$685</p>	<p>SC010 Introduction to Optical Alignment Techniques (Ruda) 8:30 am to 5:30 pm, \$1050 / \$1305</p> <p>SC015 Structural Adhesives for Optical Bonding (Daly) 8:30 am to 12:30 pm, \$350 / \$405</p>	<p>SC781 Opto-mechanical Analysis (Hatheway) 8:30 am to 5:30 pm, \$575 / \$685</p>	
Standards					
			<p>SC700 Understanding Scratch and Dig Specifications (Aikens) 1:30 to 5:30 pm, \$420 / \$475</p>	<p>SC863 Understanding ISO-10110: The Optics Drawing Standard (Aikens) 8:30 am to 5:30 pm, \$575 / \$685</p>	

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
23 January	24 January	25 January	26 January	27 January	28 January

INDUSTRY WORKSHOPS

Fundamental Optics

<p>SC747 Semiconductor Optoelectronic Device Fundamentals (Linden) 8:30 am to 5:30 pm, \$575 / \$685</p>	<p>WS609 Basic Optics for Non-Optics Personnel (Harding) 1:30 to 4:00 pm, \$150 / \$200</p>	<p>WS972 Basic Laser Technology (Sukuta) 8:30 am to 12:30 pm, \$300 / \$355</p>
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Business, Patents + IP

<p>WS936 Project Management for Rapid Product Development (Hinkle) 8:30 am to 12:30 pm, \$300 / \$355</p>	<p>WS973 Valuation of Closely Held Technology Companies, Product Lines and Intellectual Property (Smith) 8:30 am to 12:30 pm, \$300 / \$355</p>	<p>WS933 Complying with the ITAR: A Case Study (Scarlott, Moss) 1:30 to 5:30 pm, \$300 / \$355</p>
	<p>WS971 Pursuing Patents In A Changing World (Honeyman) 1:30 to 5:30 pm, \$300 / \$355</p>	

Professional Development

<p>WS985 Hit-the-Target Laser Activity Workshop (Sparks) 8:30 to 11:30 am, \$20 / \$40</p>	<p>WS897 Effective Technical Presentations (Doumont) 8:30 am to 12:30 pm, \$75 / \$125</p>
	<p>WS908 Effective Scientific Papers (Doumont) 1:30 to 5:30 pm, \$75 / \$125</p>



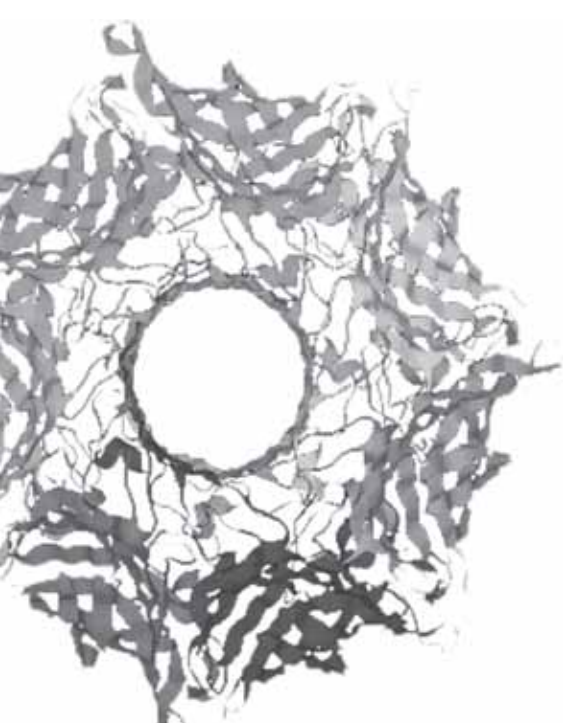
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to register

Conferences

Symposium Chair
James Fujimoto,
 Massachusetts Institute of
 Technology (USA)



Symposium Chair
R. Rox Anderson, M.D.,
 Wellman Center for
 Photomedicine, Massachusetts
 General Hospital and Harvard
 School of Medicine (USA)



Photonic Therapeutics and Diagnostics

Program Chair: **Reza S. Malek, M.D.,** Mayo Clinic (USA)

7548A	Photonics in Dermatology and Plastic Surgery (<i>Kollias, Choi, Zeng</i>)	56
7548B	Urology: Diagnostics, Therapeutics, Robotics, Minimally Invasive, and Photodynamic Therapy (<i>Malek</i>)	58
7548C	Advanced Technology and Instrumentation in Otolaryngology: Lasers, Optics, Radio Frequency, and Related Technology (<i>Wong, Ilgner</i>)	60
7548D	Diagnostic and Therapeutic Applications of Light in Cardiology (<i>Gregory, Tearney, Marcu</i>)	63
7548E	Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology (<i>Hirschberg, Madsen</i>)	64
7548F	Optics in Bone Biology and Diagnostics (<i>Mandelis</i>)	65
7548G	Photons and Neurons (<i>Mahadevan-Jansen, Jansen</i>)	66
7549	Lasers in Dentistry XVI (<i>Rechmann, Fried</i>)	67
7550	Ophthalmic Technologies XX (<i>Manns, Söderberg, Ho</i>)	69
7551	Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XIX (<i>Kessel</i>)	74
7552	Mechanisms for Low-Light Therapy V (<i>Hamblin, Waynant, Anders</i>)	76
7553	Frontiers in Pathogen Detection: From Nanosensors to Systems (<i>Fauchet</i>)	78

Clinical Technologies and Systems

Program Chairs: **Tuan Vo-Dinh,** Duke Univ. (USA); **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA)

7554	Coherence Domain Optical Methods and Optical Coherence Tomography in Biomedicine XIV (<i>Izatt, Fujimoto, Tuchin</i>)	80
7555	Advanced Biomedical and Clinical Diagnostic Systems VIII (<i>Vo-Dinh, Grundfest, Mahadevan-Jansen</i>)	85
7556	Design and Quality for Biomedical Technologies III (<i>Raghavachari, Liang</i>)	88
7557	Multimodal Biomedical Imaging V (<i>Azar, Intes</i>)	90
7558	Endoscopic Microscopy V (<i>Tearney, Wang</i>)	92
7559	Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications X (<i>Gannot</i>)	94
7560	Biomedical Vibrational Spectroscopy VI: Advances in Research and Industry (<i>Mahadevan-Jansen, Petrich</i>)	96
7561	Optical Biopsy VIII (<i>Alfano</i>)	98

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: **Steven L. Jacques,** Oregon Health & Science Univ. (USA); **William P. Roach,** Air Force Research Lab. (USA)

7562	Optical Interactions with Tissue and Cells XXI (<i>Jansen, Thomas</i>)	100
7563	Dynamics and Fluctuations in Biomedical Photonics V (<i>Tuchin, Duncan, Larin</i>)	102
7564	Photons Plus Ultrasound: Imaging and Sensing 2010 (<i>Oraevsky, Wang</i>)	104
7565	Biophotonics and Immune Responses V (<i>Chen</i>)	109
7566	Optics in Tissue Engineering and Regenerative Medicine IV (<i>Kirkpatrick, Wang</i>)	111
7567	Design and Performance Validation of Phantoms used in Conjunction with Optical Measurement of Tissue (<i>Nordstrom</i>)	112
7548G	Photons and Neurons (<i>Mahadevan-Jansen, Jansen</i>)	66

Photonics West maps:

Moscone Maps	pp. 2–5
Hilton Hotel Map	p. 3
Area Map	p. 322

Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: **Ammasi Periasamy**, Univ. of Virginia (USA); **Daniel L. Farkas**, Cedars-Sinai Medical Ctr. (USA)

7568	Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues VIII <i>(Farkas, Nicolau, Leif)</i>	113
7569	Multiphoton Microscopy in the Biomedical Sciences X <i>(Periasamy, So)</i>	116
7570	Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVII <i>(Conchello, Cogswell, Wilson, Brown)</i>	121
7571	Single Molecule Spectroscopy and Imaging III <i>(Enderlein, Gryczynski, Erdmann)</i>	123
7572	Optical Diagnostics and Sensing X: Toward Point-of-Care Diagnostics <i>(Coté)</i>	126
7573	Biomedical Applications of Light Scattering IV <i>(Wax, Backman)</i>	128
7561	Optical Biopsy VIII <i>(Alfano)</i>	98

Nano/Biophotonics

Program Chairs: **Paras Prasad**, SUNY/ Buffalo (USA); **Dan V. Nicolau**, The Univ. of Liverpool (UK)

7574	Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VII <i>(Cartwright, Nicolau)</i>	131
7575	Colloidal Quantum Dots for Biomedical Applications V <i>(Osin'ski, Parak, Jovin, Yamamoto)</i>	133
7576	Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications <i>(Achilefu, Raghavachari)</i>	136
7577	Plasmonics in Biology and Medicine VII <i>(Vo-Dinh, Lakowicz)</i>	140

BIOS Special Events	16–17
BIOS Proceedings of SPIE/CD-ROM	324
Index of Authors, Chairs, and Committee Members	267–318

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Brian J. Wong, Univ. of California, Irvine
Kenji Yamamoto, International Medical Ctr. of Japan (Japan)
Haishan Zeng, The BC Cancer Research Ctr. (Canada)

SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

BiOS Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
23 January	24 January	25 January	26 January	27 January	28 January

Photonic Therapeutics and Diagnostics

Program Chair: **Reza S. Malek, M.D.**, Mayo Clinic (USA)

7548A Photonics in Dermatology and Plastic Surgery (<i>Kollias, Choi, Zeng</i>) p. 56		7548G Photons and Neurons II (<i>Mahadevan-Jansen, Jansen</i>) p. 66
7548B Urology: Diagnostics, Therapeutics, Robotics, Minimally Invasive, and Photodynamic Therapy (<i>Malek</i>) p. 58		
7548C Advanced Technology and Instrumentation in Otolaryngology: Lasers, Optics, Radio Frequency, and Related Technology (<i>Wong, Ilgner</i>) p. 60		
7548D Diagnostic and Therapeutic Applications of Light in Cardiology (<i>Gregory, Tearney, Marcu</i>) p. 63	7549 Lasers in Dentistry XVI (<i>Rechmann, Fried</i>) p. 67	
7548E Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology (<i>Hirschberg, Madsen</i>) p. 64		
7548F Optics in Bone Biology and Diagnostics (<i>Mandelis</i>) p. 65		
7550 Ophthalmic Technologies XX (<i>Manns, Söderberg, Ho</i>) p. 69		
7551 Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XIX (<i>Kessel</i>) p. 74		
7552 Mechanisms for Low-Light Therapy V (<i>Hamblin, Waynant, Anders</i>) p. 76		
7553 Frontiers in Pathogen Detection: From Nanosensors to Systems (<i>Fauchet, Miller</i>) p. 78		

Clinical Technologies and Systems

Program Chairs: **Tuan Vo-Dinh**, Duke Univ. (USA); **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

7557 Multimodal Biomedical Imaging V (<i>Azar, Intes</i>) p. 90		7554 Coherence Domain Optical Methods and Optical Coherence Tomography in Biomedicine XIV (<i>Izatt, Fujimoto, Tuchin</i>) p. 80
	7555 Advanced Biomedical and Clinical Diagnostic Systems VIII (<i>Vo-Dinh, Grundfest, Mahadevan-Jansen</i>) p. 85	
	7556 Design and Quality for Biomedical Technologies III (<i>Raghavachari, Liang</i>) p. 88	7561 Optical Biopsy VIII: From Bench to Bedside (<i>Alfano</i>) p. 98
	7558 Endoscopic Microscopy V (<i>Tearney, Wang</i>) p. 92	
7559 Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications X (<i>Gannot</i>) p. 94		
7560 Biomedical Vibrational Spectroscopy VI: Advances in Research and Industry (<i>Mahadevan-Jansen, Petrich</i>) p. 96		

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Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **William P. Roach**, Air Force Research Lab. (USA)

7563 Dynamics and Fluctuations in Biomedical Photonics VII (<i>Tuchin, Duncan, Larin</i>) p. 102	7562 Optical Interactions with Tissues and Cells XXI (<i>Jansen, Thomas</i>) p. 100	
7567 Design and Performance Validation of Phantoms used in Conjunction with Optical Measurement of Tissue (<i>Nordstrom</i>) p. 112	7564 Photons Plus Ultrasound: Imaging and Sensing 2010 (<i>Oraevsky, Wang</i>) p. 104	
	7566 Optics in Tissue Engineering and Regenerative Medicine IV (<i>Kirkpatrick, Wang</i>) p. 111	7548G Photons and Neurons II (<i>Mahadevan-Jansen, Jansen</i>) p. 66
		7565 Biophotonics and Immune Responses V (<i>Chen</i>) p. 109

Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: **Ammasi Periasamy**, Univ. of Virginia (USA); **Daniel L. Farkas**, Cedars-Sinai Medical Ctr. (USA)

7568 Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues VIII (<i>Farkas, Nicolau, Leif</i>) p. 113	7572 Optical Diagnostics and Sensing X: Toward Point-of-Care Diagnostics (<i>Coté</i>) p. 126	7561 Optical Biopsy VIII (<i>Alfano</i>) p. 98
	7569 Multiphoton Microscopy in the Biomedical Sciences X (<i>Periasamy, So</i>) p. 116	
	7570 Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVII (<i>Conchello, Cogswell, Wilson, Brown</i>) p. 121	
7571 Single Molecule Spectroscopy and Imaging III (<i>Enderlein, Gryczynski, Erdmann</i>) p. 123		
7573 Biomedical Applications of Light Scattering IV (<i>Wax, Backman</i>) p. 128		

Nano/Biophotonics

Program Chairs: **Paras Prasad**, SUNY/Buffalo (USA); **Dan V. Nicolau**, The Univ. of Liverpool (UK)

7575 Colloidal Quantum Dots for Biomedical Applications V (<i>Osinski, Parak, Jovin, Yamamoto</i>) p. 133		7574 Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VII (<i>Cartwright, Nicolau</i>) p. 131
	7576 Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications (<i>Achilefu, Raghavachari</i>) p. 136	
		7577 Plasmonics in Biology and Medicine VII (<i>Vo-Dinh, Lakowicz</i>) p. 140

BiOS Special Events

Roundtable on Standards for Biophotonics , 5:00 to 6:00 pm, p. 17	Ophthalmic Technologies XX (Conf. 7550)—Pascal Rol Award Announcement, 5:45 to 6:00 pm, p. 17	Colloidal Quantum Dots for Biomedical Applications V (Conf. 7575)—Ocean Optics Young Investigator Award, 11:50 am to 12:00 pm, p. 17	Photons Plus Ultrasound: Imaging and Sensing 2010 (Conf. 7564)—Fairway Medical Technologies Best Paper Award, 5:25 to 5:55 pm, p. 17
BiOS HOT TOPICS , 7:00 to 8:45 pm, p. 16			
	Single Molecule Spectroscopy and Imaging III (Conf. 7571)—PicoQuant Young Investigator Award, 6:00 to 6:10 pm, p. 17	BiOS Interactive Poster Session , 5:30 to 7:00 pm, p. 17	IBOS—International Biomedical Optics Society (<i>Barton, Wang</i>), 7:30 to 9:00 pm, p. 17

Photonics in Dermatology and Plastic Surgery

Conference Chairs: **Nikiforos Kollias**, Johnson & Johnson CPPW; **Bernard Choi**, Univ. of California, Irvine; **Haishan Zeng**, The BC Cancer Research Ctr. (Canada)

Program Committee: **Anthony Joseph Durkin**, Univ. of California, Irvine; **Iltefat Hamzavi**, Henry Ford Hospital; **Jessica C. Ramella-Roman**, The Catholic Univ. of America

Saturday 23 January

SESSION 1

Room: 310 (Esplanade) Sat. 8:30 to 10:10 am

Session Chair: **Nikiforos Kollias**, Johnson & Johnson CPPW

8:30 am: **Multiphoton microscopy of engineered dermal substitutes: assessment of 3D collagen matrix remodeling induced by fibroblasts contraction**, Ana-Maria Pena, Christian Olive, Jean-François Michelet, Jean-Baptiste Galey, Dominique Fagot, Frédéric Leroy, L'Oréal Recherche (France); Jean-Louis Martin, Ecole Polytechnique (France); Anne Colonna, L'Oréal Recherche (France); Marie-Claire Schanne-Klein, Ecole Polytechnique (France) [7548A-01]

8:50 am: **Ablative fractional resurfacing drug delivery for aminolevulinic acid photodynamic therapy (ALA-PDT)**, Fernanda H. Sakamoto, Molly Wanner, Apostolos G. Doukas, William A. Farinelli, R. Rox Anderson, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) [7548A-02]

9:10 am: **Evaluation of cryo-preserved skin tissues using two-photon microscopy**, Iris Riemann, Axel Beier, Martin Schwarz, Daniel Doerr, Frank Stracke, Heiko Zimmermann, Fraunhofer-Institut für Biomedizinische Technik (Germany) [7548A-03]

9:30 am: **Effect of vacuum and thermal shock on laser treatment of trichophyton rubrum (toenail fungus)**, Guillermo Aguilar, Feng Sun, Pierre Carlier, Erica Young, David Hennings, Univ. of California, Riverside (USA) [7548A-04]

9:50 am: **In vivo multiphoton excitation spectra of skin fluorophores**, Hans Georg Breunig, Hauke Studier, JenLab GmbH (Germany); Karsten König, Saarland Univ. (Germany) and JenLab GmbH (Germany). [7548A-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 310 (Esplanade) Sat. 10:40 am to 12:00 pm

Session Chair: **Bernard Choi**, Univ. of California, Irvine

10:40 am: **A blue-LED-based device for selective photocoagulation of superficial abrasions: theoretical modeling and in vivo validation**, Francesca Rossi, Roberto Pini, Istituto di Fisica Applicata Nello Carrara, CNR (Italy); Gaetano De Siena, Daniela Massi, Francesco Saverio Pavone, Univ. degli Studi di Firenze (Italy); Domenico Alfieri, Light4tech Firenze srl (Italy); Giovanni Cannarozzo, Univ. degli Studi di Firenze (Italy) [7548A-06]

11:00 am: **Imaging of human skin lesions with the multispectral dermoscope**, Dimitrios Kapsokalyvas, Nicola Bruscolo, Vincenzo De Giorgi, Giovanni Cannarozzo, Torello Lotti, Francesco Saverio Pavone, Univ. degli Studi di Firenze (Italy); Domenico Alfieri, Light4Tech Firenze Srl (Italy) [7548A-07]

11:20 am: **Photochemical predictive analysis of photodynamic therapy in dermatology**, Félix Fanjul-Vélez, Irene Salas-García, Univ. de Cantabria (Spain); María López-Escobar, Univ. Hospital Marqués de Valdecilla (Spain); Noé Ortega-Quijano, José L. Arce-Diego, Univ. de Cantabria (Spain) [7548A-08]

11:40 am: **Use of spectral imaging for documentation of skin parameters in face lift procedure**, Eduardo C. Ruvolo, Jr., Paulo R. Bargo, Johnson & Johnson CPPW (USA); Tim Dietz, Robin Scamuffa, Kurt Shoemaker, Ethicon Endo-Surgery, Inc. (USA); Barry DiBernardo, New Jersey Plastic Surgery (USA); Nikiforos Kollias, Johnson & Johnson CPPW (USA) [7548A-09]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 3

Room: 310 (Esplanade) Sat. 1:30 to 3:10 pm

Session Chair: **Haishan Zeng**, The BC Cancer Research Ctr. (Canada)

1:30 pm: **Intravital multiphoton tomography as a novel tool for non-invasive in vivo analysis of human skin affected with atopic dermatitis**, Volker Huck, Westfälische Wilhelms-Univ. Münster (Germany); Christian Gorzelanny, Ruprecht-Karls-Univ. Heidelberg (Germany); Kai Thomas, Thomas A. Luger, Westfälische Wilhelms-Univ. Münster (Germany); Karsten König, JenLab GmbH (Germany); Stefan W. Schneider, Ruprecht-Karls-Univ. Heidelberg (Germany) [7548A-10]

1:50 pm: **Imaging spectroscopy of thermal and electrical burns**, Jessica C. Ramella-Roman, Ali Basiri, Thu Nguyen, The Catholic Univ. of America (USA) [7548A-11]

2:10 pm: **Rapid hyperspectral characterization of skin**, Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway); Trym Vegard Haavardsholm, Norwegian Defense Research Establishment (Norway); Astrid Aksnes, Norwegian Univ. of Science and Technology (Norway); Torbjørn Skauili, Norwegian Defense Research Establishment (Norway); Lars Othar Svaasand, Norwegian Univ. of Science and Technology (Norway) [7548A-12]

2:30 pm: **Automated measurement of epidermal thickness from optical coherence tomography by image analysis using a region growing technique**, Jomer de la Cruz, Jesse Weissman, Kirk W. Gossage, Unilever HPC USA (USA) [7548A-13]

2:50 pm: **Multiphoton microscopic imaging of human keloid scar**, Jianxin Chen, Fujian Normal Univ. (China) [7548A-14]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 310 (Esplanade) Sat. 3:40 to 5:00 pm

Session Chair: **Iltefat Hamzavi**, Henry Ford Hospital

3:40 pm: **Linking visual appearance of skin to the underlying optical properties using multispectral imaging**, Niloy Choudhury, Ravikant Samatham, Steven Jacques, Oregon Health & Science Univ. (USA) . [7548A-15]

4:00 pm: **Carbon nanotube assisted photothermal therapy of skin cancers—pilot proof-of-principle study in a murine model**, Naiyan Huang, Hequn Wang, Jianhua Zhao, The BC Cancer Research Ctr. (Canada); Harvey Lui, The Univ. of British Columbia (Canada); Mladen Korbellik, Haishan Zeng, The BC Cancer Research Ctr. (Canada) [7548A-16]

4:20 pm: **Fine scale alignment of skin images for acne detection and tracking over time**, Gabriela O. Cula, Johnson & Johnson CPPW (USA); Sudhir K. Madan, Texas Instruments Inc. (USA); Kristin J. Dana, Rutgers, The State Univ. of New Jersey (USA); Nikiforos Kollias, Johnson & Johnson CPPW (USA) [7548A-17]

4:40 pm: **5-ALA induced fluorescence image analysis of actinic keratosis**, Yong-Jin Cho, Youngwoo Bae, Eung-Ho Choi, Byungjo Jung, Yonsei Univ. (Korea, Republic of) [7548A-18]

Sunday 24 January

SESSION 5

Room: 310 (Esplanade) Sun. 8:50 to 9:50 am

*Session Chair: Anthony Joseph Durkin,
Beckman Laser Institute and Medical Ctr.*

8:50 am: **Multimodal confocal mosaicing microscopy: an emphasis on squamous cell carcinoma**, Nathaniel W. Chen, Ardaland Ardeshiri, Adam Blanchard, Steven Jacques, Daniel Gareau, Oregon Health & Science Univ. (USA) [7548A-19]

9:10 am: **Evaluation of basal and squamous cell carcinomas with combined Raman spectroscopy: optical coherence tomography (RS-OCT)**, Chetan A. Patil, Harish Krishnamoorthi, Vanderbilt Univ. (USA); Mingsheng Guo, Vanderbilt Univ. Medical Ctr. (USA); Darrel L. Ellis, Vanderbilt Univ. Medical Ctr. (USA) and Veterans Affairs Tennessee Valley Healthcare System (USA); Ton van Leeuwen, Univ. of Amsterdam (Netherlands) and Univ. of Twente (Netherlands); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7548A-20]

9:30 am: **In vivo comparative documentation of skin hydration by confocal Raman microscopy, skin sensor, Skicon and NovaMeter**, Guojin Zhang, Aline Papillon, Eduardo C. Ruvolo, Jr., Paulo R. Bargo, Nikiforos Kollias, Johnson & Johnson CPPW (USA) [7548A-22]

Coffee Break9:50 to 10:20 am

SESSION 6

Room: 310 (Esplanade) Sun. 10:20 to 11:40 am

*Session Chair: Jessica C. Ramella-Roman,
The Catholic Univ. of America*

10:20 am: **New multimodal multiphoton imaging and spectroscopy apparatus for dermatology**, Anthony Lee, Hequn Wang, Yingqiu Yu, Jianhua Zhao, The BC Cancer Research Ctr. (Canada); Shuo Tang, Harvey Lui, David I. McLean, The Univ. of British Columbia (Canada); Haishan Zeng, The BC Cancer Research Ctr. (Canada) [7548A-23]

10:40 am: **Assessment of microcirculation frequency components through functional diffuse reflectance spectroscopy: a promising tool for noninvasive skin diagnosis**, Paulo R. Bargo, InSeok Seo, Nikiforos Kollias, Johnson & Johnson CPPW (USA) [7548A-24]

11:00 am: **Monitoring chemically enhanced transdermal delivery of zinc oxide nanoparticles by using multiphoton microscopy**, Wen Lo, National Taiwan Univ. (Taiwan) and National Cheng Kung Univ. (Taiwan); Chih-Ting Hsu, National Taiwan Univ. (Taiwan); Tsung-Rong Kuo, National Taiwan Normal Univ. (Taiwan); Shu-Jen Chiang, Academia Sinica (Taiwan); Sung-Jan Lin, National Taiwan Univ. Hospital (Taiwan); Shean-Jen Chen, National Cheng Kung Univ. (Taiwan); Chia-Chun Chen, National Taiwan Normal Univ. (Taiwan); Chen-Yuan Dong, National Taiwan Univ. (Taiwan) [7548A-25]

11:20 am: **Automated detection of unequivocal malignant melanoma**, Ricky Hennessey, Daniel S. Gareau, Steve Jacques, Oregon Health & Science Univ. (USA) [7548A-26]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Delineating the region of localized human skin cancer (basal cell carcinoma) using polarization sensitive optical coherence tomography (PS-OCT), Arthur Ortega, Michael Wong, Shahid Islam, Christian Oh, Hyle Park, Univ. of California, Riverside (USA) [7548A-27]

Optimizing treatment parameters using 1064-nm Nd:YAG laser, Wei Gong, He Lin, Shusen Xie, Fujian Normal Univ. (China) 7548A-30

Yellow light in photodynamic therapy (PDT): the use of sodium light, Inge M. Zich, Carsten Philipp, Hans-Peter Berlien, Elisabeth Klinik (Germany) [7548A-31]

BIOS

BIOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.



Urology: Diagnostics, Therapeutics, Robotics, Minimally Invasive, and Photodynamic Therapy

Conference Chair: **Reza S. Malek**, Mayo Clinic

Program Committee: **Nathaniel M. Fried**, The Univ. of North Carolina at Charlotte; **Matthew T. Gettman**, Mayo Clinic; **Patrice Jichlinski**, Ctr. Hospitalier Univ. Vaudois (Switzerland); **Hyun Wook Kang**, Innovation Ctr., American Medical Systems, Inc. at San Jose; **Bodo E. Knudsen**, The Ohio State Univ.; **Ed Koulick**, American Medical Systems; **Unyime O. Nseyo**, North Florida Foundation for Research and Education, Inc.; **Rudolf M. Verdaasdonk**, Univ. Medical Ctr. Utrecht (Netherlands)

Saturday 23 January

SESSION 1

Room: 302 (Esplanade) Sat. 8:30 to 10:10 am

Spectroscopy/Multiphoton Microscopy

Session Chairs: **Nathaniel M. Fried**, The Univ. of North Carolina at Charlotte; **Hyun Wook Kang**, American Medical Systems

8:30 am: **Near-infrared spectroscopy of the bladder: a new technique for studying lower urinary tract function in health and disease**, Babak Shadgan, Kourosh Afshar, Lynn Stothers, Andrew J. Macnab, Univ. of British Columbia (Canada) [7548B-32]

8:50 am: **Multidimensional two-photon imaging and spectroscopy of fresh human bladder biopsies**, Riccardo Cicchi, Alfonso Crisci, Gabriella Nesi, Alessandro Cosci, Saverio Giancane, Marco Carini, Francesco Saverio Pavone, Univ. degli Studi di Firenze (Italy) [7548B-33]

9:10 am: **Endoscopic probe for in vivo Raman spectroscopy of the urinary bladder: initial results**, Matthijs C. M. Grimbergen, Ronald O. P. Draga, Univ. Medical Ctr. Utrecht (Netherlands); Christiaan F. P. van Swol, St. Antonius Ziekenhuis Nieuwegein (Netherlands); Rudolf M. Verdaasdonk, Ruud J. H. L. Bosch, Univ. Medical Ctr. Utrecht (Netherlands) [7548B-34]

9:30 am: **Quantitative analysis of urinary stone composition with micro-Raman spectroscopy**, Yi-Yu Huang, National Yang-Ming Univ. (Taiwan); Huihua Kenny Chiang, National Yang-Ming Univ. (Taiwan) and Taipei City Hospital (Taiwan); Yichun Chiu, National Yang-Ming Univ. (Taiwan); Y. H. Jet Chou, Taipei City Hospital (Taiwan); Shing-Hwa Lu, Taipei City Hospital (Taiwan) and National Yang-Ming Univ. (Taiwan); Allen W. Chiu, National Yang-Ming Univ. (Taiwan) [7548B-35]

9:50 am: **Ex vivo imaging of human bladder and kidney with multiphoton microscopy**, Sushmita Mukherjee, James S. Wysock, Gerald Wang, Ming-Ming Lee, Joshua A. Sterling, Mohammed Akhtar, Mark A. Rubin, Frederick R. Maxfield, Weill Cornell Medical College (USA); Warren R. Zipfel, Watt W. Webb, Cornell Univ. (USA); Douglas S. Scherr, Weill Cornell Medical College (USA) [7548B-36]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 302 (Esplanade) Sat. 10:40 am to 12:20 pm

Imaging

Session Chairs: **Rudolf M. Verdaasdonk**, Univ. Medical Ctr. Utrecht (Netherlands); **Ed Koulick**, American Medical Systems

10:40 am: **Near-infrared optical properties of prostate tissue using oblique-incidence reflectometry**, Shahab Chitichian, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [7548B-37]

11:00 am: **Imaging of dog prostate tissue by a Stokes polarimetry imaging system**, Jihoon Kim, Northwestern Univ. (USA); William K. Johnston III, NorthShore Univ. Health System (USA); Joseph T. Walsh, Northwestern Univ. (USA) [7548B-38]

11:20 am: **Real-time 3-D tactile elasticity imaging of prostate**, Ajay Nehra, Mayo Clinic (USA); Armen Sarvazyan, Artann Labs., Inc. (USA) [7548B-39]

11:40 am: **Real-time magnetic resonance imaging texture characterization of necrosis during laser interstitial thermotherapy procedures**, Nacim Betrouni, Renaud Lopes, Colin Pierre, Serge Mordon, INSERM, Ctr. Hospitalier Regional Univ. de Lille (France) [7548B-40]

12:00 pm: **Advantages of cross-polarization endoscopic optical coherence tomography in diagnosis of bladder neoplasia**, Natalia Gladkova, Elena Zagaynova, Olga Streltsova, Elena Kiseleva, Maria Karabut, Ludmila Snopova, Ekaterina Yunusova, Ekaterina Tararova, Nizhny Novgorod State Medical Academy (Russian Federation); Valentine Gelikonov, Institute of Applied Physics, RAS (Russian Federation) [7548B-41]

Lunch/Exhibition Break 12:20 to 1:40 pm

SESSION 3

Room: 302 (Esplanade) Sat. 1:40 to 3:00 pm

Laser-Tissue Interaction I

Session Chairs: **Bodo E. Knudsen**, The Ohio State Univ.; **Nathaniel M. Fried**, The Univ. of North Carolina at Charlotte

1:40 pm: **Visualization strategies to study the ablation mechanism of BPH lasers with tissue and imaging absolute temperature distributions inside tissue**, Rudolf M. Verdaasdonk, Stefan Been, Tjeerd de Boorder, John Klaessens, Univ. Medical Ctr. Utrecht (Netherlands) [7548B-42]

2:00 pm: **Five-year therapeutic efficacy of photo-selective vaporization of prostate**, Carl-Jørgen Arum, Pal Romundstad, Jan Mjones, St. Olavs Hospital (Norway) [7548B-43]

2:20 pm: **MRI-guided trans-perineal laser ablation of locally recurrent prostate adenocarcinoma**, Lance A. Mynderse, E. Frederick McPhail, Akira Kawashima, Matthew R. Callstrom, Krzysztof R. Gorny, Thomas D. Atwell, Matthew T. Gettman, Kimberly K. Amrami, David A. Woodrum, Mayo Clinic (USA) [7548B-44]

2:40 pm: **Photoselective vaporization of the prostate: outcomes and adverse events of 220 consecutive patients**, Edward J. Mueller, The Univ. of Texas Health Science Ctr. at San Antonio (USA) [7548B-45]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 302 (Esplanade) Sat. 3:30 to 5:30 pm

Laser-Tissue Interaction II

Session Chairs: **Ed Koulick**, American Medical Systems; **Rudolf M. Verdaasdonk**, Univ. Medical Ctr. Utrecht (Netherlands)

3:30 pm: **Incorporation of fiber optic beam shaping into a laparoscopic probe for laser stimulation of the cavernous nerves**, Serhat Tozburun, The Univ. of North Carolina at Charlotte (USA); Gwen A. Lagoda, Arthur L. Burnett, Johns Hopkins Hospital (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [7548B-46]

3:50 pm: **Enhancing laser tissue ablation with various compounds**, Michael Beck, Ed Koulick, Justin Crank, Hyun Wook Kang, American Medical Systems (USA) [7548B-47]

4:10 pm: **Comparison between two time-resolved approaches for prostate cancer diagnosis: high rate imager vs. photon counting system**, Jerome Boutet, Lionel Herve, Mathieu Debourdeau, Commissariat à l'Énergie Atomique (France); Jean-Marc Dinten, Lab. d'Electronique de Technologie de l'Information, CEA (France) [7548B-48]

4:30 pm: **Investigation of wavelength-dependent tissue ablation: visible ($\lambda=532$ nm) vs IR ($\lambda=2.01$ μ m)**, Hyun Wook Kang, Adam Nemeyer, Steven Peng, American Medical Systems (USA) [7548B-49]

4:50 pm: **Effect of an optical clearing agent on canine scrotal skin, ex vivo**, Christopher M. Cilip, The Univ. of North Carolina at Charlotte (USA); Ashley E. Ross, Jonathan P. Jarow, Johns Hopkins Hospital (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [7548B-50]

5:10 pm: **Noninvasive laser vasectomy: acute in vivo canine studies**, Christopher M. Cilip, The Univ. of North Carolina at Charlotte (USA); Ashley E. Ross, Jonathan P. Jarow, Johns Hopkins Medical School (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [7548B-51]

BiOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 5

Room: 302 (Esplanade) Sun. 8:30 to 10:10 am

Laser/Ultrasound Lithotripsy

Session Chairs: **Patrice Jichlinski**, Ctr. Hospitalier Univ. Vaudois (Switzerland); **Bodo E. Knudsen**, The Ohio State Univ.

8:30 am: **Optimal laser dosimetry for efficient Ho:YAG lithotripsy**, Jinze Qiu, The Univ. of Texas at Austin (USA); Joel M. H. Teichman, Univ. of British Columbia (Canada); Tianyi Wang, David Gamez, The Univ. of Texas at Austin (USA); Randolph Glickman, Univ. of Texas Health Science Ctr. at San Antonio (USA); Bodo Knudsen, The Ohio State Univ. (USA); Kin Foong Chan, Fourier Biotechnologies (USA); Thomas E. Milner, The Univ. of Texas at Austin (USA) [7548B-52]

8:50 am: **Use of a tapered distal fiber tip for thulium fiber laser lithotripsy**, Richard L. Blackmon, The Univ. of North Carolina at Charlotte (USA); Pierce B. Irby, Carolinas Medical Ctr. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [7548B-53]

9:10 am: **Holmium:Yag versus thulium fiber laser lithotripsy**, Richard L. Blackmon, The Univ. of North Carolina at Charlotte (USA); Pierce B. Irby, Carolinas Medical Ctr. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [7548B-54]

9:30 am: **Evaluation of six holmium:YAG optical fibers for ureteroscopy: What's new in 2009?**, Bodo E. Knudsen, The Ohio State Univ. Medical Ctr. (USA); Joel M. H. Teichman, The Univ. of British Columbia (Canada) [7548B-55]

9:50 am: **Comparative evaluation of inertial forces generated by ultrasonic lithotriptors**, Bodo E. Knudsen, The Ohio State Univ. Medical Ctr. (USA) [7548B-56]

Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 302 (Esplanade) Sun. 10:40 am to 12:00 pm

PDD/PDT/Stereotactics/Spectroscopy

Session Chairs: **Hyun Wook Kang**, American Medical Systems; **Patrice Jichlinski**, Ctr. Hospitalier Univ. Vaudois (Switzerland)

10:40 am: **Characterization of the positive sites by high magnification cystoscopy during fluorescence cystoscopy with Hexvix**, Blaise Lovisa, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Daniela Aymon, Patrice Jichlinski, Ctr. Hospitalier Univ. Vaudois (Switzerland); Hubert van den Bergh, Georges A. Wagnières, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7548B-57]

11:00 am: **Responses to hexyl 5-aminolevulinate-induced photodynamic treatment in rat bladder cancer model**, Carl-Jørgen Arum, St. Olavs Hospital (Norway); Odrun Gederas, Eivind Larsen, Lise Randeberg, Norwegian Univ of Science and Technology (Norway); Chun-Mei Zhao, St. Olavs Hospital (Norway) [7548B-58]

11:20 am: **Study on photochemical inactivation of cell-associated and cell-free human immunodeficiency virus in vitro**, Huijuan Yin, Yingxin Li, Tianjin Medical Univ. (China); Yongtang Zheng, Kunming Institute of Zoology, CAS (China); Zhaohui Zou, Tianjin Medical Univ. (China) [7548B-59]

11:40 am: **The feasibility of real-time bladder mapping using a stereotactic navigational system**, Ronald Draga, Herke Jan Noordmans, Tycho M.T. W. Lock, Matthijs C. M. Grimbergen, Ruud J. L. H. Bosch, Univ. Medical Ctr. Utrecht (Netherlands) [7548B-60]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 7

Room: 302 (Esplanade) Sun. 1:30 to 2:50 pm

PDT/Laser-Tissue Interaction III

Session Chairs: **Unyime O. Nseyo**, North Florida Foundation for Research and Education, Inc.; **Ed Koulick**, American Medical Systems

1:30 pm: **Photodynamic action of the Hypericum Perforatum L. methanolic extracted fraction after short intravesical instillation and white light photoactivation in orthotopic implantation of transitional cell carcinoma AY-27 cells in rat bladder**, Ioannis Tsimaris, Nikos E. Stavropoulos, Asimina Ntemou, Ioannis Tsironis, Hatzikosta General Hospital (Greece); Dimitris Skalkos, Univ. of Ioannina (Greece); Unyime O. Nseyo, North Florida Foundation for Research and Education, Inc. (USA) [7548B-61]

1:50 pm: **GreenLight laser prostatectomy: a safe and effective treatment for bladder outflow obstruction by prostate cancer**, Gordon Muir, F. Liberale, S. Chandrasekara, K. Walsh, King's College Hospital (United Kingdom) [7548B-62]

2:10 pm: **Multicentre prospective analysis of safety and efficacy of GreenLight HPS laser prostatectomy**, Gordon Muir, Fernando Gómez Sancha, Alexander Bachmann, Ben Choi, Edward Collins, Jean J. de la Rosette, Oliver Reich, Shahin Tabatabah, Henry Woo, King's College Hospital (United Kingdom) [7548B-63]

2:30 pm: **Problems with assessing new technologies in surgery: assessing the evidence and new study design**, Gordon Muir, King's College Hospital (United Kingdom) [7548B-64]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

IR absorption spectra of dried urine samples in case of any deviation in urine composition and with the presence pathological salts, Oksana Z. Drobchak, Oleg Bordun, Ivan Franko National Univ. of L'viv (Ukraine) [7548B-65]

Anticancer effect of the Hypericum Perforatum L. extract in high grade T24 human bladder cancer cells after white light photoactivation, Ioannis Tsimaris, Nikos E. Stavropoulos, Hatzikosta General Hospital (Greece); Sofia Mbellou, Dimitris Skalkos, Univ. of Ioannina (Greece); Unyime O. Nseyo, North Florida Foundation for Research and Education, Inc. (USA) [7548B-66]

Advanced Technology and Instrumentation in Otolaryngology: Lasers, Optics, Radio Frequency, and Related Technology

Conference Chairs: **Brian Jet-Fei Wong**, Univ. of California, Irvine; **Justus F. R. Igner**, Univ. Hospital Aachen (Germany)

Program Committee: **James A. Burns**, Massachusetts General Hospital; **Holger Lubatschowski**, Rowiak GmbH (Germany); **Udayan K. Shah**, Nemours/Alfred I. duPont Hospital for Children; **Colin Hopper**, Univ. College London (United Kingdom); **Henricus J. C. M. Sterenborg**, Erasmus Medical Ctr. (Netherlands); **Waseem K. Jerjes**, Univ. College London (United Kingdom)

In conjunction with:



The 2nd Scientific Meeting of the Head and Neck Optical Diagnostics Society (HNODS)

Support for this conference has been provided by: **Karl Storz Spectroscopy America, Karl Storz GmbH, Imalux, and Lumenis**

Saturday 23 January

Introductions and Opening Remarks

Room: 232 (Mezzanine) Sat. 8:15 to 8:20 am

Session Chairs: **Brian Jet-Fei Wong**, Univ. of California, Irvine; **Colin Hopper**, Univ. College London Hospitals NHS Foundation Trust (United Kingdom)

SESSION 1

Room: 232 (Mezzanine) Sat. 8:20 am to 12:00 pm

Head and Neck Optical Diagnostics: Session 1

Session Chairs: **Colin Hopper**, Univ. College London Hospitals NHS Foundation Trust (United Kingdom); **Adel K. El-Naggar**, The Univ. of Texas M.D. Anderson Cancer Ctr.

8:20 am: **Our experience with optical diagnostics of the head and neck**, Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom); Waseem K. Jerjes, Tahwinder Upile, Univ. College Hospital (United Kingdom) [7548C-67]

8:40 am: **Wide-field and high-resolution optical imaging for early detection of oral neoplasia**, Mark C. Pierce, Kelsey Rosbach, Darren M. Roblyer, Tim Muldoon, Rice Univ. (USA); Michelle D. Williams, Adel K. El-Naggar, Ann M. Gillenwater, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Rebecca R. Richards-Kortum, Rice Univ. (USA) [7548C-68]

9:00 am: **The detection of oral cancer using differential pathlength spectroscopy**, H. J. C. M. Sterenborg, Univ. Medisch Ctr. Rotterdam (Netherlands) [7548C-69]

9:20 am: **Raman spectroscopy of lymph nodes in the head and neck**, Linda Orr, Catherine A. Kendall, Joanne C. Hutchings, Martin Isabelle, John Horsnell, Nicholas Stone, Gloucestershire Royal Hospital (United Kingdom) .. [7548C-70]

9:40 am: **Design, conduct and challenges of a clinical trial utilizing elastic light scattering spectroscopy in thyroid lesions**, Jennifer E. Rosen, Hyunsuk Suh, Stephanie Lee, Ousama M. Aamar, Irving J. Bigio, Boston Univ. (USA) [7548C-168]

Coffee Break 10:00 to 10:30 am

10:30 am: **Assessment of suspicious oral lesions using optical coherence tomography**, Zaid Hamdoon, Waseem K. Jerjes, Tahwinder Upile, Univ. College Hospital (United Kingdom); Gordon P. McKenzie, Michelson Diagnostics Ltd. (United Kingdom); Amrita Jay, Gareth J. Thomas, Univ. College Hospital (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom) [7548C-72]

10:45 am: **Assessment of tumour resection margins using optical coherence tomography**, Zaid Hamdoon, Waseem K. Jerjes, Tahwinder Upile, Univ. College Hospital (United Kingdom); Gordon P. McKenzie, Michelson Diagnostics Ltd. (United Kingdom); Amrita Jay, Gareth J. Thomas, Univ. College Hospital (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom) [7548C-73]

11:00 am: **Quantitative analysis of head and neck resection margins using optical coherence tomography: Imperial-UCL work**, Zaid Hamdoon, Waseem K. Jerjes, Tahwinder Upile, Univ. College Hospital (United Kingdom); Gordon P. McKenzie, Michelson Diagnostics Ltd. (United Kingdom); Amrita Jay, Univ. College Hospital (United Kingdom); Ann Sandison, Imperial College London (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom) [7548C-74]

11:20 am: **Real-time volumetric optical coherence tomography OCT imaging with a surgical microscope**, Gereon Hüttmann, Joachim Probst, Univ. zu Lübeck (Germany); Tino Just, Hans W. Pau, Univ. Rostock (Germany); Stefan Oelckers, MÖLLER-WEDEL GmbH (Germany); Dierck Hillmann, Peter Koch, Thorlabs GmbH (Germany); Eva M. Lankenau, Univ. zu Lübeck (Germany) [7548C-75]

11:40 am: **Current Munich status concerning in-vivo optical coherence tomography for differentiating lesions of the upper aerodigestive tract**, Veronika Volgger, Herbert G. Stepp, Ludwig-Maximilians-Univ. München (Germany); Waseem K. Jerjes, Tahwinder Upile, Univ. College Hospital (United Kingdom); Andreas Leunig, Ludwig-Maximilians-Univ. München (Germany); Colin Hopper, Univ. College London Hospital (United Kingdom); Christian S. Betz, Ludwig-Maximilians-Univ. München (Germany) [7548C-174]

Lunch/Exhibition Break 12:00 to 1:20 pm

SESSION 2

Room: 232 (Mezzanine) Sat. 1:20 to 6:00 pm

Head and Neck Optical Diagnostics: Session 2

Session Chairs: **Brian Jet-Fei Wong**, Univ. of California, Irvine; **Henricus J. C. M. Sterenborg**, Univ. Medisch Ctr. Rotterdam (Netherlands)

1:20 pm: **Automatic segmentation of clinical OCT images for the determination of epithelial thickness changes in laryngeal lesions**, Henning Wisweh, Laura Martinez Mateu, Laser Zentrum Hannover e.V. (Germany); Marcel Kraft, Kantonsspital Aarau (Switzerland); Alexander Krüger, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7548C-76]

1:40 pm: **Ultra-high-resolution 3D full-field optical coherence microscopy of the pulmonary airways ex vivo**, Linbo Liu, William Oh, Brett E. Bouma, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Steven M. Rowe, The Univ. of Alabama at Birmingham (USA); Guillermo J. Tearney, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [7548C-77]

2:00 pm: **High-speed three-dimensional imaging of the pulmonary alveoli**, Eman Namati, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Carolin Unglert, Harvard Medical School (USA) and Massachusetts General Hospital (USA) and Air Liquide (France); Brett E. Bouma, Guillermo J. Tearney, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) [7548C-78]

2:20 pm: **Multimodality bronchoscopic imaging of airway abnormalities**, Septimiu D. Murgu M.D., Henri G. Colt, Yeh-Chan Ahn, Matthew Brenner M.D., Univ. of California, Irvine (USA) [7548C-175]

2:40 pm: **Reflectance microscopy techniques for 3D imaging of the alveolar structure**, Carolin Unglert, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) and Air Liquide R&D Medical Gases (France); Eman Namati, Linbo Liu, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Hongki Yoo, DongKyun Kang, Brett E. Bouma, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Guillermo Tearney, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [7548C-79]

Sunday 24 January

SESSION 3

Room: 232 (Mezzanine) Sun. 8:00 to 9:40 am

Nasal Airway and Cartilage Reshaping Technologies

Session Chair: Brian Jet-Fei Wong, Univ. of California, Irvine

8:00 am: **Feedback controlled laser system for safe and efficient reshaping of nasal cartilage** (*Invited Paper*), Emil Sobol, Alexander Sviridov, Natalia Vorobieva, Institute of Laser and Information Technologies (Russian Federation); Valery Svistushkin, Vladimirskiy Research and Clinical Institute of Moscow Region (Russian Federation) [7548C-84]

8:20 am: **Methods for evaluating changes in cartilage stiffness following electromechanical reshaping**, Amanda Lim, Dmitriy E. Protsenko, Brian J. Wong, Beckman Laser Institute and Medical Ctr. (USA) [7548C-85]

8:35 am: **Using optical coherence tomography to monitor effects of electromechanical reshaping in septal cartilage**, Heather Chen, Univ. of Southern California (USA) and University of California, Irvine (USA); Lingfeng Yu, Cyrus Manuel, Brian Jet-Fei Wong, University of California, Irvine (USA) [7548C-86]

8:45 am: **Comparison of bend angle measurements in fresh cryopreserved cartilage specimens after electromechanical reshaping**, Koohyar Karimi, Dmitriy Protsenko, Edward Wu, Allen Foulad, Cyrus Manuel, Brian J. Wong M.D., Beckman Laser Institute and Medical Ctr. (USA) [7548C-87]

8:55 am: **Monitoring of electrical current in rabbit and porcine cartilage tissue during electromechanical reshaping**, Cyrus Manuel, Allen Foulad, Dimitry Protsenko, Brian J. Wong, Beckman Laser Institute, Univ. of California, Irvine (USA) [7548C-88]

9:05 am: **Numerical analysis of costal cartilage warping after laser modification**, Allen Foulad, Cyrus Manuel, Brian J. Wong, Beckman Laser Institute, University of California Irvine (USA) [7548C-89]

9:20 am: **A laser device for fusion of nasal mucosa** (*Invited Paper*), Michael C. Larson, Valmiki Sooklal, Jesse McClure, Luke Hooper, Jason Sieber, Univ. of Colorado at Colorado Springs (USA) [7548C-90]

SESSION 4

Room: 232 (Mezzanine) Sun. 9:40 am to 12:10 pm

PDT and Advanced Application of Lasers in the Head and Neck I

Session Chairs: Justus F. R. Ilgner, Univ. Hospital Aachen (Germany); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom)

9:40 am: **Ten years of experience with photodynamic therapy of early oral cavity and oropharynx cancers: a retrospective report of 170 patients**, Baris Karakullukcu, Kim van Oudanaarde, Maarten Wildeman, Martin Klop, Bing Tan, Antoni van Leeuwenhoek, The Netherlands Cancer Institute (Netherlands) [7548C-91]

Coffee Break :3:10 to 3:40 pm

10:30 am: **The role of photodynamic therapy in the management of oral dysplasia**, Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom); Waseem K. Jerjes, Zaid Hamdoon, Tahwinder Upile, Univ. College Hospital (United Kingdom) [7548C-92]

10:50 am: **Photodynamic therapy of laryngeal cancers** (*Invited Paper*), Merrill A. Biel, Virginia Piper Cancer Institute, Abbott Northwestern Hospital (USA) [7548C-93]

11:10 am: **Ultrasound-guided interstitial photodynamic therapy for deeply seated pathologies: assessment of outcome**, Jonas Osher, Waseem K. Jerjes, Tahwinder Upile, Zaid Hamdoon, Farai Nhembe, Rishi Bhandari, Sorcha Mackay, Priya Shah, Univ. College Hospital (United Kingdom); Charles Alexander Mosse, Univ. College London (United Kingdom); Simon Morley, Univ. College Hospital (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom) [7548C-94]

11:30 am: **Photochemical internalization**, Waseem K. Jerjes, Tahwinder Upile, Univ. College Hospital (United Kingdom); Charles A. Mosse, Martin R. Austwick, Univ. College London (United Kingdom); Zaid Hamdoon, Dawn Carnell, Univ. College Hospital (United Kingdom); Kristian Berg, Oslo Univ. Hospital (Norway); Anders Høgset, PCI Biotech AS (Norway); Stephen G. Bown, Colin Hopper, National Medical Laser Ctr. (United Kingdom) [7548C-180]

3:00 pm: **Three-dimensional microscopy of the human bronchial mucosa**, Melissa J. Suter, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); David R. Riker, Lahey Clinic Medical Ctr. (USA); Brett E. Bouma, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); John F. Beamis, Jr., Lahey Clinic Medical Ctr. (USA); Guillermo J. Tearney, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) [7548C-80]

3:20 pm: **Fiber-based microendoscopic multiphoton imaging**, Gangjun Liu, Beckman Laser Institute and Medical Ctr., Univ. of California, Irvine (USA); Brian J. Wong M.D., Univ. of California, Irvine (USA); Zhongping Chen, Beckman Laser Institute and Medical Ctr., Univ. of California, Irvine (USA) ... [7548C-167]

Coffee Break :3:40 to 4:00 pm

4:00 pm: **Endoscopic ICG perfusion imaging for flap transplants: technical development**, Herbert G. Stepp, Ludwig-Maximilians-Univ. München (Germany) [7548C-81]

4:15 pm: **Endoscopic ICG perfusion imaging for flap transplants: clinical results**, Christian S. Betz, Ludwig-Maximilians-Univ. München (Germany) [7548C-82]

4:30 pm: **Utilizing 5-aminolevulinic acid and pulsed dye laser for photodynamic therapy of oral leukoplakia: pilot study**, Gal Shafirstein, Univ. of Arkansas for Medical Sciences (USA); Wolfgang Baeumler, Univ. Clinics Regensburg (Germany); Eric Sigel, Chun-Yang Fan, Emre Vural, B. Stack, James Y. Suen M.D., Univ. of Arkansas for Medical Sciences (USA) [7548C-176]

4:50 pm: **In vivo monitoring of Foscan-mediated photodynamic therapy in clinical head and neck procedures using optical spectroscopy**, Stephen C. Kanick, Univ. Medisch Ctr. Rotterdam (Netherlands); Baris Karakullukcu, Antoni van Leeuwenhoek Hospital, Netherlands Cancer Institute (Netherlands); Robert L. van Veen, Henricus J. C. M. Sterenborg, Univ. Medisch Ctr. Rotterdam (Netherlands); I. Bing, Antoni van Leeuwenhoek Hospital, Netherlands Cancer Institute (Netherlands); Max J. Witjes M.D., Univ. Medical Ctr. Groningen (Netherlands); Arjen Amelink, Dominic J. Robinson, Univ. Medisch Ctr. Rotterdam (Netherlands) [7548C-83]

5:10 pm: **Emerging applications for OCT in the head and neck**, Marc Rubinstein, Jason Kim, William B. Armstrong, Hamid R. Djallilian, Univ. of California, Irvine (USA); Zhongping Chen, Brian J. Wong M.D., Beckman Laser Institute and Medical Ctr., Univ. of California, Irvine (USA) [7548C-177]

5:25 pm: **Measurement of epithelial thickness within the oral cavity using optical coherence tomography (OCT)**, Sven Prestin, Christian S. Betz, Marcel Kraft, State Hospital Aarau (Switzerland) and Ludwig-Maximilian Univ. Hospital München (Germany) [7548C-178]

5:40 pm: **Towards early dental caries detection with OCT and polarized Raman spectroscopy**, Lin-P'ing Choo-Smith, National Research Council Canada (Canada) [7548C-179]

BiOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

11:50 am: **Non-invasive measurement of photosensitizer concentration using fluorescence differential path-length spectroscopy: validation for different liposomal formulations of m-THPC: Foscan, Foslip and Fospeg.** Sebastiaan A. de Visscher, Max J. Witjes M.D., Univ. Medical Ctr. Groningen (Netherlands); Slávka Kascáková, Dominic J. Robinson, Henricus J. C. M. Sterenberg, Univ. Medisch Ctr. Rotterdam (Netherlands); Jan L. N. Roodenburg, Univ. Medical Ctr. Groningen (Netherlands); Arjen Amelink, Univ. Medisch Ctr. Rotterdam (Netherlands) [7548C-184]
 Lunch/Exhibition Break 12:10 to 1:20 pm

SESSION 5

Room: 232 (Mezzanine) Sun. 1:20 to 6:00 pm

PDT and Advanced Application of Lasers in the Head and Neck II

Session Chairs: **Justus F. R. Ilgner**, Univ. Hospital Aachen (Germany); **Waseem K. Jerjes**, Univ. College Hospital (United Kingdom)

1:20 pm: **Treatment planning for interstitial photodynamic therapy for head and neck cancer.** R. L. P. van Veen, Dominic J. Robinson, Henricus J. C. M. Sterenberg, Univ. Medisch Ctr. Rotterdam (Netherlands); Jan Bonne Aans, Erasmus MC (Netherlands); I. B. Tan, F. Hoebbers, Het Nederlands Kanker Instituut (Netherlands); Max J. Witjes M.D., Univ. Medisch Ctr. Groningen (Netherlands); P. C. Levendag, Erasmus MC (Netherlands) [7548C-181]

1:40 pm: **Photodynamic therapy as the “last hope” for tongue-based carcinoma.** Waseem K. Jerjes, Tahwinder Upile, Zaid Hamdoon, Farai Nhembe, Rishi Bhandari, Sorcha Mackay, Univ. College Hospital (United Kingdom); Charles Alexander Mosse, Univ. College London (United Kingdom); Simon Morley, Univ. College Hospital (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom) [7548C-96]

1:55 pm: **Laser interactive thermal therapy for head and neck lesions.** Gal Shafirstein, Gresham Richter, Lisa Buckmiller, James Y. Suen M.D., Univ. of Arkansas for Medical Sciences (USA) [7548C-182]

2:10 pm: **CO₂ laser transoral laser microsurgery of head and neck cancer: lessons learned over ten years.** William B. Armstrong, Univ. of California, Irvine (USA); Marc Rubinstein, Beckman Laser Institute and Medical Ctr., Univ. of California, Irvine (USA) [7548C-169]

2:30 pm: **Femtosecond laser microstructuring and bioactive nanocoating of titanium surfaces in relation to chondrocyte growth.** Justus F. R. Ilgner, Slavomir Biedron, Univ. Hospital Aachen (Germany); Elena Fadeeva, Boris Cichkov, Laser Zentrum Hannover e.V. (Germany); Doris Klee, RWTH Aachen (Germany); Anneke Loos, Eveline Sowa-Soehle, Medizinische Hochschule Hannover (Germany); Martin Westhofen, Univ. Hospital Aachen (Germany) [7548C-99]

2:50 pm: **CO₂ laser myringoplasty using a handheld waveguide.** David M. Kaylie, Jason Miller, Duke Univ. Medical Ctr. (USA) [7548C-101]

Coffee Break 3:10 to 3:40 pm

3:40 pm: **The effect of PDT on H. influenza biofilm in vivo.** Chung-Ku Rhee M.D., So-Young Chang, Phil-Sang Chung M.D., Jae-Yun Jung M.D., Jin-chul Ahn M.D., Myung-Whan Suh, Dankook Univ. Hospital (Korea, Republic of) [7548C-97]

4:00 pm: **Toward endoscopic ultrafast laser microsurgery of vocal folds.** Adela Ben-Yakar, Christopher L. Hoy, W. Neil Everett, The Univ. of Texas at Austin (USA); James Kobler, Massachusetts General Hospital (USA) [7548C-98]

4:20 pm: **Laser hearing aids.** G. I. Wenzel, Medizinische Hochschule Hannover (Germany); Hubert H. Lim, Medizinische Hochschule Hannover (Germany) and Univ. of Minnesota (USA); Kaiyin Zhang, Laser Zentrum Hannover e.V. (Germany); Sven Balster, Medizinische Hochschule Hannover (Germany); Ole Massow, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany); Guenter Reuter, Thomas Lenarz, Medizinische Hochschule Hannover (Germany) [7548C-100]

4:40 pm: **An optical coherence tomography study for imaging the round window niche and the promontorium tympani.** Tino Just, Univ. Rostock (Germany); Eva M. Lankenau, Gereon Hüttmann, Univ. zu Lübeck (Germany); Hans W. Pau, Univ. Rostock (Germany) [7548C-71]

5:00 pm: **Lasers, a tool for soft cochleostomies.** Andrew J. Fishman, Feinberg School of Medicine, Northwestern Univ. (USA) and National Naval Medical Ctr. (USA); Laura E. Moreno, Feinberg School of Medicine, Northwestern Univ. (USA); Arnold Rivera, National Naval Medical Ctr. (USA); Claus-Peter Richter, Feinberg School of Medicine, Northwestern Univ. (USA) and National Naval Medical Ctr. (USA) [7548C-171]

5:20 pm: **The use of CO₂ laser in tumour resection of the oropharyngeal region.** Tahwinder Upile, Waseem K. Jerjes, Zaid Hamdoon, Univ. College Hospital (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom) [7548C-102]

5:40 pm: **CO₂ laser ablation of oropharyngeal dysplasia.** Tahwinder Upile, Waseem K. Jerjes, Zaid Hamdoon, Univ. College Hospital (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom) [7548C-103]



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See p. 10

Diagnostic and Therapeutic Applications of Light in Cardiology

Conference Chairs: **Kenton W. Gregory**, Oregon Medical Laser Ctr.; **Guillermo J. Tearney**, Massachusetts General Hospital; **Laura Marcu**, Univ. of California, Davis

Saturday 23 January

SESSION 1

Room: 308 (Esplanade). Sat. 8:00 to 10:00 am

Spectroscopy and Therapy

Session Chair: **Laura Marcu**, Univ. of California, Davis

8:00 am: **Contour mapping of the chemical composition within human coronary artery via intravascular Raman spectroscopy**, Jonathan Nazemi, James F. Brennan III, Prescient Medical, Inc. (USA); Giuseppe M. Sangiorgi M.D., Univ. of Modena and Reggio Emilia (Italy); Alessandro Mauriello, Univ. of Rome Tor Vergata (Italy) [7548D-104]

8:20 am: **A steerable IVUS guided multimodal catheter for in vivo time-resolved fluorescence spectroscopy**, Hongtao Xie, Douglas N. Stephens, Yang Sun, Yinghua Sun, Laura Marcu, Univ. of California, Davis (USA) [7548D-105]

8:40 am: **Endoscopic FLIM images of carotid plaque: an automated classification method**, Jennifer E. Phipps, Nisa Hatami, Yinghua Sun, Ramez Saroufeem, Laura Marcu, Univ. of California, Davis (USA) [7548D-106]

9:00 am: **Raman spectroscopy for atherosclerotic plaque characterization**, Alexandra H. Chau, Massachusetts Institute of Technology (USA) and Massachusetts General Hospital (USA); Joseph A. Gardecki, Brett E. Bouma, Guillermo J. Tearney, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [7548D-107]

9:20 am: **Non-thermal ablation technology for arrhythmia therapy: acute and chronic electrical conduction block with photosensitization reaction**, Arisa Ito, Hiroki Matsuo, Tsukasa Suenari, Takuro Kajihara, Keio Univ. (Japan); Takehiro Kimura, Shunichiro Miyoshi, Keio Univ. School of Medicine (Japan); Tsunenori Arai, Keio Univ. (Japan) [7548D-108]

9:40 am: **Monitoring and guidance of cardiac radiofrequency ablation using optical coherence tomography**, Christine P. Fleming, Hui Wang, Zhilin Hu, Case Western Reserve Univ. (USA); Kara J. Quan, Metro Health Medical Ctr. (USA); Andrew M. Rollins, Case Western Reserve Univ. (USA) [7548D-109]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 308 (Esplanade). Sat. 10:30 to 11:50 am

OCT I

Session Chair: **Guillermo J. Tearney**, Wellman Ctr. for Photomedicine

10:30 am: **Impact of the beam distortion on the quantitative coronary artery optical coherence tomography analysis**, Nobuaki Suzuki, Hirosada Yamamoto, Shuichi Ishikawa, Yoshitaka Shiratori, Akiyoshi Miyazawa, Ken Kozuma, Takaaki Isshiki, Teikyo Univ. (Japan) [7548D-110]

10:50 am: **Toward the development of an automatic image processing algorithm for initiating and terminating intracoronary OFDI pullback**, Lida P. Hariri, Brett Bouma, Guillermo J. Tearney, Massachusetts General Hospital (USA) [7548D-111]

11:10 am: **Optimizing flushing parameters in intracoronary optical coherence tomography: an in vivo swine study**, Melissa J. Suter, Seemantini K. Nadkarni, Kevin A. Gallagher, Nayan Asanani, Harvard Medical School and Wellman Ctr. for Photomedicine (USA); Gerard B. Condit, Armando Tellex, Krzysztof Milewski, Greg L. Kaluza, Juan F. Granada, Cardiovascular Research Foundation (USA); Brett E. Bouma, Guillermo J. Tearney, Harvard Medical School and Wellman Ctr. for Photomedicine (USA) [7548D-112]

11:30 am: **Durable phantoms of atherosclerotic arteries for optical coherence tomography**, Charles-Etienne Bisailon, Marc L. Dufour, Guy Lamouche, National Research Council Canada (Canada) [7548D-113]

Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 3

Room: 308 (Esplanade). Sat. 1:20 to 2:40 pm

OCT II

Session Chair: **Seemantini K. Nadkarni**, Harvard Medical School

1:20 pm: **Clinical studies of frequency domain optical coherence tomography in the coronary arteries: the first 200 patients**, Christopher Petersen, Desmond C. Adler, Joseph M. Schmitt, LightLab Imaging, Inc. (USA) [7548D-114]

1:40 pm: **OCT catheterization of healthy and diseased artery models**, Mark D. Hewko, Guy Lamouche, Marc Dufour, Michael Smith, Bruno Gauthier, Elicia Kohlenberg, Saro Bascaramurty, Sebastien Vergnole, Charles-Etienne Bisailon, Lin-P'ing Choo-Smith, Chun-Te Ko, Christian Padioleau, Frédéric D'Amours, Eric Pellerin, Michael Sowa, National Research Council Canada (Canada) [7548D-115]

2:00 pm: **Increase of retrograde blood flow in the early quail embryonic vitelline artery after acute hypoxic exposure**, Shi Gu, Michael W. Jenkins, Lindsay M. Peterson, Michiko Watanabe, Yong-Qiu Doughman, Andrew M. Rollins, Case Western Reserve Univ. (USA) [7548D-116]

2:20 pm: **Clinical experience with intracoronary optical frequency domain imaging for visualization of coronary artery microstructure**, Guillermo J. Tearney, Massachusetts General Hospital (USA); Sergio Waxman, Lahey Clinic (USA); Melissa Suter, Milen Shishkov, Benjamin Vakoc, Massachusetts General Hospital (USA); Akiko Maehara, Celia Castellanos, Columbia Univ. Medical Ctr. (USA); Mark Freilich, Lahey Clinic (USA); Mireille Rosenberg, Massachusetts General Hospital (USA); Giora Weisz, Jeffrey Moses, Martin Leon, Columbia Univ. Medical Ctr. (USA); Brett Bouma, Massachusetts General Hospital (USA) [7548D-117]

Coffee Break 2:40 to 3:10 pm

SESSION 4

Room: 308 (Esplanade). Sat. 3:10 to 4:30 pm

Flow, Perfusion, Diffusion

Session Chair: **Kenton W. Gregory**, Oregon Medical Laser Ctr.

3:10 pm: **Assessment of peripheral tissue perfusion by dynamic optical imaging and nonlinear regression modeling**, Yujung Kang, Jungsul Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of); Kihwan Kwon, Ewha Womans Univ. (Korea, Republic of); Chulhee Choi, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7548D-118]

3:30 pm: **Assessment of permeation of lipoproteins in human carotid tissue**, Kirill V. Larin, Mohamad Ghosn, Univ. of Houston (USA) [7548D-119]

3:50 pm: **Intraoperative assessment of acute revascularization effect on ischemic muscle perfusion and oxygenation**, Yu Shang, Univ. of Kentucky (USA); Youquan Zhao, Univ. of Kentucky (USA) and Tianjin Univ. (China); Ran Cheng, Lixin Dong, Sibin P. Saha, Guoqiang Yu, Univ. of Kentucky (USA) [7548D-120]

4:10 pm: **Optical frequency domain imaging for intracoronary blood flow measurements**, Guillermo J. Tearney, Melissa Suter, Benjamin Vakoc, Milen Shishkov, Seemantini Nadkarni, Brett Bouma, Massachusetts General Hospital (USA) [7548D-121]

BiOS Hot Topics

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Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Conference Chairs: **Henry Hirschberg**, Univ. of California, Irvine; **Steen J. Madsen**, Univ. of Nevada, Las Vegas

Saturday 23 January

SESSION 1

Room: 226 (Mezzanine) Sat. 8:40 to 10:00 am

Blood Flow Measurements in the Brain

Session Chair: **Steen J. Madsen**, Univ. of Nevada, Las Vegas

8:40 am: **Multichannel time-resolved spectroscopic system for TBI/stroke monitoring: preliminary study**, Juliette J. Selb, Massachusetts General Hospital (USA); Mircea Mujat, Daniel X. Hammer, Nicusor Iftimia, Physical Sciences, Inc. (USA) [7548E-122]

9:00 am: **Functional Doppler optical coherence tomography for cortical blood flow imaging**, Lingfeng Yu, Gangjun Liu, Elaine Nguyen, Bernard Choi, Zhongping Chen, Beckman Laser Institute and Medical Ctr., Univ. of California, Irvine (USA) [7548E-123]

9:20 am: **Optically based quantification of absolute cerebral metabolic rate of oxygen (CMRO₂) with high spatial resolution in rodents**, Mohammad A. Yaseen, Vivek J. Srinivasan, Sava Sakadžić, Massachusetts General Hospital (USA); Sergei A. Vinogradov, Univ. of Pennsylvania (USA); David A. Boas, Massachusetts General Hospital (USA) [7548E-124]

9:40 am: **Long-term monitoring cerebrovascular response in focal traumatic and ischemic brain injuries**, Yali Jia, Andras Gruber, Nabil Alkayed, Ruikang K. Wang, Oregon Health & Science Univ. (USA) [7548E-125]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 226 (Mezzanine) Sat. 10:30 to 11:50 am

Brain Imaging I

Session Chair: **Henry Hirschberg**, Beckman Laser Institute and Medical Ctr.

10:30 am: **Four-dimensional multi-site two-photon excitation**, Vincent R. Daria, Christian Stricker, The Australian National Univ. (Australia); Richard Bowman, Univ. of Glasgow (United Kingdom); Hans Bachor, Steve Redman, The Australian National Univ. (Australia) [7548E-126]

10:50 am: **A modified MPEG2 algorithm for HD and 3D medical imaging**, Wayne J. Picard, Picard Internet Products (Canada) [7548E-127]

11:10 am: **Semantic deficit in Chinese dyslexia: a NIRS study**, Jinyan Sun, Jiahuan Zhai, Ting Li, Zhongxing Zhang, Hui Gong, Huazhong Univ. of Science and Technology (China) [7548E-128]

11:30 am: **Causality of cerebral hemodynamic responses to whisker stimulation in the rat brain using NIRS**, Seungduk Lee, Dalkwon Koh, Korea Univ. (Korea, Republic of); Young-Jin Jung, Chang-Hwan Im, Yonsei Univ. (Korea, Republic of); Beop-Min Kim, Korea Univ. (Korea, Republic of) [7548E-129]

Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 3

Room: 226 (Mezzanine) Sat. 1:20 to 3:00 pm

Brain Tumor Therapy

Session Chair: **Steen J. Madsen**, Univ. of Nevada, Las Vegas

1:20 pm: **Dynamic contrast enhanced magnetic resonance imaging (DCE-MRI) for the assessment of Pc 4-sensitized photodynamic therapy of a U87-derived glioma model in the athymic nude rat**, Ali Anka, Paul Thompson, Eric Mott, Rahul Sharma, Ruozhen Zhang, Nathan Cross, Jiayang Sun, Chris A. Flask, Nancy L. Oleinick, David Dean, Case Western Reserve Univ. (USA) [7548E-130]

1:40 pm: **Development of an autofluorescent probe designed to help brain tumour removal: study on an animal model**, Rainer Siebert, CNRS, Univ. Paris-Sud 11 (France); Barbara Leh, Univ. Paris-Sud 11 (France); Mauricette Collado-Hilly, François Monnet, INSERM (France); Pascale Varlet, Hôpital Sainte Anne (France); Yves Charon, Univ. Paris 7 (France); Marie-Alix Duval, Univ. Evry (France); Laurent Menard, Univ. Paris 7 (France) [7548E-131]

2:00 pm: **Bypassing the blood brain barrier: delivery of therapeutic agents by macrophages**, Henry Hirschberg, Beckman Laser Institute and Medical Ctr. (USA); Gultekin Gulsen, Young Jik Kwon, Univ. of California, Irvine (USA); Steen J. Madsen, Univ. of Nevada, Las Vegas (USA) [7548E-132]

2:20 pm: **Near-infrared-activated gold nanoshells for thermal ablation of macrophages in vitro**, Steen J. Madsen, Amani R. Makkouk, Univ. of Nevada, Las Vegas (USA); H. Michael Gach, Nevada Cancer Institute (USA); Henry Hirschberg M.D., Beckman Laser Institute and Medical Ctr. (USA) [7548E-133]

2:40 pm: **RF hyperthermia using conductive nanoparticles**, Michael Gach, Tejas Nair, Nevada Cancer Institute (USA) [7548E-134]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 226 (Mezzanine) Sat. 3:30 to 4:50 pm

Brain Imaging II

Session Chair: **Henry Hirschberg**, Beckman Laser Institute and Medical Ctr.

3:30 pm: **Using the blood oxygenation level dependent signal utilizing spectral-domain optical coherence tomography**, Erica Freeman, Yan Wang, Md. Shahidul Islam, Christian M. Oh, Arthur Ortega, B. Hyle Park, Univ. of California, Riverside (USA) [7548E-135]

3:50 pm: **Neuroendovascular optical coherence tomography Imaging: Clinical feasibility and applications**, Marlon S. Mathews, Univ. at Buffalo (USA); Jianping Su, Esmail Heidari, Beckman Laser Institute and Medical Ctr. (USA); Mark E. Linskey, Univ. of California, Irvine (USA); Leo N. Hopkins, Univ. at Buffalo (USA); Zhongping Chen, Beckman Laser Institute and Medical Ctr. (USA) [7548E-137]

4:10 pm: **Brain connectivity study of joint attention using frequency-domain optical imaging technique**, Ujwal Chaudhary, Vishwani Sharma, Anuradha Godavarty, Florida International Univ. (USA) [7548E-138]

4:30 pm: **Dynamic differential imaging of intrinsic optical responses in the retina**, Xin-Cheng Yao, Yang-Guo Li, Lei Liu, The Univ. of Alabama at Birmingham (USA) [7548E-139]

BiOS Hot Topics

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Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Optics in Bone Biology and Diagnostics

Conference Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

Program Committee: **Robert R. Alfano**, The City College of New York; **Bennett T. Amaechi**, The Univ. of Texas Health Science Ctr. at San Antonio; **Angela Cheung**, Univ. Health Network (Canada); **Peter Fratzl**, Max-Planck-Institut für Kolloid- und Grenzflächenforschung (Germany); **Huabei Jiang**, Univ. of Florida; **Stephen J. Matcher**, The Univ. of Sheffield (United Kingdom); **Michael D. Morris**, Univ. of Michigan; **Eleftherios P. Paschalis**, Ludwig Boltzmann Institut (Austria); **George Sandor**, Hospital for Sick Children Toronto (Canada)

Saturday 23 January

SESSION 1

Room: 218 (Mezzanine) Sat. 8:30 to 10:00 am

Bone Spectroscopy and Optical Processes I

Session Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

- 8:30 am: **Potential of Raman spectroscopy to evaluate bone quality in postmenopausal osteoporosis patients: first results of a perspective study** (*Invited Paper*), Gurjit S. Mandair, Francis W. Esmonde-White, Aaron M. Swick, Univ. of Michigan (USA); Mohammed P. Akhter, Creighton Univ. (USA); Jaclynn Kreider, Steven A. Goldstein, Univ. of Michigan (USA); Robert R. Recker, Creighton Univ. (USA); Michael D. Morris, Univ. of Michigan (USA) [7548F-140]
- 9:00 am: **Stereo digital image correlation for characterization of fresh bone**, Megan E. Bland, Univ. of Michigan (USA); Marisol Cortes, Western New England College (USA); Kristin J. Solt, Mohammad-Reza Siadat, Lian Xiang Yang, Oakland Univ. (USA) [7548F-141]
- 9:20 am: **Polarized Raman spectroscopy of bone tissue: watch the scattering**, Mekhala Raghavan, Nadder D. Sahar, Robert H. Wilson, Mary-Ann Mycek, Univ. of Michigan (USA); Nancy Pleshko, Temple Univ. (USA); David H. Kohn, Michael D. Morris, Univ. of Michigan (USA) [7548F-142]
- 9:40 am: **Raman spectroscopic evidence of crystalline phosphate precursor to bone apatitic mineral**, John-David P. McElderry, Qian Yang, Gurjit S. Mandair, Renny T. Franceschi, Michael D. Morris, Univ. of Michigan (USA) [7548F-143]
- Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 218 (Mezzanine) Sat. 10:30 am to 12:20 pm

Bone Spectroscopy and Optical Processes II

Session Chair: **Michael D. Morris**, Univ. of Michigan

- 10:30 am: **Results of CO₂ robotic laser osteotomy in surgery with motion compensation** (*Invited Paper*), Holger Mönnich, Daniel Stein, Univ. Karlsruhe (Germany) [7548F-144]
- 11:00 am: **Maturity of human bone estimated by FTIR spectroscopy analysis: implications for osteoporosis**, Irene Salas-García, Luis Buelta-Carrillo, Félix Fanjul-Vélez, Noé Ortega-Quijano, Univ. de Cantabria (Spain); M. Rada-Arias, ICANE (Spain); José L. Arce-Diego, Univ. de Cantabria (Spain) [7548F-145]
- 11:20 am: **Treatment feasibility study of osteoporosis using minimal invasive laser needle system**, Dongyeon Kang, Chang-Yong Ko, Yeon-Hang Ryu, Sunwook Park, Han-Sung Kim, Byungjo Jung, Yonsei Univ. (Korea, Republic of) [7548F-146]
- 11:40 am: **Exposed and transcutaneous measurement of musculoskeletal tissues using fiber optic coupled Raman spectroscopy**, Francis W. L. Esmonde-White, Karen A. Esmonde-White, Michael D. Morris, Univ. of Michigan (USA) [7548F-147]
- 12:00 pm: **Dynamic photophysical processes in laser irradiated human cortical skull bone measured by means of modulated luminescence and infrared photothermal radiometry**, Andreas Mandelis, Univ. of Toronto (Canada); Chi Hang Kwan, University of Toronto (Canada); Anna Matvienko, [7548F-148]
- Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 3

Room: 218 (Mezzanine) Sat. 1:50 to 3:30 pm

Bone Spectroscopy and Optical Processes III

Session Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

- 1:50 pm: **Optical analysis of physical and biochemical properties of murine calvaria with combined Raman spectroscopy optical coherence tomography** (*Invited Paper*), Harish Krishnamoorthi, Chetan A. Patil, Daniel S. Perrien, Elizabeth C. O'Quinn, Gloria E. Gutierrez, Jeffrey S. Nyman, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7548F-149]
- 2:20 pm: **Photothermal radiometry and modulated luminescence examination of demineralized and remineralized dental lesions** (*Invited Paper*), Andreas Mandelis, Univ. of Toronto (Canada); Adam Hellen, Univ. of Toronto (Canada) and Univ. of Toronto, Dept. of Dentistry (Canada); Yoav Finer, University of Toronto (Canada) [7548F-150]
- 2:50 pm: **In vivo detection of osteoarthritis in the hand with three-dimensional photoacoustic tomography**, Yao Sun, Eric S. Sobel, Huabei Jiang, Univ. of Florida (USA) [7548F-170]
- 3:10 pm: **Evaluation of laser ablation of knee cartilage as an alternative to microfracture surgery: pilot investigations**, Erica Su, Brian J. F. Wong, Hui Sun, Tibor Juhasz, Univ. of California, Irvine (USA) [7548F-151]

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Photons and Neurons II

Conference Chairs: **Anita Mahadevan-Jansen**, Vanderbilt Univ.; **E. Duco Jansen**, Vanderbilt Univ.

Program Committee: **Edward S. Boyden**, Massachusetts Institute of Technology; **Timothy J. Ebner**, Univ. of Minnesota; **Maarten Frens**, Erasmus MC (Netherlands); **Elizabeth M. C. Hillman**, Columbia Univ.; **Henry Hirschberg**, Univ. of California, Irvine; **Steen J. Madsen**, Univ. of Nevada, Las Vegas; **Agnella Izz Matic**, Northwestern Univ.; **Jonathon D. Wells**, Lockheed Martin Aculight

Monday 25 January

SESSION 1

Room: 234 (Mezzanine) Mon. 8:30 to 9:30 am

Imaging - OCT

8:30 am: **Non-contact detection of functionally stimulated nerve activity using spectral domain optical coherence tomography**, Yan Wang, Christian M. Oh, Erica G. Freeman, Yan Wang, Christian Oh, Arthur R. Ortega, Boris H. Park, Univ. of California, Riverside (USA) [7548G-152]

9:00 am: **Quantitative assessment of peripheral nerve damaging using polarization-sensitive optical coherence tomography**, Yan Wang, Christian M. Oh, Md. Shahidul Islam, Erica G. Freeman, Arthur Ortega, B. Hyle Park, Univ. of California, Riverside (USA) [7548G-153]

SESSION 2

Room: 234 (Mezzanine) Mon. 9:30 to 10:30 am

Imaging - Microscopy

9:30 am: **Fast two-photon neuronal imaging and control using a spatial light modulator and ruthenium compounds**, Darcy Peterka, Volodymyr Nikolenko, Elodie Fino, Roberto Araya, Columbia Univ. (USA); Roberto Etchenique, Univ. de Buenos Aires (Argentina); Rafael Yuste, Columbia Univ. (USA) [7548G-154]

10:00 am: **Optical devices for neural imaging: an analysis of light source noise**, Elizabeth A. Munro, Univ. of Toronto (Canada); Thomas D. O'Sullivan, Stanford Univ. (USA); Kelvin So, Hart Levy, Xiaofan Jin, Univ. of Toronto (Canada); James S. Harris, Jr., Stanford Univ. (USA); Ofer Levi, Univ. of Toronto (Canada) [7548G-155]

Coffee Break 10:30 to 11:00 am

SESSION 3

Room: 234 (Mezzanine) Mon. 11:00 am to 12:30 pm

Neural Activity

11:00 am: **Plasma membrane permeabilization by ultrashort electric pulses in neuroblastoma cells**, Bennett L. Ibey, Air Force Research Lab. (USA); Franck M. Andre, Vasyly V. Nesin, Old Dominion Univ. (USA); Gerald J. Wilmink, W. P. Roach, Air Force Research Lab. (USA); Andrei G. Pakhomov, Old Dominion Univ. (USA) [7548G-156]

11:30 am: **Thermographic and oxygenation imaging system for non-contact skin measurements to determine the effects of regional block anesthesia**, John H. Klaessens, Mattijs Landman, Rowland de Roode, Herke J. Noordmans, Rudolf M. Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands) [7548G-157]

12:00 pm: **Noninvasive optical measurements of spatially resolved electrical activity in the mouse retina**, Hansford C. Hendargo, Rolf Herrmann, Bradley A. Bower, Vadim Y. Arshavsky, Joseph A. Izatt, Duke Univ. (USA) [7548G-158]

Lunch Break 12:30 to 2:00 pm

SESSION 4

Room: 234 (Mezzanine) Mon. 2:00 to 3:30 pm

Optical Stimulation in Tissues

2:00 pm: **Combined optical and electrical stimulation of neural tissue in vivo**, Austin R. Duke, Jonathan Cayce, Jonathan Malphrus, Peter Konrad, Anita Mahadevan-Jansen, Duco Jansen, Vanderbilt Univ. (USA) [7548G-159]

2:30 pm: **A comparison between infrared neural and electrical stimulation in the rat brain**, Jonathan M. Cayce, Robert Friedman, E. D. Jansen, Anita Mahadevan-Jansen, Peter Konrad, Vanderbilt Univ. (USA) [7548G-160]

3:00 pm: **Investigating the effects of infrared neural stimulation in the Aplysia californica**, Austin R. Duke, Melanie A. Gault, Vanderbilt Univ. (USA); Jocelyn Eckert, Hui Lu, Michael Jenkins, Case Western Reserve Univ. (USA); E. Duco Jansen, Vanderbilt Univ. (USA); Hillel J. Chiel, Case Western Reserve Univ. (USA) [7548G-161]

Coffee Break 3:30 to 4:00 pm

SESSION 5

Room: 234 (Mezzanine) Mon. 4:00 to 5:00 pm

Optical Stimulation in Cells

4:00 pm: **An optogenetic neural stimulation platform for concurrent induction and recording of neural activity in neurons**, Brian McGovern, Patrick Degenaar, Nir Grossman, Rolando Berlinguer-Palmini, Mark Neil, Emmanuel Drakakis, Imperial College London (United Kingdom) [7548G-162]

4:30 pm: **Transdermal Stimulation of Neural Receptors using a Nanosecond-pulsed Laser**, Nichole M. Jindra, Air Force Research Lab. (USA) [7548G-163]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Plasticity of climbing fibers after laser-axotomy, Anna Letizia Allegra Mascarò, Univ. degli Studi di Firenze (Italy); Paolo Cesare, Fondazione Santa Lucia (Italy); Leonardo Sacconi, Univ. degli Studi di Firenze (Italy); Giorgio Grasselli, Piergiorgio Strata, Fondazione Santa Lucia (Italy); Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) [7548G-164]

Sensitivity map to photostimulation of pyramidal neurons with femtosecond laser pulses, Xiuli Liu, Shaoqun Zeng, Britton Chance Ctr. for Biomedical Photonics (China) [7548G-165]

In vivo optical microscopy of axonal myelination in chronic EAE using polarization sensitive-optical coherence tomography (PS-OCT), Christian M. Oh, Yan Wang, Mohammed Shahidul Islam, Erica Freeman, Arthur Ortega, Hyle Park, Univ. of California, Riverside (USA) [7548G-166]

Lasers in Dentistry XVI

Conference Chairs: **Peter Rechmann**, Univ. of California, San Francisco; **Daniel Fried**, Univ. of California, San Francisco

Program Committee: **Gregory B. Altshuler**, Palomar Medical Technologies, Inc.; **Tatjana Dostálová**, Charles Univ. in Prague (Czech Republic); **John D. Featherstone**, Univ. of California, San Francisco; **David M. Harris**, Bio-Medical Consultants, Inc.; **Harvey A. Wigdor**, Advocate Illinois Masonic Medical Ctr.

Sunday 24 January

SESSION 1

Room: 218 (Mezzanine) Sun. 8:20 to 11:30 am

Lasers in Dental Hard Tissue Diagnostics, Imaging, and Ablation

Session Chair: **Peter Rechmann**, Univ. of California, San Francisco

8:20 am: **Near-IR imaging of thermal changes in dental enamel during drilling with a high-speed CO₂ laser and the dental hand-piece**, Linn H. Maung, Chul Sung Lee, Daniel Fried, Univ. of California, San Francisco (USA) [7549-02]

8:40 am: **Analysis of dental abfractions by optical coherence tomography**, Eniko T. Demjan, Corina Marcauteanu D.D.S., Cosmin Sinescu, Meda-Lavinia Negrutiu, Rodica Lighezan, Liliana Vasile, Florin Topala, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Michael Hughes, Adrian Bradu, George Dobre, Adrian G. Podoleanu, Univ. of Kent (United Kingdom). [7549-03]

9:00 am: **Evaluation of a SS-OCT versus a TD-OCT system for early caries assessment**, Lin-P'ing Choo-Smith, Sebastien Vergnole, National Research Council Canada (Canada); Jialin Li, Univ. of Manitoba (Canada); Marc Dufour, Mark Hewko, Guy Lamouche, Michael Sowa, National Research Council Canada (Canada). [7549-04]

9:20 am: **Near-IR and PS-OCT imaging of secondary caries lesions**, Jonathan Stahl, Hobin Kang, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) [7549-05]

Coffee Break 9:40 to 10:10 am

10:10 am: **Selective near-UV ablation of dental calculus: measurement of removal rates**, Joshua E. Shoently, Wolf Seka, Univ. of Rochester (USA); Peter Rechmann D.D.S., Univ. of California, San Francisco (USA) [7549-06]

10:30 am: **High-speed scanning ablation of dental hard tissues with an I=9.3-µm CO₂ laser: heat accumulation and peripheral thermal damage**, Daniel Nguyen, Michal Staninec, Chul Sung Lee, Daniel Fried, Univ. of California, San Francisco (USA) [7549-07]

10:50 am: **Laser brackets debonding: Tm:YAP and Clarity™ SL self-ligating appliance system**, Tatjana Dostalova, Charles Univ. in Prague (Czech Republic); Helena Jelinkova, Jan Sulc, Czech Technical Univ. in Prague (Czech Republic); Pavel Michalik, Charles Univ. in Prague (Czech Republic); Petr Koranda, Michal Nemeč, Michal Jelínek, Martin Fibrich, Czech Technical Univ. in Prague (Czech Republic); Mitsunobu Miyagi, Sendai National College of Technology (Japan) [7549-08]

11:10 am: **Er:YAG laser debonding of porcelain veneers**, Cynthia Moforth, Natalie C. H. Buu, Frederick C. Finzen, Arun B. Sharma, Univ. of California, San Francisco (USA) [7549-09]

POSTER POPS - SESSION A

Room: 218 (Mezzanine) Sun. 11:30 am to 12:00 pm

Authors of the following posters have 2 minutes to present key content of their poster with a maximum of 2 vu-graphs/powerpoint slides. The poster presenter has to be available at the poster for discussion.

Poster authors: please put up your poster before the conference or during the morning coffee break. Posters must be removed from the boards immediately following the conference. Any posters left on the boards will be considered unwanted and will be discarded.

The impact of antimicrobial photodynamic therapy on streptococcus mutans in an artificial biofilm model, Martin Schneider, Gregor Kirfel, Felix Krause, Olivier Brede, Matthias Frentzen, Andreas Braun, Univ. Bonn (Germany) [7549-16]

Evaluation of the antimicrobial effect of photodynamic antimicrobial therapy in dentin caries: a pilot in vivo study, Fátima Maria C. Borges, Juliana P. M. L. Lima, Mary Anne S. Melo, Federal Univ. of Ceara (Brazil); Marines Nobre-dos-Santos, Piracicaba Dental School -State University of Campinas (Brazil); Lidiany K. A. Rodrigues, Iriana C. J. Zanin, Federal Univ. of Ceara (Brazil) [7549-17]

Lunch/Exhibition Break 12:00 to 2:00 pm

SESSION 2

Room: 218 (Mezzanine) Sun. 2:00 to 4:10 pm

Lasers in Caries Prevention, Periodontology, and Biostimulation

Session Chair: **Daniel Fried**, Univ. of California, San Francisco

2:00 pm: **Influence of photodynamic therapy on dental plaque of oral biofilm of artificial dental caries**, Zhaohui Zou, Yingxin Li, Huijuan Yin, Tianjin Medical Univ. (China) [7549-10]

2:20 pm: **Effects of 980 diode laser treatment combined with scaling and root planing on periodontal pockets in chronic periodontitis patients**, Alireza Fallah D.D.S., [7549-11]

2:40 pm: **Connective tissue attachment regeneration effect of new integrated biostimulation/soft tissue laser and the reduction of periodontal pockets**, Robert Gougloff, Redondo Beach Dental Group (USA) and Loma Linda Ctr. for Implantology (USA); Nelson Marquina, USA Laser Biotech Inc. (USA) [7549-12]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Color analysis of the mucogingival tissues depending on abutment type using hyperspectral imaging**, Herke J. Noordmans, Marco Cune, Ralph v. Brakel, Rudolf Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands) [7549-13]

3:50 pm: **Compositional and crystallographic changes on enamel when irradiated by Nd:YAG or Er,Cr:YSGG lasers and its resistance to demineralization when associated with fluoride**, Denise M. Zezell, Patricia A. Ana D.D.S., Instituto de Pesquisas Energéticas e Nucleares (Brazil); Luciano Bachmann, Univ. de São Paulo (Brazil); Felipe G. Albero, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Cinthia Tabchoury, Jaime A. Cury, Faculdade de Odontologia de Piracicaba-UNICAMP (Brazil) [7549-14]

POSTER POPS - SESSION B

Room: 218 (Mezzanine) Sun. 4:30 to 5:30 pm

Authors of the following posters have 2 minutes to present key content of their poster with a maximum of 2 vu-graphs/powerpoint slides. The poster presenter has to be available at the poster for discussion.

Poster authors: please put up your poster before the conference or during the morning coffee break. Posters must be removed from the boards immediately following the conference. Any posters left on the boards will be considered unwanted and will be discarded.

Secondary caries detection with an oral fluorescence based camera system in vitro, Olivier Brede, Claudia Wilde, Felix Krause, Andreas Braun, Matthias Frentzen, Univ. Bonn (Germany)[7549-21]

Dental hard tissue investigation after Er:YAG laser-assisted treatment, Carmen C. Todea, Cosmin Balabuc, Cosmin Sinescu, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Cosmin Locovei, Camelia Demian, Aurel Raduta, Politehnica Univ. of Timisoara (Romania); Adrian Bradu, Adrian Podoleanu, Univ. of Kent (United Kingdom)[7549-22]

An in vitro study of the effect of a pulsed 10.6 µm CO₂ laser and fluoride on the reduction of caries lesions progression in bovine root dentin, Thaís M. Parisotto, Patrícia A. Sacramento, Faculdade de Odontologia de Piracicaba (Brazil); Marcelo C. Alves, Educational Institution for Agriculture-ESALQ (Brazil); Maria Beatriz D. Gavião, Regina M. Puppim-Rontani, Marínes Nobre dos Santos, Faculdade de Odontologia de Piracicaba (Brazil)[7549-23]

In vitro near-IR imaging of occlusal caries lesions using a germanium enhanced CMOS camera, Chul Sung Lee, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA)[7549-24]

Near-IR polarization imaging of sound and carious dental hard tissues, Cynthia L. Darling, Jane J. Jiao, Chul Sung Lee, Hobin Kang, Daniel Fried, Univ. of California, San Francisco (USA)[7549-25]

Imaging early demineralization with PS-OCT, Hobin Kang, Jane J. Jiao, Chul Sung Lee, Daniel Fried, Univ. of California, San Francisco (USA)[7549-26]

Measurement of the severity of occlusal caries lesions with near-IR imaging and PS-OCT, Shane M. Douglas, Daniel Fried, Cynthia L. Darling, Univ. of California, San Francisco (USA)[7549-27]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Ophthalmic Technologies XX

Conference Chairs: **Fabrice Manns**, Univ. of Miami; **Per G. Söderberg**, Uppsala Univ. (Sweden); **Arthur Ho**, Institute for Eye Research Ltd. (Australia)

Program Committee: **Rafat R. Ansari**, NASA Glenn Research Ctr.; **Michael Belkin**, Tel Aviv Univ. (Israel); **Ralf Brinkmann**, Univ. zu Lübeck (Germany); **Wolfgang Drexler**, Cardiff Univ. (United Kingdom); **Daniel X. Hammer**, Physical Sciences Inc.; **Karen Margaret Joos**, Vanderbilt Univ.; **Katsuhiko Kobayashi**, Topcon Corp. (Japan); **Kirill V. Larin**, Univ. of Houston; **Ezra I. Maguen**, American Eye Institute; **Donald T. Miller**, Indiana Univ.; **Peter J. Milne**, National Science Foundation; **Daniel V. Palanker**, Stanford Univ. Medical Ctr.; **Jean-Marie A. Parel**, Univ. of Miami Medical School; **Roberto Pini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Luigi L. Rovati**, Univ. degli Studi di Modena (Italy); **Georg Schuele**, OptiMedica Corp.; **Jerry Sebag**, Univ. of Southern California; **Peter Soliz**, VisionQuest Inc.; **William B. Telfair**, IRIDEX Corp.; **Valery V. Tuchin**, Saratov State Univ. (Russian Federation)

Saturday 23 January

Welcome and Introduction

Room: 306 (Esplanade) Sat. 8:10 to 8:15 am

SESSION 1

Room: 306 (Esplanade) Sat. 8:15 to 9:30 am

Ophthalmic Treatment Monitoring and Assessment

Session Chairs: **Georg Schuele**, OptiMedica Corp.; **William B. Telfair**, IRIDEX Corp.

8:15 am: **Three-dimensional multimodal microscopy of rabbit cornea after cross-linking treatment**, Alexander Krueger, Laser Zentrum Hannover e.V. (Germany); Marine Hovakimyan, Univ. Rostock (Germany); Diego F. Ramirez, Raoul-Amadeus Lorbeer, Laser Zentrum Hannover e.V. (Germany); Maria Kröger, Oliver Stachs, Andreas Wree, Rudolf F. Guthoff, Univ. Rostock (Germany); Holger Lubatschowski, Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany)[7550-01]

8:30 am: **Internal limiting membrane layer visualization and vitreoretinal surgery guidance using a common-path OCT integrated microsurgical tool**, Xuan Liu, The Johns Hopkins Univ. (USA); Peter Gehlbach, Johns Hopkins Univ. School of Medicine (USA); Jin U. Kang, The Johns Hopkins Univ. (USA)[7550-02]

8:45 am: **On-line visualization of retinal photocoagulation by OCT: Ex-vivo experiments**, Heike H. Müller, Kerstin Schlott, Tim Bonin, Eva Lankenau, Marco Bever, Ralf Brinkmann, Univ. of Lübeck (Germany); Gereon Hüttmann, Univ. zu Lübeck (Germany)[7550-03]

9:00 am: **Bioluminescent reporters of retinal response to sub-lethal thermal stress**, Mark A. Mackanos, Stanford Univ. (USA); Hiroyuki Nomoto, Stanford Univ. School of Medicine (USA); Christopher Sramek, Stanford Univ. (USA); Christopher H. Contag, Daniel Palanker, Stanford Univ. School of Medicine (USA)[7550-04]

9:15 am: **Automatic dosimetry control for gentle retinal photocoagulation**, Ralf Brinkmann, Kerstin Schlott, Lars Ptaszynski, Jens Langejürgen, Marco Bever, Univ. zu Lübeck (Germany); Stefan Koinzer, Johann Roider, Univ. Schleswig-Holstein (Germany); Reginald Birngruber, Univ. zu Lübeck (Germany)[7550-05]

SESSION 2

Room: 306 (Esplanade) Sat. 9:30 to 11:15 am

Presbyopia and Cataract

Session Chairs: **Jean-Marie A. Parel**, Univ. of Miami; **Ezra I. Maguen**, American Eye Institute

9:30 am: **Measurement of vibrations induced on the surface of crystalline eye lens using PhS-SDOCT**, Kirill V. Larin, Narendran Sudheendran, Univ. of Houston (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA)[7550-06]

9:45 am: **Onset of oxidative stress in clear lenses using dynamic light scattering**, Rafat R. Ansari, NASA Glenn Research Ctr. (USA); Manuel B. Datiles III, National Institutes of Health (USA)[7550-07]

Coffee Break 10:00 to 10:30 am

10:30 am: **Femto-disruption of the crystalline lens for presbyopia and cataract surgery: history and new advancements**, Ronald R. Krueger, The Cleveland Clinic Foundation (USA); Ramon Naranjo Tackman, Univ. Nacional Autonoma de Mexico (Mexico); Jorge Villar Kuri, APEC Hospital (Mexico); Randy Frey, LensAR, Inc. (USA)[7550-08]

11:00 am: **Extended depth of focus intra-ocular lens: A solution for presbyopia and astigmatism**, Zeev Zalevsky, Bar-Ilan Univ. (Israel); Alex Zlotnik, Ido Raveh, Shai Ben Yaish, Xceed Imaging Ltd. (Israel); Oren Yehezkel, Michael Belkin, Tel-Aviv Univ. (Israel)[7550-10]

Keynote Session

Room: 306 (Esplanade) Sat. 11:15 am to 12:00 pm

Session Chair: **Per G. Söderberg**, Uppsala Univ. (Sweden)

11:15 am: **Technology needs for the development of the accommodative intraocular lens (Invited Paper)**, Okihiko Nishi, Nishi Eye Hospital (Japan)[7550-100]



Dr. Okihiko Nishi, M.D., was born as the son of a scholarly ophthalmologist in Osaka and began medical studies in Tokyo University in 1958. He continued the studies in the University of Freiburg, Germany, in 1960, graduating in 1967. Upon returning to Japan, Dr. Nishi studied ophthalmology at Tokyo University under Prof. Saichi Mishima. He moved to Jinshikai Medical Foundation, Nishi Eye Hospital in 1972 and has been in the present position since 1980. Dr. Nishi's clinical and experimental works have focused mainly on finding solutions to problems involved in cataract surgery followed by intraocular lens implantation. These include the prevention and treatment of postoperative complications, and particularly those caused by residual lens epithelial cells including their pathophysiology (prevention of posterior capsule opacification by sharp-edged IOL) and the restoration of accommodation.

Dr. Nishi has presented at numerous international ophthalmological conferences and congresses, published 97 original papers in international journals and participated in 20 books written in English as a contributor. Dr. Nishi is a member of several National and International Professional Societies.

Lunch/Exhibition Break 12:00 to 1:15 pm

SESSION 3

Room: 306 (Esplanade) Sat. 1:30 to 3:00 pm

Ophthalmic Imaging and Diagnostics: Functional

Session Chairs: **Kirill V. Larin**, Univ. of Houston; **Rafat R. Ansari**, NASA Glenn Research Ctr.

1:30 pm: **Measuring the rate of hypoxic swelling of individual layers in human cornea with high-speed ultrahigh-resolution optical coherence tomography**, Kostadinka K. Bizheva, Daryl Chulho Hyun, Alireza A. Moayed, Justin Eichel, Saad Shakeel, Luigina Sorbara, Trefford Simpson, Natalie Hutchings, Univ. of Waterloo (Canada)[7550-12]

1:45 pm: **Rapid line-scan confocal imaging of retinal activation**, Yang-Guo Li, Xin-Cheng Yao, The Univ. of Alabama at Birmingham (USA)[7550-13]

2:00 pm: **High-sensitive blood flow imaging of the retina and choroid by using double-beam optical coherence angiography**, Shuichi Makita, Masahiro Yamanari, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan); Masahiro Miura, Tokyo Medical Univ. (Japan) and Computational Optics and Ophthalmology Group (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan)[7550-14]

2:15 pm: **Flicker stimulated retinal perfusion changes assessed with high-speed Doppler tomography**, Tilman Schmoll, Cedric Blatter, Medizinische Univ. Wien (Austria); Martin L. Villiger, Christoph Pache, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Rainer A. Leitgeb, Medizinische Univ. Wien (Austria)[7550-15]

2:30 pm: **True velocity mapping using joint spectral and time domain optical coherence tomography**, Ireneusz Grulkowski, Maciej Szkulmowski, Danuta Bukowska, Szymon Tamborski, Iwona Gorczynska, Andrzej A. Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) . . .[7550-16]

2:45 pm: **Perfusion measures from dynamic ICG scanning laser ophthalmoscopy**, Sean Larkin, Lickenbrock Technologies, LLC (USA); Alessandro Invernizzi, Univ. of Milan (Italy); David Beecher, Lickenbrock Technologies, LLC (USA); Giovanni Staurenghi, Univ. of Milan (Italy); Timothy J. Holmes, Lickenbrock Technologies, LLC (USA)[7550-17]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 306 (Esplanade). Sat. 3:30 to 5:00 pm

Ocular Biometry

Session Chairs: **Arthur Ho**, Institute for Eye Research Ltd. (Australia); **Katsuhiko Kobayashi**, Topcon Corp. (Japan)

3:30 pm: **Corneal topography and pachymetry using high-speed swept source OCT**, Karol M. Karnowski, Michalina Gora, Bartłomiej J. Kaluzny, Nicolaus Copernicus Univ. (Poland); Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany); Maciej Szkulmowski, Nicolaus Copernicus Univ. (Poland); Susana Marcos, Consejo Superior de Investigaciones Científicas (Spain); Andrzej A. Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland)[7550-18]

3:45 pm: **Extraction of clinical refractive parameters from spectral domain optical coherence tomography of the cornea**, Mingtao Zhao, Anthony Kuo, Sina Farsiu, Joseph A. Izatt, Duke Univ. (USA)[7550-19]

4:00 pm: **Change in peripheral refraction during accommodation: myopes vs. emmetropes**, Arthur Ho, S. Delgado, Aldo Martinez, Padmaja Sankaridurg, Institute for Eye Research Ltd. (Australia)[7550-20]

4:15 pm: **Imaging distortions of the isolated crystalline lens posterior surface during optical coherence tomography**, David Borja, Stephen R. Uhlhorn, Raksha Urs, Fabrice Manns, Bascom Palmer Eye Institute, Univ. of Miami Miller School of Medicine (USA) and Univ. of Miami (USA); Jean-Marie A. Parel, Bascom Palmer Eye Institute, Univ. of Miami Miller School of Medicine (USA) and Univ. of Miami (USA) and Vision Cooperative Research Ctr. (Australia)[7550-21]

4:30 pm: **A novel scanning method in anterior segment OCT to be used in imaging the radial 3-mm section of the crystalline lens**, Rahul Yadav, Univ. of Rochester (USA); Geun-Young Yoon, Univ. of Rochester Eye Institute (USA) and Univ. of Rochester (USA)[7550-22]

4:45 pm: **Directionality of the retinal reflection as measured with optical coherence tomography**, Weihua Gao, Indiana Univ. (USA); Barry Cense, Utsunomiya Univ. (Japan); Omer P. Kocaoglu, Qiang Wang, Ravi S. Jonnal, Donald T. Miller, Indiana Univ. (USA)[7550-23]

SESSION 5

Room: 306 (Esplanade). Sat. 5:00 to 6:00 pm

Ophthalmic Imaging: Polarization

Session Chairs: **Wolfgang Drexler**, Cardiff Univ. (United Kingdom); **Donald T. Miller**, Indiana Univ.

5:00 pm: **Polarization sensitive corneal and anterior segment swept-source optical coherence tomography**, Yiheng Lim, Masahiro Yamanari, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan)[7550-24]

5:15 pm: **Tissue discrimination in anterior eye using three optical parameters obtained by polarization sensitive optical coherence tomography**, Arata Miyazawa, Masahiro Yamanari, Shuichi Makita, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan); Masahiro Miura, Tokyo Medical Univ. Kasumigaura Hospital (Japan) and Computational Optics and Ophthalmology Group (Japan); Keisuke Kawana, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan); Keiichi Iwaya, National Defense Medical College (Japan) and Tokyo Medical Univ. (Japan); Hiroshi Goto, Tokyo Medical Univ. (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan)[7550-25]

5:30 pm: **Thickness and birefringence measurement of retinal nerve fiber layer tissue using polarization-sensitive optical coherence tomography and adaptive optics**, Qiang Wang, Barry Cense, Omer P. Kocaoglu, Weihua Gao, Ravi S. Jonnal, Donald T. Miller, Indiana Univ. (USA)[7550-26]

5:45 pm: **Quantification of retinal lesions by polarization sensitive optical coherence tomography**, Christoph K. Hitzenberger, Bernhard Baumann, Erich Götzinger, Michael Pircher, Harald Sattmann, Christian Ahlers, Christopher Schütze, Ferdinand Schlanitz, Ursula Schmidt-Erfurth, Medizinische Univ. Wien (Austria)[7550-27]

BiOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 6

Room: 306 (Esplanade). Sun. 8:00 to 9:30 am

Ophthalmic Laser-Tissue Interactions

Session Chairs: **Ralf Brinkmann**, Univ. zu Lübeck (Germany); **Roberto Pini**, Istituto di Fisica Applicata Nello Carrara (Italy)

8:00 am: **Irreversible electroporation for non-chemical sterilization of eye drops**, Michael Belkin, Tel Aviv Univ. (Israel); Alex Golberg, Boris Rubinsky, The Hebrew Univ. of Jerusalem (Israel)[7550-28]

8:15 am: **Ultrashort pulse laser surgery on healthy and oedematous cornea and sclera**, Karsten Plamann, Donald A. Peyrot, Florent Deloison, Caroline Crotti, Ecole Nationale Supérieure de Techniques Avancées (France); Michèle Savoldelli, Jean-Marc Legeais, Hôpital Hôtel Dieu (France); Franck Morin, Frédéric Druon, Marc Hanna, Patrick Georges, Institut d'Optique Graduate School (France)[7550-29]

8:30 am: **Visualizing of fs laser pulse induced micro-incisions inside crystalline lens tissue**, Oliver Stachs, Univ. Rostock (Germany); Silvia Schumacher, Laser Zentrum Hannover e.V. (Germany); Maria Kröger, Univ. Rostock (Germany); Heike Hoffmann, Michael Fromm, Alexander Heisterkamp, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany); Rudolf F. Guthoff, Univ. Rostock (Germany)[7550-30]

8:45 am: **Improved safety of retinal photocoagulation with a shaped beam**, Christopher Sramek, Jefferson Brown, Stanford Univ. (USA); Yannis Paulus, Hiroyuki Nomoto, Daniel V. Palanker, Stanford Univ. School of Medicine (USA)[7550-31]

9:00 am: **Selective retinal therapy with a continuous line scanning laser**, Yannis M. Paulus, ATul Jain, Ray F. Gariano, Stanford Univ. (USA); Hiroyuki Nomoto, Stanford Univ. School of Medicine (USA); Georg Schuele, Optimedica Corp. (USA); Christopher Sramek, Resmi Charalel, Stanford Univ. (USA); Daniel V. Palanker, Stanford Univ. School of Medicine (USA)[7550-32]

9:15 am: **Experimental retinectomy with a 6.1 μm Q-switched Raman-shifted alexandrite laser**, Karen M. Joos, Ratna Prasad, John A. Kozub, Borislav L. Ivanov, Anita Agarwal, Jin-Hui Shen, Vanderbilt Univ. (USA)[7550-33]

SESSION 7

Room: 306 (Esplanade) Sun. 9:30 to 10:30 am

Ophthalmic Adaptive Optics I: Retinal Imaging

Session Chairs: **Daniel V. Palanker**, Stanford Univ. School of Medicine; **Luigi L. Rovati**, Univ. degli Studi di Modena (Italy)

9:30 am: **Integrated eye tracking and wide-field imaging for adaptive optics SLO**, Robert D. Ferguson, Daniel X. Hammer, Physical Sciences Inc. (USA); Zhangyi Zhong, Stephen A. Burns, Indiana Univ. School of Optometry (USA) [7550-34]

9:45 am: **Retinal imaging with a combined adaptive optics optical coherence tomography and adaptive optics scanning laser ophthalmoscopy system**, Robert J. Zawadzki, UC Davis Medical Ctr. (USA); Steven M. Jones, Lawrence Livermore National Lab. (USA); Suman Pili, UC Davis Medical Ctr. (USA); DaeYu Kim, UC Davis Medical Ctr. (USA); Scot S. Olivier, Lawrence Livermore National Lab. (USA); John S. Werner, UC Davis Medical Ctr. (USA) [7550-36]

10:00 am: **Imaging retinal nerve fiber bundles at ultrahigh speed and ultrahigh resolution using OCT with adaptive optics**, Omer P. Kocaoglu, Indiana Univ. (USA); Barry Cense, Utsunomiya Univ. (Japan); Qiang Wang, Jeremy Bruestle, Jason Besecker, Weihua Gao, Ravi S. Jonnal, Donald T. Miller, Indiana Univ. (USA) [7550-37]

10:15 am: **Multimodal adaptive optics for depth enhanced high-resolution ophthalmic imaging**, Daniel X. Hammer, Mircea Mujat, Nicusor V. Iftimia, Robert D. Ferguson, Physical Sciences Inc. (USA) [7550-35]

Coffee Break 10:30 to 11:00 am

SESSION 8

Room: 306 (Esplanade) Sun. 11:00 am to 12:00 pm

Ophthalmic Adaptive Optics II: Vision Correction

Session Chairs: **Peter Soliz**, VisionQuest Biomedical, LLC; **Michael Belkin**, Tel Aviv Univ. (Israel)

11:00 am: **Adaptive optics for the correction of eye aberrations**, Anja Hansen, Mohammed K. Khattab, Raoul-Arnadeus Lorbeer, Laser Zentrum Hannover e.V. (Germany); Ronald R. Krueger, The Cleveland Clinic Foundation (USA); Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7550-38]

11:15 am: **Novel applications of an adaptive optics visual simulator in the clinical setting**, Ronald R. Krueger, Karolinne Maia Rocha, The Cleveland Clinic Foundation (USA) [7550-39]

11:30 am: **Binocular adaptive optics visual simulator: understanding the impact of aberrations in real vision**, Enrique J. Fernandez, Pedro Prieto, Pablo Artal, Univ. de Murcia (Spain) [7550-40]

11:45 am: **Hybrid adaptive optics visual simulator**, Carmen Canovas, Silvestre Manzanera, Pedro Prieto, Pablo Artal, Univ. de Murcia (Spain) [7550-41]

Lunch/Exhibition Break 12:00 to 1:15 pm

SESSION 9

Room: 306 (Esplanade) Sun. 1:15 to 2:45 pm

Ophthalmic Imaging: Animal Models

Session Chairs: **Karen Margaret Joos**, Vanderbilt Univ.; **Daniel Hammer**, Dresden Univ. of Technology (Germany)

1:15 pm: **Small animal ocular biometry using optical coherence tomography**, Marco Ruggeri, Omer P. Kocaoglu, Stephen R. Uhlhorn, David Borja, Raksha Urs, Tsung-Han Chou, Bascom Palmer Eye Institute, Univ. of Miami Miller School of Medicine (USA) and Univ. of Miami (USA); Vittorio Porciatti, Bascom Palmer Eye Institute, Univ. of Miami Miller School of Medicine (USA); Jean-Marie A. Parel, Bascom Palmer Eye Institute, Univ. of Miami Miller School of Medicine (USA) and Univ. of Miami (USA) and Vision Cooperative Research Ctr. (Australia); Fabrice Manns, Bascom Palmer Eye Institute, Univ. of Miami Miller School of Medicine (USA) and Univ. of Miami (USA) [7550-42]

1:30 pm: **Ultrahigh speed imaging of the rat retina using ultrahigh resolution spectral/Fourier domain OCT**, Jonathan J. Liu, Massachusetts Institute of Technology (USA); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs, Inc. (USA); Yueli Chen, Massachusetts Institute of Technology (USA); Iwona M. Gorczynska, Massachusetts Institute of Technology (USA) and Tufts Medical Ctr. (USA) and New England Eye Ctr. (USA); Vivek J. Srinivasan, Massachusetts General Hospital (USA); Jay S. Duker, Tufts Medical Ctr. (USA) and New England Eye Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [7550-43]

1:45 pm: **Glaucoma models in tree shrew and rat imaged with 3D 1050-nm optical coherence tomography**, Alexandre R. Tumlinson, Paulina Samsel, Vasily Vorobyov, Ketan Kapoor, Wolfgang Drexler, James E. Morgan, Cardiff Univ. (United Kingdom) [7550-44]

2:00 pm: **An adaptive-optics scanning laser ophthalmoscope for imaging murine retinal microstructure**, Clemens Alt, David P. Biss, Wellman Ctr. for Photomedicine (USA); Nadja Tajouri, Schepens Eye Research Institute (USA); Tatjana C. Jakobs, Massachusetts Eye and Ear Infirmary (USA); Charles P. Lin, Massachusetts General Hospital (USA) [7550-45]

2:15 pm: **Imaging of mouse embryonic eye development using optical coherence tomography**, Kirill V. Larin, Saba Syed, Univ. of Houston (USA) [7550-46]

2:30 pm: **Structural and biochemical characterization of the rat retina with combined Raman spectroscopy optical coherence tomography**, Chetan A. Patil, Vanderbilt Univ. (USA); Jeroen Kalkman, Academisch Medisch Ctr. (Netherlands); Dirk J. Faber, Univ. van Amsterdam (Netherlands); John S. Penn, Vanderbilt Univ. (USA); Ton A. G. van Leeuwen, Univ. van Amsterdam (Netherlands) and Univ. Twente (Netherlands); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7550-47]

SESSION 10

Room: 306 (Esplanade) Sun. 2:45 to 3:45 pm

Ophthalmic Imaging: Cellular, Resolution, Speed, Penetration I

Session Chairs: **Kirill V. Larin**, Univ. of Houston; **Roberto Pini**, Istituto di Fisica Applicata Nello Carrara (Italy)

2:45 pm: **Multimodal multiphoton imaging of unstained cornea**, Nicolas Olivier, Ecole Polytechnique (France); Florent Aptel, Ecole Nationale Supérieure de Techniques Avancées (France); Ariane Deniset-Besseau, Ecole Polytechnique (France); Jean-Marc Legeais, Hôpital Hôtel Dieu (France); Karsten Plamann, Ecole Nationale Supérieure de Techniques Avancées (France); Marie-Claire Schanne-Klein, Emmanuel Beaurepaire, Ecole Polytechnique (France) [7550-48]

3:00 pm: **Real-time mapping of the corneal sub-basal nerve plexus by in vivo laser scanning confocal microscopy**, Rudolf F. Guthoff, Andrey Zhivov, Oliver Stachs, Univ. Rostock (Germany) [7550-49]

3:15 pm: **Fully automated analysis of specular microscopy images within a large range of endothelial cell densities**, Curry P. Bucht, St Erik's Eye Hospital (Sweden); Goran Manneberg, Royal Institute of Technology (Sweden); Per G. Söderberg, Uppsala Univ. (Sweden) [7550-50]

3:30 pm: **Ultrahigh-resolution corneal microstructure and tear film imaging with FDOCT at 100,000 scans/sec**, Rainer A. Leitgeb, Tilman Schmoll, Christoph Kolbitsch, Medizinische Univ. Wien (Austria); Tuan Le, Andreas Stingl, FEMTOLASERS Produktions GmbH (Austria) [7550-51]

Coffee Break 3:45 to 4:15 pm

SESSION 11

Room: 306 (Esplanade) Sun. 4:15 to 5:45 pm

Ophthalmic Imaging: Cellular, Resolution, Speed, Penetration II

Session Chairs: **Donald T. Miller**, Indiana Univ.; **Wolfgang Drexler**, Cardiff Univ. (United Kingdom)

4:15 pm: **low-cost, high resolution scanning laser ophthalmoscope for the clinical environment**, Peter Soliz, VisionQuest Inc. (USA); Simon Barriga, VisionQuest Biomedical (USA) and University of New Mexico (USA); Andrey Larichev, Moscow State Univ. (Russian Federation) [7550-52]

4:30 pm: **Spectrally encoded confocal scanning laser ophthalmoscope**, Yuankai K. Tao, Joseph A. Izatt, Duke Univ. (USA) [7550-53]

4:45 pm: **In vivo investigation of human cone photoreceptors with high-speed high-resolution SLO/OCT**, Michael Pircher, Bernhard Baumann, Harald Sattmann, Hannah Prokesch, Erich Goetzinger, Tilman Schmoll, Rainer A. Leitgeb, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) . [7550-54]

5:00 pm: **Improved clinical performance in OCT using 1060 nm**, Marieh Esmaelpour, Boris Hermann, Boris Pvozozay, Bernd Hofer, Vedran Kajic, Nick Sheen, Rachel V. North, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7550-55]

5:15 pm: **Ultrahigh-speed volumetric OCT ophthalmic imaging at 800 nm and 1050 nm**, Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Jonathan Liu, Massachusetts Institute of Technology (USA); Yueli Chen, Iwona Gorczynska, Massachusetts Institute of Technology (USA) and Tufts Medical Ctr. (USA) and New England Eye Ctr. (USA); Vivek J. Srinivasan, Massachusetts General Hospital (USA); Scott Barry, James Y. Jiang, Alex Cable, Thorlabs Inc. (USA); Varsha Manjunath, New England Eye Ctr. (USA) and Tufts Medical Ctr. (USA); Jay S. Duker, Tufts Medical Ctr. (USA) and New England Eye Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA)[7550-56]

5:30 pm: **Clinical application of the high-penetration optical coherence tomography using 1060-nm wavelength**, Yasushi Ikuno, Kaori Sayanagi, Osaka Univ. Medical School (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan); Shinichi Usui, Kei Nakai, Miki Sawa, Motokazu Tsujikawa, Fumi Gomi, Osaka Univ. Medical School (Japan)[7550-57]

Pascal Rol Award Announcement
Room: 306 (Esplanade) Sun. 5:45 to 6:00 pm

Pascal Rol Award Announcement
Session Chair: Fabrice Manns, Univ. of Miami

The Pascal Rol Award will be given to the
 Best Paper in Ophthalmic Technologies

Award Sponsor

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See page 17 for details.

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Characterization of corneal edema by forward and backward second harmonic generation microscopy, Chiu-Mei Hsueh, Wen Lo, Hsin-Yuan Tan, Chen-Yuan Dong, National Taiwan Univ. (Taiwan)[7550-58]

Automated image classification applied to reconstituted human corneal epithelium for the early detection of toxic damage, Giovanni F. Crosta, Chiara Urani, Univ. degli Studi di Milano-Bicocca (Italy); Barbara De Servi, Marisa Meloni, VitroScreen Srl (Italy)[7550-59]

Segmentation of ophthalmic optical coherence tomography images using graph cuts, Sina Farsi, Xiao Li, Cynthia A. Toth, Joseph A. Izatt, Duke Univ. (USA)[7550-60]

Multimodal imaging of retina tissue with enhanced contrast by multifunctional microbubbles and nanobubbles, Leilei Zhang, Jeff S. Xu, Jiwei Huang, Cynthia J. Roberts, Ronald X. Xu, The Ohio State Univ. (USA)[7550-61]

In vivo dual-modality imaging of eye in small animal models: optical coherence tomography and photoacoustic microscopy within a single instrument, Bin Rao, Li Li, Song Hu, Konstantin Maslov, Lihong V. Wang, Washington Univ. at St. Louis (USA)[7550-62]

Early cataract detection by dynamic light scattering with sparse Bayesian learning, Su-Long Nyee, National Cheng Kung Univ. (Taiwan); Rafat R. Ansari, NASA Glenn Research Ctr. (USA)[7550-63]

Label-free structural characterization of mitomycin C modulated wound healing after photorefractive keratectomy by the use of multiphoton microscopy, Wen Lo, National Taiwan Univ. (Taiwan) and National Cheng Kung Univ. (Taiwan); Tsung-Jen Wang, Taipei Medical Univ. (Taiwan) and National Taiwan Univ. (Taiwan) and National Taiwan Univ. College of Medicine (Taiwan); Chiu-Mei Hsueh, National Taiwan Univ. (Taiwan); Shean-Jen Chen, National Cheng Kung Univ. (Taiwan); Fung-Rong Hu, National Taiwan Univ. Hospital

(Taiwan) and National Taiwan Univ. College of Medicine (Taiwan); Chen-Yuan Dong, National Taiwan Univ. (Taiwan)[7550-64]

In vivo monitoring of outer retinal damage in a rat retina model with high-resolution OCT, Sepideh Hariri, Alireza Akhlagh Moayed, Chulho Hyun, Saad Shakeel, Univ. of Waterloo (Canada); Andre Ali-Ridha, St. Michaels Hospital (Canada); Kostadinka Bizheva, Univ. of Waterloo (Canada); Shelley Boyd, St. Michaels Hospital (Canada)[7550-65]

Spectral characterization of an ophthalmic fundus camera, Clayton Miller, Timothy Holmes, Lickenbrock Technologies, LLC (USA); Carl J. Bassi, Univ. of Missouri, St. Louis (USA); Dale Brodsky, St. Louis Ophthalmic Equipment Co. (USA)[7550-66]

Image processing algorithms for ocular fundus reflectometry, Nithiyantham Palanisamy, Matteo Bonaiuti, Luigi Rovati, Univ. degli Studi di Modena e Reggio Emilia (Italy); Charles E. Riva, Univ. degli Studi di Bologna (Italy)[7550-67]

Use of a cyanine dye probe to estimate the composition of the vitreous body after enzymatic treatment, Ina G. Panova, Koltsov Institute of Developmental Biology (Russian Federation); Alexander S. Tatikolov, Emanuel Institute of Biochemical Physics (Russian Federation); Natalia P. Sharova, Koltsov Institute of Developmental Biology (Russian Federation)[7550-68]

Oxygen saturation imaging of human retinal vessels and measurement in eye disease patient for clinical application, Daisuke Nakamura, Noboru Matsuoka, Kenichi Tatsuguchi, Manabu Ogata, Yukiyasu Yoshinaga, Kyushu Univ. (Japan); Hiroshi Enaida, Kyushu Medical Ctr. (Japan); Tatsuo Okada, Tatsuhiro Ishibashi, Kyushu Univ. (Japan)[7550-69]

Blood flow measurement and slow flow detection in retinal vessels with joint spectral and time domain method in ultrahigh-speed OCT, Iwona M. Gorczynska, Maciej Szkulmowski, Ireneusz Grulkowski, Anna Szkulmowska, Daniel Szlag, Nicolaus Copernicus Univ. (Poland); James G. Fujimoto, Massachusetts Institute of Technology (USA); Andrzej Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland)[7550-70]

High-resolution wide field of view blood perfusion maps for retina and choroid with optical micro angiography, Lin An, Ruikang Wang, Oregon Health & Science Univ. (USA)[7550-71]

Near-infrared receiver for advanced ophthalmology, Richard A. Myers, Radiation Monitoring Devices, Inc. (USA); Yuhua Zhang, Univ. of Alabama at Birmingham (USA); Gregory Derderian, Dipole Engineering, Inc. (USA); Frank Robertson, Radiation Monitoring Devices, Inc. (USA); Austin Roorda, Univ. of California, Berkeley (USA)[7550-72]

Retinal oximetry with a multi-aperture camera, Paul Lemaillet, Jessica C. Ramella-Roman, The Catholic Univ. of America (USA); Arthur Lompado, Polaris Sensor Technologies, Inc. (USA); Quan Nguyen, Johns Hopkins Medical Institutions (USA)[7550-73]

Quantitative analysis of thermally induced alterations of corneal stroma by second-harmonic generation imaging, Paolo Matteini, Fulvio Ratto, Francesca Rossi, Istituto di Fisica Applicata Nello Carrara (Italy); Riccardo Cicchi, Dimitris Kapsokalyvas, Francesco S. Pavone, Univ. degli Studi di Firenze (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy)[7550-74]

Availability of fluorescence spectroscopic in the accompaniment of formation of corneal cross-linking, Mardoqueu M. Costa, Sr., Univ. de São Paulo (Brazil); Cristina Kurachi, Univ. de São Paulo (Brazil) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Vanderlei S. Bagnato, Sidney J. d. F. Souza, Liliiane Ventura, Univ. de São Paulo (Brazil)[7550-76]

Long term observation of low power diode laser welding after penetrating keratoplasty in human patients, Francesca Rossi, Paolo Matteini, Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy); Luca Menabuoni, Ivo Lenzetti, Unita Operativa Oculistica (Italy)[7550-77]

Ultraviolet analysis on in vitro corneas following tissue removal, Victor A. C. Lincoln, Liliiane Ventura, Sidney Julio de Faria e Sousa, Univ. de São Paulo (Brazil)[7550-78]

Zernike modes from anisotropic material and noncircular plate deformations for adaptive optical applications, Chung-Jen Ou, Hsiuping Institute of Technology (Taiwan)[7550-79]

Simultaneous correction of large LOA and HOA with a new deformable mirror technology, Frédéric Rooms, Sebastien Camet, Jean-Francois Curis, ALPAO (France)[7550-80]

Measurement of the tearfilm and anterior chamber by confocal microscopy, Kim K. Buttenschoen, John Girkin, Durham Univ. (United Kingdom); Clive G. Wilson, Univ. of Strathclyde (United Kingdom); Daniel J. Daly, Lein Applied Diagnostics Ltd. (United Kingdom)[7550-81]

Characterization of transverse chromatic aberration of electro-optic ophthalmic lens, Guoqiang Li, Univ. of Missouri/St. Louis (USA)[7550-82]

BOOKS of Related Interest

Visit the onsite Marketplace or
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Non-toric extended depth of focus contact lenses for astigmatism and presbyopia correction, Zeev Zalevsky, Bar-Ilan Univ. (Israel); Shai Ben Yaish, Alex Zlotnik, Xceed Imaging Ltd. (Israel); Oren Yehezkel, Michael Belkin, Tel Aviv Univ. (USA) [7550-83]

Software for keratometry measurements using portable devices, Jean-Jacques G. S. De Groot, Univ. de Ribeirão Preto (Brazil); Liliane Ventura, Claudine M. Iyomasa, Univ. de São Paulo (Brazil) [7550-84]

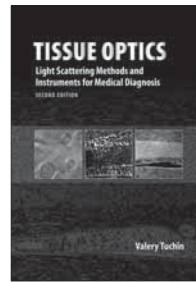
Age-related model of the human crystalline lens during simulated accommodation, Derek D. Nankivil, David Borja, Bascom Palmer Eye Institute (USA); Veerendra Nath, L. V. Prasad Eye Institute (India); Esdras Arrieta-Quintero, Bascom Palmer Eye Institute (USA); Mukesh Taneja, L. V. Prasad Eye Institute (India); Noël M. Ziebarth, Bascom Palmer Eye Institute (USA); Ashik Mohamed, L V Prasad Eye Institute (India); Arthur Ho, Institute for Eye Research Ltd. (Australia); Fabrice Manns, Jean-Marie A. Parel, Univ. of Miami (USA) [7550-86]

Surfaces geometry and optical aberrations of ex vivo isolated human crystalline lenses, Juan M. Bueno, Christina Schwarz, Univ. de Murcia (Spain); Eva Acosta, Univ. de Santiago de Compostela (Spain); Pablo Artal, Univ. de Murcia (Spain) [7550-87]

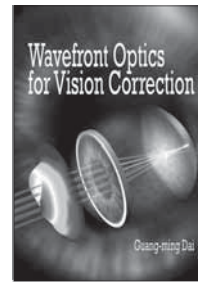
Monochromatic aberrations estimated from single-pass point spread functions of a physical model eye by computational phase retrieval, Ravi Chandra Bakaraju, Klaus Ehrmann, Eric B. Papas, Arthur Ho, Institute for Eye Research Ltd. (Australia) and Vision Co-operative Research Ctr. (Australia) and The Univ. of New South Wales (Australia) [7550-88]

Toward an anatomically correct solid eye model with volumetric representation of retinal morphology, Robert J. Zawadzki, UC Davis Medical Ctr. (USA); T. Scott Rowe, Rowe Technical Design (USA); Alfred R. Fuller, Bernd Hamann, Univ. of California, Davis (USA); John S. Werner, UC Davis Medical Ctr. (USA) [7550-89]

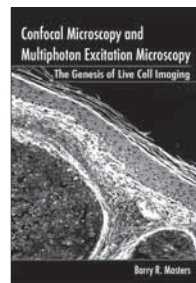
Non-invasive measurements of flicker vertigo, Maria G. Masi, Lorenzo Peretto, Univ. degli Studi di Bologna (Italy); Luigi Rovati, Univ. degli Studi di Modena (Italy); Rafat Ansari, NASA Glenn Research Ctr. (USA) [7550-11]



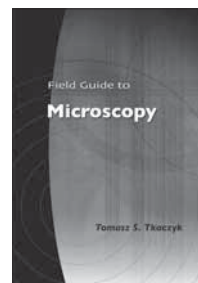
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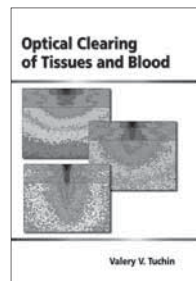
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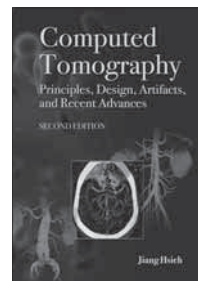
Vol. PM161



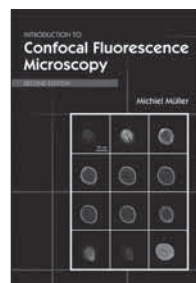
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Vol. PM154



Vol. PM188



Vol. TT69

Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XIX

Conference Chair: **David H. Kessel**, Wayne State Univ.

Conference Co-Chair: **Tayyaba Hasan**, Wellman Ctr. for Photomedicine and Harvard Medical School

Program Committee: **Thomas H. Foster**, Univ. of Rochester Medical Ctr.; **Charles J. Gomer**, Childrens Hospital Los Angeles; **Nancy L. Oleinick**, Case Western Reserve Univ.; **Brian W. Pogue**, Dartmouth College; **Kenneth K. Wang**, Mayo Clinic

Saturday 23 January

Introductory Remarks

Room: 208/210 (Mezzanine). Sat. 8:50 to 9:00 am

SESSION 1

Room: 208/210 (Mezzanine). Sat. 9:00 to 10:00 am

Session Chair: **David H. Kessel**, Wayne State Univ.

9:00 am: **Early cellular effects of photodynamic therapy**, David H. Kessel, Wayne State Univ. (USA) [7551-01]

9:20 am: **Molecular markers of cell and tumor response to photodynamic therapy**, Nancy L. Oleinick, Case Western Reserve Univ. (USA) [7551-02]

9:40 am: **Combination treatments with PDT are enhanced by co-encapsulation of PDT agents and biologics in targeted nanoconstructs**, Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA) [7551-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 208/210 (Mezzanine). Sat. 10:30 to 11:50 am

Session Chair: **Tayyaba Hasan**, Wellman Ctr. for Photomedicine

10:30 am: **Vitamin D as a potential enhancer of aminolevulinic acid-based photodynamic therapy for nonmelanoma skin cancer (Invited Paper)**, Edward V. Maytin, Sanjay Anand, N. Atanaskova, C. Wilson, Cleveland Clinic Lerner Research Institute (USA) [7551-04]

10:50 am: **In vivo detection of time-resolved singlet oxygen luminescence under PDT relevant conditions**, Beate Röder, Jan Schlothauer, Steffen Hackbarth, Jürgen Lademann, Humboldt-Univ. zu Berlin (Germany) [7551-05]

11:05 am: **Effects of Verteporfin-PDT on tumor microenvironment**, Theresa M. Busch, Amanda L. Maas, Shirron L. Carter, Min Yuan, The Univ. of Pennsylvania Health System (USA); Xiaoman Xing, Univ. of Pennsylvania (USA) [7551-06]

11:20 am: **Explicit dosimetry for photodynamic therapy: macroscopic singlet oxygen modeling**, Ken Kang-Hsin Wang, Theresa Busch, Jarod C. Finlay, Timothy C. Zhu, Univ. of Pennsylvania (USA) [7551-07]

11:35 am: **Spectroscopic evaluation of photodynamic therapy of the intraperitoneal cavity**, Jarod C. Finlay, Andreea Dimofte, Keith Cengel, Timothy C. Zhu, Univ. of Pennsylvania (USA) [7551-08]

Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 3

Room: 208/210 (Mezzanine). Sat. 1:30 to 3:05 pm

Session Chair: **Conor L. Evans**, Wellman Ctr. for Photomedicine

1:30 pm: **To be announced**, Charles J. Gomer, Childrens Hospital Los Angeles (USA) [7551-09]

1:50 pm: **A fast heterogeneous algorithm for light fluence rate for prostate PDT**, Chang Chang, Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [7551-10]

2:05 pm: **A treatment planning system for pleural PDT**, Julia Sandell, Chang Chang, Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [7551-11]

2:20 pm: **Comparative study of diffuse reflectance data analysis algorithms**, Julia Sandell, Jarod C. Finlay, Univ. of Pennsylvania (USA) [7551-12]

2:35 pm: **A heterogeneous optimization algorithm for the optimization of reacted singlet oxygen for interstitial PDT**, Timothy C. Zhu, Margin D. Altschuler, Yida Hu, Ken Wang, Jarod C. Finlay, Andreea Dimofte, Keith Cengel, Stephen M. Hahn, The Univ. of Pennsylvania Health System (USA) [7551-13]

2:50 pm: **In vivo PDT dosimetry: singlet oxygen emission and photosensitizer fluorescence**, Seonkyung Lee, Kristin L. Galbally-Kinney, Brian A. Murphy, Steven J. Davis, Physical Sciences Inc. (USA); Tayyaba Hasan, Bryan Spring, Yupeng Tu, Massachusetts General Hospital (USA); Brian W. Pogue, Julia A. O'Hara, Dartmouth College (USA) [7551-14]

Coffee Break 2:55 to 3:30 pm

SESSION 4

Room: 208/210 (Mezzanine). Sat. 3:30 to 4:30 pm

Session Chair: **Theresa M. Busch**, The Univ. of Pennsylvania Health System

3:30 pm: **Targeting cytochrome C oxidase in mitochondria with Pt(II)-porphyrins for photodynamic therapy**, Michael Börsch, Univ. Stuttgart (Germany); Herbert Zimmermann, Albert-Ludwigs-Univ. Freiburg (Germany) [7551-15]

3:45 pm: **Absolute fluence rate quantification in a three-dimensional volume for interstitial photodynamic therapy using multisensor fluorescence probes**, Benjamin Lai, Ontario Cancer Institute (Canada) and Univ. of Toronto (Canada); Lothar Lilge, Ontario Cancer Institute (Canada) [7551-16]

4:00 pm: **3D ovarian cancer models: imaging and therapeutic combinations**, Jonathan P. Celli, Imran Rizvi, Wellman Ctr. for Photomedicine (USA); Feng Xu, Brigham and Women's Hospital (USA); Conor Evans, Adnan Abu-Yousif, Wellman Ctr. for Photomedicine (USA); SangJun Moon, Brigham and Women's Hospital (USA); Johannes F. deBoer, Vrije Univ. Amsterdam (Netherlands); Utkan Demirci, Brigham and Women's Hospital (USA); Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA) [7551-17]

4:15 pm: **Three-dimensional visualization of the structure and treatment dynamics of ovarian tumor models following photodynamic therapy**, Conor L. Evans, Adnan Abu-Yousif, Imran Rizvi, Jonathan Celli, Wellman Ctr. for Photomedicine (USA); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands); Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA) [7551-18]

BiOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 5

Room: 208/210 (Mezzanine) Sun. 9:00 to 10:00 am

Session Chair: Kenneth K. Wang, Mayo Clinic

9:00 am: **Photodynamic therapy for gastrointestinal cancers**, Kenneth K. Wang M.D., Mayo Clinic (USA) [7551-19]

9:20 am: **PDT for locally advanced pancreatic cancer: early clinical results**, Stephen P. Pereira, Neomal S. Sandanayake, Stephen G. Bown, Univ. College London (United Kingdom) [7551-20]

9:40 am: **Photodynamic therapy of head and neck malignancies**, Merrill A. Biel M.D., Virginia Piper Cancer Institute, Abbott Northwestern Hospital (USA) [7551-21]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 208/210 (Mezzanine) Sun. 10:30 to 11:45 am

Session Chair: Brian W. Pogue, Dartmouth College

10:30 am: **Interstitial Doppler optical coherence tomography vascular monitoring and quantification during photodynamic therapy of prostatic carcinoma: a preclinical in vivo study**, Beau A. Standish, Ryerson Univ. (Canada) and Ontario Cancer Institute (Canada); Kenneth K. Lee, Xiao Jin, Adrian Mariampillai, Nigel R. Munce, Michael Wood, Brian C. Wilson, I. A. Vitkin, Ontario Cancer Institute (Canada); Victor X. Yang, Ryerson Univ. (Canada) and Ontario Cancer Institute (Canada) [7551-22]

10:45 am: **Laser-induced photoacoustic imaging for breast cancer detection using multivariate image analysis**, Yasser H. El-Sharkawy, Cairo Univ. (Egypt) [7551-23]

11:00 am: **Optical characteristics of hematoporphyrin monomethyl ether (HMME): a new PDT photosensitizer**, Greg Glazner, Srinivas Pendyala, Tim Lei, Univ. of Colorado, Denver (USA); Xiuli Wang, Hongwei Wang, Shanghai Skin Diseases and STD Hospital (China); Fred Hetzel, Zheng Huang, Univ. of Colorado, Denver (USA) [7551-24]

11:15 am: **EGF targeted fluorescence molecular tomography as a predictor of PDT outcomes in pancreas cancer models**, Kimberley S. Samkoe, Scott C. Davis, Subhadra Srinivasan, Julia A. O'Hara, Dartmouth College (USA); Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA); Brian W. Pogue, Dartmouth College (USA) [7551-25]

11:30 am: **Novel visible light activated Type 1 Photosensitizers**, Raghavan Rajagopalan, Amruta Poreddy, Amol Karwa, Przemyslaw Lusiak, Kripa Srivastava, Richard B. Dorshow, Covidien (USA) [7551-26]

Lunch/Exhibition Break 11:45 am to 1:15 pm

SESSION 7

Room: 208/210 (Mezzanine) Sun. 1:15 to 2:45 pm

Session Chair: Jarod C. Finlay, Univ. of Pennsylvania

1:15 pm: **In vitro biological effects of novel Type I photosensitizers and their mechanism of action**, Amol Karwa, Amruta Poreddy, Przemyslaw Lusiak, Kripa Srivastava, Richard B. Dorshow, Raghavan Rajagopalan, Covidien (USA) [7551-27]

1:30 pm: **Noninvasive assessment of tissue distribution and tumor pharmacokinetics of Pc 181: a silicon phthalocyanine analogue in mice**, Lihua Bai, Jianxia Guo, Univ. of Pittsburgh Cancer Institute (USA) and Univ. of Pittsburgh (USA); Dana Clausen, Univ. of Pittsburgh Cancer Institute (USA); Julie Eiseman, Univ. of Pittsburgh Cancer Institute (USA) and Univ. of Pittsburgh (USA) [7551-28]

1:45 pm: **Plasmonic gold nanoparticle enhanced photodynamic therapy**, Si Chen, Chalmers Univ. of Technology (Sweden); Brigitte Bauer, Univ. of Gothenburg (Sweden); Linda Gunnarsson, Alexandre Dimitriev, Mikael Käll, Chalmers Univ. of Technology (Sweden); Marica Ericson, Univ. of Gothenburg (Sweden) [7551-29]

2:00 pm: **Photodynamic inactivation of psuedomonas aeruginosa in burned skin in rats**, Akihiro Hirao, Keio Univ. (Japan); Shunichi Sato, Daizoh Saitoh, Nariyoshi Shinomiya, Hiroshi Ashida, National Defense Medical College (Japan); Minoru Obara, Keio Univ. (Japan) [7551-30]

2:15 pm: **Patient specific integrating spheres for the improvement of dosimetry in skin PDT**, Diana L. Glennie, McMaster Univ. (Canada); Thomas J. Farrell, Michael S. Patterson, Joseph E. Hayward, Juravinski Cancer Ctr. (Canada) and McMaster Univ. (Canada); Greg Sawesky, Juravinski Cancer Ctr. (Canada) [7551-31]

2:30 pm: **Gold nanoparticle assisted light activation of heat-sensitive nanobubbles for photothermal therapy**, Songbo Xu, Jiwei Huang, Ronald Xu, The Ohio State Univ. (USA) [7551-32]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Photodynamic therapy with 5-ALA in the treatment of condyloma by human papillomavirus: clinical protocol, device development, and application, Natalia M. Inada, Cristina Kurachi, Orlando Guimaraes, Mardoqueu Costa, Silvana Quintana, Wellington Lombardi, Vanderlei Bagnato, Univ. de São Paulo (Brazil) [7551-33]

Vibrational spectroscopy characterization of low-level laser therapy on mammary culture cells: an micro-FTIR study, Taciana D. Magrini, Nathalia V. dos Santos, Giselle Cerchiaro, Nasser A. Daghestanli, Herculanio d. Silva Martinho, Univ. Federal do ABC (Brazil) [7551-34]

Color image reconstruction of oral cavity for abnormal tissue detection, Hsiang-Chen Wang, Hao-Ye Zih, Fu-Jie Hsu, National Chung Cheng Univ. (Taiwan); Chun-Ping Chiang, National Taiwan Univ. (Taiwan); Fang-Hsuan Cheng, Chung Hua Univ. (Taiwan) [7551-35]

Reconstruction of optical properties using a linear source model for interstitial diffuse optical tomography, Ken Kang-Hsin Wang, Timothy C. Zhu, Univ. of Pennsylvania (USA) [7551-36]

Pre-clinic study of uniformity of light blanket for intraoperative photodynamic therapy, Yida Hu, Ken K. Wang, Timothy C. Zhu, Univ. of Pennsylvania (USA); Brian C. Wilson, Univ. of Toronto (Canada) [7551-37]

The online optimal motion planning of robotic multichannel platform for photodynamic therapy, Yida Hu, Jarod C. Finlay, Timothy C. Zhu, Univ. of Pennsylvania (USA) [7551-38]

Dependence of light fluence on treated depth with photosensitization reaction shortly after photosensitizer injection in rabbit myocardial tissue in vivo, Tsukasa Suenari, Hiroki Matsuo, Arisa Ito, Keio Univ. (Japan); Shunichiro Miyoshi, Keio Univ. School of Medicine (Japan); Tsunenori Arai, Keio Univ. (Japan) [7551-40]

Light dosimetry for pleural PDT, Andreea Dimofte, Timothy C. Zhu, Jarod C. Finlay, Melissa Cullighan, Joseph S. Friedberg M.D., Keith A. Cengel, Stephen M. Hahn M.D., Univ. of Pennsylvania (USA) [7551-43]

In vivo sampling of Verteporfin uptake in pancreas cancer xenograft models: comparison of surface, oral, and interstitial measurements, Martin E. Isabelle, Julia A. O'Hara, Kimberley S. Samkoe, P. Jack Hoopes, Dartmouth College (USA); Sandy Mosse, Stephen P. Pereira, Univ. College London (United Kingdom); Tayyaba Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Brian W. Pogue, Dartmouth College (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) [7551-44]

Analytic modeling of in vivo drug delivery: comparison of antibody versus vesicle-mediated delivery to tumor cells, Brian W. Pogue, Subhadra Srinivasan, Dartmouth College (USA); Prakash R. Rai, Zhiming Mai, Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA) [7551-45]

Mechanisms for Low-Light Therapy V

Conference Chairs: **Michael R. Hamblin**, Massachusetts General Hospital; **Ronald W. Waynant**, U.S. Food and Drug Administration; **Juanita Anders**, Uniformed Services Univ. of the Health Sciences

Program Committee: **James D. Carroll**, THOR Photomedicine Ltd. (United Kingdom); **Luis H. De Taboada**, PhotoThera, Inc.; **Mary Dyson**, King's College London (United Kingdom); **Tomas Lars Mikael Hode**, Irradia USA

Saturday 23 January

SESSION 1

Room: 300 (Esplanade) Sat. 8:00 to 10:00 am

Reviews and Dosimetry

Session Chair: **Michael R. Hamblin**, Massachusetts General Hospital

8:00 am: **Fundamental mechanisms of phototherapy**, Tomas Hode, Immunophotonics, Inc. (USA) and Irradia USA (USA); Peter Jenkins, Irradia USA (USA); Lars Hode, Swedish Laser-Medical Society (Sweden) [7552-01]

8:20 am: **The importance of pulsing illumination parameters in low-level light therapy**, Daniel Barolet, RoseLab Skin Optics Lab. (Canada) and McGill Univ. (Canada) [7552-02]

8:40 am: **The effects of laser phototherapy device design and treatment technique on the optical properties of tissue, and the clinical implications thereof**, Peter A. Jenkins, Irradia LLC (USA) and SpectraVET, Inc. (USA) and SpectraMedics Pty, Ltd. (USA); Tomas Hode, ImmuoPhotonics, Inc. (USA) and Irradia LLC (USA) [7552-03]

9:00 am: **Role of the circulation in the systemic effects of low-light therapy**, Mary Dyson, King's College London (United Kingdom) [7552-04]

9:20 am: **Will LLLT be an alternative treatment for traumatic brain injury?**, Ying-Ying Huang, QiuHe Wu, Aaron C. Chen, Michael R. Hamblin, Massachusetts General Hospital (USA) [7552-05]

9:40 am: **Molecular mechanisms of the anti-inflammatory effect on rheumatoid arthritis by low level laser irradiation**, Yoshimitsu Abiko, Nihon Univ. (Japan) [7552-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 300 (Esplanade) Sat. 10:30 am to 12:10 pm

In Vitro Studies

Session Chair: **Juanita Anders**, Uniformed Services Univ. of the Health Sciences

10:30 am: **In vitro suppression of metabolic activity in malignant human brain cancer and normal human fibroblast due to extremely low frequency pulsed electric potential exposures**, Darrell B. Tata, U.S. Food and Drug Administration (USA); Abby Schlichting, Marquette Univ. (USA); Ronald W. Waynant, U.S. Food and Drug Administration (USA) [7552-07]

10:50 am: **Dermal papilla cell activation by low level light irradiation**, Yi-Shuan Sheen, National Taiwan Univ. Hospital (Taiwan) and National Taiwan Univ. College of Medicine (Taiwan); Sung-Jan Lin, National Taiwan Univ. Hospital (Taiwan); Mai-Yi S. Fan, National Taiwan Univ. (Taiwan); Chih-Chieh Chan, Shiou-Hwa Jee, National Taiwan Univ. Hospital (Taiwan) [7552-08]

11:10 am: **Activation of transcription factors by low level light in different cell types**, Aaron C. Chen, Ying-Ying Huang, Michael R. Hamblin, Massachusetts General Hospital (USA) [7552-09]

11:30 am: **Effect of low-level laser on hair cell regeneration following gentamicin induced ototoxicity in postnatal organotypic culture of rat cochlea**, Chung-Ku Rhee, Myung-Whan Suh, Peijie He, Jin-Chul Ahn, Dankook Univ. Hospital (Korea, Republic of) [7552-10]

11:50 am: **Optimization of dose and power density for 980 nm and 810 nm light based on mitochondrial activity**, Isaac Erbele, Xingjia Wu, Helina Moges, Uniformed Services Univ. of the Health Sciences (USA); Brian Pryor, LiteCure (USA); Juanita Anders, Uniformed Services Univ. of the Health Sciences (USA) [7552-11]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 3

Room: 300 (Esplanade) Sat. 1:40 to 3:40 pm

Animal Studies

Session Chair: **Ronald W. Waynant**, U.S. Food and Drug Administration

1:40 pm: **NIR treatment delays the progression of Parkinson's disease model in A53T transgenic mice**, Harry T. Whelan, Medical College of Wisconsin (USA); Kristina Desmet, Univ. of Wisconsin, Milwaukee (USA); Ellen Buchmann, Michele Henry, Medical College of Wisconsin (USA); Janis T. Eells, Univ. of Wisconsin, Milwaukee (USA) [7552-12]

2:00 pm: **Low-power light effects on rat hearts after ischemia of myocardium**, Victor A. Monich, Nizhny Novgorod State Medical Academy (Russian Federation) [7552-13]

2:20 pm: **LASER and LED photobiomodulation in the prevention and treatment of oral mucositis after chemotherapy: experimental study in hamsters**, Maria do Rosário S. Freire, Robert Prehatney, Aparecida Maria C. Marques, Luciana Maria P. Ramalho, Viviane A. Sarmento, Federal Univ. of Bahia (Brazil) [7552-14]

2:40 pm: **Raman spectroscopy validates the use of fluorescence readings of the Diagnodent® as a method of optical biopsy of tibial fractures treated or not with laser phototherapy, BMPs, guided bone regeneration and internal rigid fixation**, Antonio L. Barbosa Pinheiro, Univ. Federal da Bahia (Brazil); Cibele B. Lopes, Univ. do Vale do Paraíba (Brazil); Marcos Tadeu T. Pacheco, Aldo Brugnera Junior, Unicastelo (Brazil); Fatima Antonia A. Zanin, Instituto Brugnera & Zanin (Brazil); Maria Cristina T. Cangussu, Univ. Federal da Bahia (Brazil); Landulfo Silveira Junior, Unicastelo (Brazil) [7552-15]

3:00 pm: **The photobiomodulation in the bone repair after radiotherapy: experimental study in rats**, Maria do Rosário S. Freire, Federal Univ. of Bahia (Brazil); Darcy de Almeida, Federal Univ. of Reconcavo Baiano (Brazil); Jean N. dos Santos, Viviane A. Sarmento, Federal Univ. of Bahia (Brazil) [7552-16]

3:20 pm: **Prevention of bloodstream infections by photodynamic inactivation of multiresistant pseudomonas aeruginosa in burn wounds**, Maria Cristina E. Hashimoto, Renato A. Prates, Daniel J. Toffoli, Lília C. Courrol, Martha S. Ribeiro, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [7552-17]

Coffee Break 3:40 to 4:10 pm

SESSION 4

Room: 300 (Esplanade) Sat. 4:10 to 5:50 pm

Clinical Studies

Session Chair: **James D. Carroll**, THOR Photomedicine Ltd. (United Kingdom)

4:10 pm: **Review of technology development and clinical trials of low level light therapy for acute stroke treatment**, Brian E. Catanzaro, CFE Services (USA); Jackson Streeter M.D., Luis de Taboada, PhotoThera (USA) [7552-18]

4:30 pm: **Laser therapy for the treatment of arthritic knees: a clinical study**, Fred Kahn M.D., Leslie Perrin, Fernanda Saraga, Meditech International, Inc. (Canada) [7552-19]

4:50 pm: **Transcranial high-intensity LED therapy for cognitive dysfunction in chronic mild traumatic brain injury: two case reports**, Margaret Naeser, Boston Univ. School of Medicine (USA); Anita Saltmarche, MedX Health Corp. (Canada) [7552-20]

5:10 pm: **The effects of infrared laser therapy and weightbath traction hydrotherapy as a component of complex physical treatment in disorders of lumbar spine: a controlled pilot study with follow-up**, Csaba Oláh, Béla Demeter, Valéria Páll, Borsod County Univ. Teaching Hospital (Hungary); Mihály Oláh, Hungarospa Health Resort (Hungary); Zoltán Jancsó, Debrecen Medical Univ. (Hungary); Tamás Bender, St. John of God Hospital (Hungary) [7552-21]

5:30 pm: **Syntonics phototherapy**, Ray Gottlieb, College of Syntonics Optometry (USA) [7552-23]

BiOS Hot Topics

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Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Polarized light improves cutaneous healing on diabetic rats, Luciana M. P. Ramalho, Priscila C. Oliveira, Aparecida Maria C. Marques, Antonio L. Barbosa Pinheiro, Univ. Federal da Bahia (Brazil) [7552-24]

Assessment of laser photobiomodulation and polarized light on the healing of cutaneous wounds on euthyroid and hypothyroid induced rats, Luciana Maria P. Ramalho, Barbara M. P. Weyll, Maira D. M. da Costa Lino, Maria Jose P. Ramalho, Antonio L. Barbosa Pinheiro, Univ. Federal da Bahia (Brazil) [7552-25]

The antinociceptive effects of monechma ciliatum and changes in EEG waves following oral and intrathecal administration in rats, Ajibola B. Meraiyebu, Bingham Univ. (Nigeria) and University of Jos (Nigeria); Alexander B. Adelaiye, [7552-28]

Transcranial near infrared laser treatment (NILT) improves clinical performance in embolized rabbits: correlation with increased cortical adenosine-5'-triphosphate (ATP) content, P. A. Lapchak, Univ. of California, San Diego (USA); Luis H. De Taboada, PhotoThera, Inc. (USA) [7552-31]

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Frontiers in Pathogen Detection: From Nanosensors to Systems

Conference Chairs: **Philippe M. Fauchet**, Univ. of Rochester; **Benjamin L. Miller**, Univ. of Rochester

Program Committee: **Carl A. Batt**, Cornell Univ.; **Jeffrey L. Coffey**, Texas Christian Univ.; **Harold Craighead**, Cornell Univ.; **Jiri Homola**, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic); **Hongrui Jiang**, Univ. of Wisconsin-Madison; **Laura M. Lechuga**, Ctr. d'Investigacions en Nanociència i Nanotecnologia (Spain); **Deborah Leckband**, Univ. of Illinois at Urbana-Champaign; **Sonia E. Letant**, Lawrence Livermore National Lab.; **Frances S. Ligler**, Naval Research Lab.; **Daniel V. Lim**, Univ. of South Florida; **Christopher Myatt**, Precision Photonics Corp.; **Michael J. Sailor**, Univ. of California, San Diego; **Christopher M. Strohsahl**, Lighthouse Biosciences, LLC; **Sharon M. Weiss**, Vanderbilt Univ.

Saturday 23 January

SESSION 1

Room: 309 (Esplanade) Sat. 8:30 to 10:00 am

Fluidics and Photonic Crystals I

Session Chair: **Philippe M. Fauchet**, Univ. of Rochester

8:30 am: **Photonic crystal-enhanced fluorescence** (*Invited Paper*), Brian T. Cunningham, Univ. of Illinois at Urbana-Champaign (USA) ... [7553-01]

9:00 am: **Real-time small molecule binding detection using a label-free optical biosensor**, Yunbo Guo, Jing Y. Ye, Univ. of Michigan (USA); Baohua Huang, Daniel McNerny, The Michigan Nanotechnology Institute for Medicine and Biological Sciences (USA); Thommey P. Thomas, Univ. of Michigan (USA); James R. Baker, Jr., The Michigan Nanotechnology Institute for Medicine and Biological Sciences (USA); Theodore B. Norris, Univ. of Michigan (USA) [7553-02]

9:15 am: **Microcavities in photonic crystal waveguides for biosensor applications**, Sudeshna Pal, Elisa Guillermain, Benjamin L. Miller, Philippe M. Fauchet, Univ. of Rochester (USA) [7553-03]

9:30 am: **Single virus detection with optical microcavities** (*Invited Paper*), Frank Vollmer, Harvard Univ. (USA); Stephen Arnold, Polytechnic Institute of NYU (USA) [7553-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 309 (Esplanade) Sat. 10:30 to 11:45 am

Fluidics and Photonic Crystals II

Session Chair: **Brian T. Cunningham**, Univ. of Illinois at Urbana-Champaign

10:30 am: **Colorimetric-resonant-reflection and image-correlation sensing with sub-wavelength low-index-contrast aperiodic gratings**, Svetlana V. Boriskina, Sylvanus Lee, Ashwin Gopinath, Boston Univ. (USA); Jason A. Amsden, Jessica Mondia, David Kaplan, Fiorenzo Omenetto, Tufts Univ. (USA); Luca Dal Negro, Boston Univ. (USA) [7553-05]

10:45 am: **The design of a microfluidic biochip for the rapid multiplexed detection of food-borne pathogens by surface plasmon resonance imaging**, Michael D. Zordan, Meggie G. Grafton, Kinam Park, James F. Leary, Purdue Univ. (USA) [7553-06]

11:00 am: **A microflow cytometer on a chip**, Joel P. Golden, Jason Kim, George Anderson, Nastaran Hashemi, Richard Eitel, Frances Ligler, Naval Research Lab. (USA) [7553-07]

11:15 am: **Programmable nano-bio-chip sensor systems: toward next-generation pathogen detectors** (*Invited Paper*), John T. McDevitt, Rice University (USA) [7553-08]

Lunch/Exhibition Break 11:45 am to 1:45 pm

SESSION 3

Room: 309 (Esplanade) Sat. 1:45 to 2:45 pm

Surface Chemistry and Nanoparticles

Session Chair: **Benjamin L. Miller**, Univ. of Rochester

1:45 pm: **Design of nanoscale interfaces for optical biosensors** (*Invited Paper*), Ashutosh Chilkoti, Duke Univ. (USA) [7553-09]

2:15 pm: **Rapid and sensitive homogenous detection of the Ibaraki virus NS3 cDNA using magnetic modulation biosensing system**, Amos Danielli, Tel-Aviv Univ. (Israel); Noga Porat, Univ. of Illinois at Chicago (USA); Ady Arie, Marcelo Ehrlich, Tel-Aviv Univ. (Israel) [7553-10]

2:30 pm: **Detection of food-borne pathogens by nanoparticle technology coupled to a low-cost fluorescence cell reader**, Isabelle Noiseux, Jean-Pierre Bouchard, INO (Canada); Honge Cao, Shu Chen, Univ. of Guelph (Canada); Roger Johnson, Public Health Agency of Canada (Canada); Marcia Vernon, Ozzy Mermut, INO (Canada) [7553-11]

Coffee Break 2:45 to 3:15 pm

SESSION 4

Room: 309 (Esplanade) Sat. 3:15 to 4:15 pm

Plasmonics

Session Chair: **John E. Sipe**, Univ. of Toronto (Canada)

3:15 pm: **Engineered photonic-plasmonic aperiodic surfaces for optical biosensing**, Luca Dal Negro, The Boston Univ. Photonics Ctr. (USA) . . [7553-13]

3:30 pm: **Biological sensing using SERS on metallized ultra-thin porous silicon membranes**, Krishanu Shome, Christiane Hoepfener, Maryna Kavalenka, Lukas Novotny, Philippe M. Fauchet, Univ. of Rochester (USA) [7553-14]

3:45 pm: **Colorimetric signatures on photonic-plasmonic surfaces for biosensing**, Yuk Kwan Sylvanus Lee, Boston Univ. (USA); Jason Amsden, Tufts Univ. (USA); Svetlana Boriskina, Ashwin Gopinath, Boston Univ. (USA); David Kaplan, Fiorenzo Omenetto, Tufts Univ. (USA); Luca Dal Negro, Boston Univ. (USA) [7553-15]

4:00 pm: **Ultrasensitive Raman sensor based on a highly scattering non-absorbing porous structure**, Vladislav V. Yakovlev, Univ. of Wisconsin-Milwaukee (USA) [7553-16]

BIOS Hot Topics

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Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 5

Room: 309 (Esplanade) Sun. 9:00 to 10:30 am

Reflective and Photonic Devices I

Session Chair: **Michael J. Sailor**, Univ. of California, San Diego

9:00 am: **Spectral reflectance imaging for a multiplexed, high-throughput, label-free, and dynamic biosensing platform: protein, DNA and virus detection** (*Invited Paper*), M. Selim Ünlü, Emre Ozkumur, Carlos Lopez, Ayca Yalcin, Boston Univ. (USA); Marcella Chiari, C.N.R. (Italy); Sunmin Ahn, George Daaboul, Alex Reddington, Margo Monroe, Rahul Vedula, John H. Connor, Boston Univ. (USA) [7553-17]

9:30 am: **Multiplex detection of disease marker proteins with arrayed imaging reflectometry**, Benjamin L. Miller, Amrita Yadav, Rashmi Sriram, Univ. of Rochester (USA) [7553-18]

9:45 am: **LED-based spectral reflectance imaging biosensor for label-free high-throughput multi-analyte and single-pathogen detection**, George Daaboul, Rahul S. Vedula, Alex Reddington, Emre Ozkumur, Carlos Lopez, John Connor, Helen Fawcett, Selim Ünlü, Boston Univ. (USA) [7553-19]

10:00 am: **Hybrid nanoporous silicon optical biosensor architectures for biological sample analysis** (*Invited Paper*), Lisa A. DeLouise, Univ. of Rochester Medical Ctr. (USA); Lisa M. Bonanno, Univ. of Rochester (USA) [7553-20]

Coffee Break 10:30 to 11:00 am

SESSION 6

Room: 309 (Esplanade) Sun. 11:00 am to 12:30 pm

Reflective and Photonic Devices II

Session Chair: **Lisa A. DeLouise**, Univ. of Rochester Medical Ctr.

11:00 am: **Enhancement of diffraction-based biosensing using porous structures and electromagnetic surface states** (*Invited Paper*), John E. Sipe, Univ. of Toronto (Canada); Sharon Weiss, Vanderbilt Univ. (USA); Marco Liscidini, Univ. degli Studi di Pavia (Italy) [7553-21]

11:30 am: **Photonic molecules as ultrasensitive and tunable devices for mass and fluorescence spectroscopy**, Svetlana V. Boriskina, Boston Univ. (USA) [7553-22]

11:45 am: **Sensitivity analysis of polymer-cladded porous silicon waveguide for small molecule detection**, Yang Jiao, Sharon M. Weiss, Vanderbilt Univ. (USA) [7553-23]

12:00 pm: **Detection of biologicals with functional porous nanostructures** (*Invited Paper*), Michael J. Sailor, Univ. of California, San Diego (USA) . [7553-24]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Suspended photonic crystal slabs for biosensing, Mohamed El Beheiry, Univ. of Toronto (Canada); Victor Liu, Shanhui Fan, Stanford Univ. (USA); Ofer Levi, Univ. of Toronto (Canada) and Stanford Univ. (USA) [7553-25]

New sensitive ammonia gas sensor based on the Fabry-Perot properties of the layer-by-layer assembly films, Wang Lin, Kexin Xu, Tianjin Univ. (China) [7553-26]



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Coherence Domain Optical Methods and Optical Coherence Tomography in Biomedicine XIV

Conference Chairs: **Joseph A. Izatt**, Duke Univ.; **James G. Fujimoto**, Massachusetts Institute of Technology; **Valery V. Tuchin**, Saratov State Univ. (Russian Federation)

Program Committee: **Peter Eskil Andersen**, Technical Univ. of Denmark (Denmark); **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign; **Zhongping Chen**, Univ. of California, Irvine; **Johannes F. de Boer**, Vrije Univ. Amsterdam (Netherlands); **Wolfgang Drexler**, Cardiff Univ. (United Kingdom); **Christoph K. Hitzenberger**, Medizinische Univ. Wien (Austria); **Martin J. Leahy**, Univ. of Limerick (Ireland); **Rainer Andreas Leitgeb**, Univ. Wien (Austria); **Xingde Li**, The Johns Hopkins Univ.; **Adrian Gh. Podoleanu**, Univ. of Kent (United Kingdom); **Andrew M. Rollins**, Case Western Reserve Univ.; **Natalia M. Shakhova**, Institute of Applied Physics (Russian Federation); **Guillermo J. Tearney**, Massachusetts General Hospital; **Ruikang Wang**, Oregon Health & Science Univ.; **Maciej Wojtkowski**, Nicolaus Copernicus Univ. (Poland); **Yoshiaki Yasuno**, Univ. of Tsukuba (Japan)

Monday 25 January

SESSION 1

Room: 303 (Esplanade) Mon. 8:30 to 10:00 am

Cardiovascular Applications

Session Chair: **Joseph Adam Izatt**, Duke Univ.

8:30 am: **Optical frequency domain imaging for studying the natural history of coronary atherosclerotic plaques**, Guillermo J. Tearney, Massachusetts General Hospital (USA); Sergio Waxman, Lahey Clinic (USA); Melissa J. Suter, Milen Shishkov, Benjamin J. Vakoc, Massachusetts General Hospital (USA); Akiko Maehara, Celia Castellanos, Columbia Univ. Medical Ctr. (USA); Mark I. Freilich, Lahey Clinic (USA); Mireille Rosenberg, Massachusetts General Hospital (USA); Giora Weisz, Jeffrey W. Moses, Martin B. Leon, Columbia Univ. Medical Ctr. (USA); Brett E. Bouma, Massachusetts General Hospital (USA) [7554-01]

8:45 am: **System design and image processing algorithms for frequency domain optical coherence tomography in the coronary arteries**, Desmond C. Adler, Chenyang Xu, Christopher L. Petersen, Joseph M. Schmitt, LightLab Imaging Inc. (USA) [7554-02]

9:00 am: **Optical coherence tomography forward imaging catheter for real-time monitoring of cardiac radiofrequency ablation lesion formation**, Christine P. Fleming, Hui Wang, Zhilin Hu, Wei Kang, Case Western Reserve Univ. (USA); Kara J. Quan, MetroHealth Medical Ctr. (USA); Andrew M. Rollins, Case Western Reserve Univ. (USA) [7554-03]

9:15 am: **Catheter motion tracking in intracoronary optical frequency division imaging**, Jinyong Ha, Milen Shishkov, Max Colice, Wang Yuhl Oh, Linbo Liu, Guillermo Tearney, Brett Bouma, Harvard Medical School (USA) [7554-04]

9:30 am: **Investigations of the intravascular backscattering distribution of light in optical coherence tomography**, Peter Cimalla, Julia Walther, Edmund Koch, Technische Univ. Dresden (Germany) [7554-05]

9:45 am: **Scanning the cardiac functions of live drosophila with optical coherence tomography**, Meng-Tsan Tsai, National Taiwan Univ. (Taiwan) and Chang Gung Univ. (Taiwan); Cheng-Kuang Lee, Ting-Ta Chi, June-Tai Wu, Lian-Yu Lin, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [7554-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 303 (Esplanade) Mon. 10:30 am to 12:00 pm

Endoscopic and Cancer Imaging

Session Chair: **James G. Fujimoto**, Massachusetts Institute of Technology

10:30 am: **In vivo early detection of smoke-induced airway injury using 3D swept source optical coherence tomography**, Jiechen Yin, Gangjun Liu, Jun Zhang, Lingfeng Yu, Sari Mahon, David Mukai, Beckman Laser Institute and Medical Ctr. (USA); Matthew Brenner, Beckman Laser Institute and Medical Ctr. (USA) and Irvine Medical Ctr., Univ. of California, Irvine (USA); Zhongping Chen, Univ. of California, Irvine (USA) and Beckman Laser Institute and Medical Ctr. (USA) [7554-07]

10:45 am: **Multiscale imaging of human thyroid pathologies using integrated optical coherence tomography (OCT) and optical coherence microscopy (OCM)**, Chao Zhou, Massachusetts Institute of Technology (USA); Yihong Wang, Beth Israel Deaconess Medical Ctr. (USA); Aaron D. Aguirre, Tsung-Han Tsai, Massachusetts Institute of Technology (USA); David W. Cohen, James L. Connolly, Beth Israel Deaconess Medical Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [7554-08]

11:00 am: **Three-dimensional swine esophageal imaging in vivo using spectral-domain optical coherence tomography**, Wei Kang, Hui Wang, Case Western Reserve Univ. (USA); Yinsheng Pan, Thorlabs, Inc. (USA); Michael W. Jenkins, Case Western Reserve Univ. (USA); Gerard Isenberg, Amitabh Chak, Deepak Agrawal, Case Western Reserve Univ. (USA) and Univ. Hospital Case Medical Ctr. (USA); Zhilin Hu, Andrew Rollins, Case Western Reserve Univ. (USA) [7554-09]

11:15 am: **Optical frequency domain imaging of the biliary tree: a pilot clinical study**, Melissa J. Suter, William Warger, Milen Shishkov, Patrick S. Yachimski, David Forcinone, William Brugge, Brett E. Bouma, Guillermo J. Tearney, Harvard Medical School and Wellman Ctr. for Photomedicine (USA) [7554-10]

11:30 am: **Differentiating different carcinogenesis stages of oral lesions with optical coherence tomography**, Meng-Tsan Tsai, Chang Gung Univ. (Taiwan); Cheng-Kuang Lee, Ting-Ta Chi, Kai-Min Yang, Hsin-Ming Chen, Chun-Ping Chiang, Yih-Ming Wang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [7554-11]

11:45 am: **Resonant fiber scanning endoscope for high-speed three-dimensional and en face OCT imaging**, Li Huo, Jiefeng Xi, Yicong Wu, Xingde Li, The Johns Hopkins Univ. (USA) [7554-12]

Lunch Break 12:00 to 1:00 pm

SESSION 3

Room: 303 (Esplanade) Mon. 1:00 to 3:00 pm

Ophthalmic: New Technology

Session Chair: Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland)

- 1:00 pm: **Adaptive optics spectral domain optical coherence tomography with one-micrometer light source**, Kazuhiro Kurokawa, Kazuhiro Sasaki, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [7554-13]
- 1:15 pm: **Real-time intraoperative spectral domain optical coherence tomography for vitreoretinal surgery**, Yuankai K. Tao, Cynthia A. Toth, Joseph A. Izatt, Duke Univ. (USA) [7554-14]
- 1:30 pm: **Simultaneous visualization of retinal structure and function in vivo in healthy and diseased rat retina with a combined UHROCT and ERG system**, Alireza Akhlagh Moayed, Sepideh Hariri, Univ. of Waterloo (Canada); Timothy W. Kraft, The Univ. of Alabama at Birmingham (USA); Bruce Doran, Diagnosys, LLC (USA); Shelley Boyd, St. Michael's Hospital (Canada) and Univ. of Toronto (Canada); Kostadinka Bizheva, Univ. of Waterloo (Canada) . [7554-15]
- 1:45 pm: **Choroidal neovascularization imaging in a laser-induced mouse model using phase contrast swept-source optical coherence tomography at 1050 nm**, Reza S. Motaghianezam, David Koos, California Institute of Technology (USA); Shikun He, David R. Hinton, Keck School of Medicine, The Univ. of Southern California (USA); Scott E. Fraser, California Institute of Technology (USA) [7554-16]
- 2:00 pm: **In vitro retinal imaging with full field swept source optical coherence tomography**, James R. Fergusson, Boris Povazay, Bernd Hofer, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7554-17]
- 2:15 pm: **Variable lateral size imaging of the human retina in vivo by combined confocal/en face optical coherence tomography with closed loop OPD-locked low coherence interferometry based active axial eye motion tracking**, Radu G. Cucu, Univ. of Kent (United Kingdom); Mark Hathaway, OTI/Opko Instrumentation (Canada); Adrian Podoleanu, Univ. of Kent (United Kingdom); Richard Rosen M.D., New York Eye and Ear Infirmary (USA) [7554-18]
- 2:30 pm: **Ultrahigh-speed full range complex spectral domain optical coherence tomography for volumetric imaging at 140,000 A scans per second**, Hrebesh Subhash, Lin An, Ruikang Wang, Oregon Health & Science Univ. (USA) [7554-19]
- 2:45 pm: **Keratometric optical coherence tomography using fast distributed scan patterns**, Ryan P. McNabb, Duke Univ. (USA); Anthony Kuo, Duke Univ. Eye Ctr. (USA); Mingtao Zhao, Joseph A. Izatt, Duke Univ. (USA) [7554-20]
- Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 303 (Esplanade) Mon. 3:30 to 5:30 pm

Cellular and Small Animal Imaging

Session Chair: Andrew M. Rollins, Case Western Reserve Univ.

- 3:30 pm: **Shear stress in the developing heart tube**, Michael W. Jenkins, Madhusudhana Gargesh, Lindsay M. Peterson, Shi Gu, Bryan M. Webb, Case Western Reserve Univ. (USA); Kersti K. Linask, Univ. of South Florida (USA); Michiko Watanabe, David L. Wilson, Andrew M. Rollins, Case Western Reserve Univ. (USA) [7554-21]
- 3:45 pm: **Mutant and wild type cell chemotaxis in 3D and 4D with ultrahigh-resolution optical coherence tomography**, Sara M. Rey, Boris Povazay, Bernd Hofer, Angelika Unterhuber, Adrian Harwood, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7554-22]
- 4:00 pm: **Structural and functional imaging of live rat embryos with OCT**, Kirill V. Larin, Univ. of Houston (USA); Irina Larina, Baylor College of Medicine (USA); Richard Behringer, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) [7554-23]
- 4:15 pm: **A heterodyne Mach-Zehnder interferometer employing dynamic phase demodulation technique to investigate live-cell dynamics**, Shiju Joseph, Stokes Research Institute (Ireland); Jean-Michel Gineste, European Commission Joint Research Ctr (Italy); Maurice Whelan, European Commission Joint Research Ctr. (Italy); David Newport, Stokes Research Institute (Ireland) [7554-24]
- 4:30 pm: **Visualization of damage in mouse models of muscular dystrophy by three-dimensional optical coherence tomography**, Blake R. Klyen, Derek Gerstmann, Thea Shavlakadze, Hannah G. Radley, Miranda D. Grounds, David D. Sampson, The Univ. of Western Australia (Australia) [7554-25]

- 4:45 pm: **Spectral characterization of individual biological cells and microparticles via spectroscopic optical coherence tomography**, Ji Yi, Xu Li, Northwestern Univ. (USA) [7554-26]
- 5:00 pm: **In vivo optical coherence tomography of percutaneous implants in hairless mice**, Sabine Donner, Laser Zentrum Hannover e.V. (Germany); Frank Witte, Ivonne Bartsch, CrossBIT (Germany); Frank Petraglia, Univ. of Pittsburgh (USA); Ole Massow, Marko Heidrich, Holger Lubatschowski, Alexander Heisterkamp, Alexander Krueger, Laser Zentrum Hannover e.V. (Germany) [7554-27]
- 5:15 pm: **Characterizing matrix remodeling in collagen gels using optical coherence tomography**, David Levitz, Monica T. Hinds, Stephen R. Hanson, Steven L. Jacques, Oregon Health & Science Univ. (USA) [7554-28]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

- In vivo 3D FD OCT of subpleural lung parenchyma in the intact thorax**, Sven Meissner, Christian Schnabel, Lilla Knels, Edmund Koch, Technische Univ. Dresden (Germany) [7554-85]
- Optical Doppler tomography and spectral Doppler imaging of localized ischemic stroke in a mouse model**, Lingfeng Yu, Univ. of California, Irvine (USA) [7554-86]
- Monitoring of sutured flexor tendons using Fourier domain optical coherence tomography**, Chia Meng B. Tay, Nanyang Technological Univ. (Singapore); Min He, Wei-Tat A. Gan, National Univ. Hospital (Singapore); Tzu-Hao Chow, Beng-Koon Ng, Nanyang Technological Univ. (Singapore); Khin-Sze A. Chong, National Univ. Hospital (Singapore); Sirajudeen Gulam Razul, Nanyang Technological Univ. (Singapore) [7554-87]
- Preliminary optical coherence tomography investigation of the temporomandibular joint disc**, Corina Marcautuanu, Eniko T. Demjan, Cosmin G. H. Sinescu, Meda-Lavinia Negrutiu, Adrian Motoc, Rodica Lighezan, Cezar Clonda, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Michael R. Hughes, Adrian Bradu, George Dobre, Adrian G. Podoleanu, Univ. of Kent (United Kingdom) [7554-88]
- A study on the qualitative morphological features of the muscle and subcutaneous shapes in vivo using Fourier-domain common path OCT**, Chul-Gyu Song, Chonbuk National Univ. (Korea, Republic of) and The Johns Hopkins Univ. (USA) [7554-89]
- Clinical optical coherence tomography combined with multiphoton tomography of patients with skin diseases**, Karsten König, Marco Speicher, Hauke Studier, Rainer Bückle, Julia Reckfort, JenLab GmbH (Germany); Gordon P. McKenzie, Michelson Diagnostics Ltd. (United Kingdom); Julia Welzel, General Hospital Augsburg (Germany); Martin J. Koehler, Peter Elsner, Martin Kaatz, Friedrich-Schiller-Univ. Jena (Germany) [7554-90]
- Pulse analyzer system using optical coherence tomography for oriental medical application**, Namhyun Cho, Unsang Jung, Mansik Jeon, Changho Lee, Kyungpook National Univ. (Korea, Republic of); Chang Su Na, Dongshin Univ. (Korea, Republic of); Jae-Won Song, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) [7554-91]
- Spectral domain polarization sensitive optical coherence tomography for imaging the nerve fiber layer at 1 micron**, Badr Elmaanaoui, Jordan C. Dwell, The Univ. of Texas at Austin (USA); Austin B. McElroy, Volcano Corp. (USA); Amit Paranjape, Larry Luck, Henry G. Rylander III, Thomas Milner, The Univ. of Texas at Austin (USA) [7554-92]
- Morphometric analysis of the optic nerve head with optical coherence tomography**, M. Young, S. Lee, Simon Fraser Univ. (Canada); K. Hsu, Micron Optics (USA); M. F. Beg, Simon Fraser Univ. (Canada); P. J. Mackenzie, Univ. of British Columbia (Canada); M. V. Sarunic, Simon Fraser Univ. (Canada) [7554-93]
- Dynamic analysis of mental sweating by optical coherence tomography**, Masato Ohmi, Motomu Tanigawa, Hiroyuki Saigusa, Akihiro Yamada, Yoshihiro Ueda, Masamitsu Haruna, Osaka Univ. (Japan) [7554-94]
- Minimal invasive localization of the germinal disc in ovo for subsequent chicken sexing using optical coherence tomography**, Anke Burkhardt, Stefan Geissler, Peter Cimalla, Julia Walther, Edmund Koch, Technische Univ. Dresden (Germany) [7554-95]

High-speed concatenation of frequency ramps using sampled grating distributed Bragg reflector laser diode sources for OCT resolution enhancement, Dennis J. Derickson, Brandon J. George, California Polytechnic State Univ., San Louis Obispo (USA)[7554-96]

Tunable semiconductor laser based on interaction between strongly mismatched Fabry-Perot interferometer and waveguide modes, Alexander A. Moiseev, Valentine M. Gelikonov, Grigory V. Gelikonov, Institute of Applied Physics (Russian Federation); Eugene A. Mashcovitch, Nizhny Novgorod State Univ. (Russian Federation).[7554-97]

MEMS scanner based swept-source laser for optical coherence tomography, Kouki Totsuka, Keiji Isamoto, Tooru Sakai, Atsushi Morosawa, Changho Chong, Santec Corp. (Japan)[7554-98]

Measurement of the coherent transfer function, Martin L. Villiger, Christophe Pache, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7554-99]

Real-time display on SD-OCT using a linear-in-wavenumber spectrometer and a graphics processing unit, Yuuki Watanabe, Toshiki Itagaki, Yamagata Univ. (Japan)[7554-100]

Frequency domain optical coherence tomography with subsequent depth resolved spectroscopic image analysis, Christoph Kasseck, Ruhr-Univ. Bochum (Germany); Volker Jaedicke, Georg Agricola Univ. of Applied Sciences (Germany); Nils C. Gerhardt, Ruhr-Univ. Bochum (Germany); Hubert Welp, Georg Agricola Univ. of Applied Sciences (Germany); Martin R. Hofmann, Ruhr-Univ. Bochum (Germany)[7554-101]

Adaptive filtering of optical coherent tomography fringe data with ensemble empirical mode decomposition, Gangjun Liu, Jun Zhang, Lingfeng Yu, Zhongping Chen, Beckman Laser Institute and Medical Ctr. (USA)[7554-102]

High-speed full-range imaging with harmonic detection swept-source optical coherence tomography, Kristen A. Peterson, Chuanyong Huang, Southwest Sciences, Inc. (USA); Andrei B. Vakhtin, Vista Photonics (USA)[7554-103]

Signal processing with unequally spaced data in Fourier-domain optical coherence tomography, Sebastien Vergnole, Daniel Lévesque, National Research Council Canada (Canada); Sherif S. Sherif, Univ. of Manitoba (Canada); Guy Lamouche, National Research Council Canada (Canada)[7554-104]

Evaluation of complex conjugate artifact removal methods used in spectrometer based Fourier-domain optical coherence tomography systems: a comparative study, Dae Yu Kim, John S. Werner, Robert J. Zawadzki, Univ. of California, Davis (USA)[7554-105]

Three-dimensional speckle suppression in optical coherence tomography based on the curvelet transform, Lingfeng Yu, Zhongping Jian, Bin Rao, Bruce J. Tromberg, Zhongping Chen, Univ. of California, Irvine (USA) [7554-106]

Multi-beam resolution video rate swept source optical coherence tomography (OCT) provides endogenous contrast for in vivo blood flow independent of flow direction, Florian Bazant-Hegemark, Simon Hattersley, Jon Holmes, Michelson Diagnostics Ltd. (United Kingdom).[7554-107]

Focusing light through living tissue, Ivo M. Vellekoop, Christof M. Aegerter, Univ. of Zürich (Switzerland)[7554-108]

Coherent noise compensation improvement in spectral-domain optical coherence tomography, Pavel A. Shilyagin, Valentin M. Gelikonov, Grigory V. Gelikonov, Irene V. Kasatkina, Dmitry A. Terpelov, Institute of Applied Physics (Russian Federation)[7554-109]

Effective bandwidth in spectral-domain OCT, Minshan Jiang, Shuliang Jiao, The Univ. of Southern California (USA)[7554-110]

Comparison of time domain vs. frequency domain high-speed full-field optical coherence tomography with low NA, Tim Bonin, Martin Hagen-Eggert, Univ. zu Lübeck (Germany); Peter Koch, Thorlabs HL AG (Germany); Gereon Hüttmann, Univ. zu Lübeck (Germany)[7554-111]

Speckle imaging by combination of mathematical morphology and contrast ratio, Zhifang Li, Shoudong Cai, Lingling Fan, Hui Li, Fujian Normal Univ. (China)[7554-112]

Tuesday 26 January

SESSION 5

Room: 303 (Esplanade)..... Tues. 8:30 to 10:00 am

Other Clinical Applications

Session Chair: Wolfgang Drexler, Cardiff Univ. (United Kingdom)

8:30 am: Multimodal imaging with integrated photoacoustic microscopy and optical coherence tomography, Shuliang Jiao, Univ. of Southern California (USA); Hao F. Zhang, Zhixing Xie, Univ. of Wisconsin-Milwaukee (USA)[7554-29]

8:45 am: Optimizing penetration depth, contrast, and resolution in 3D dermatologic OCT, Alex Aneesh, Boris Pova?ay, Bernd Hofer, Cardiff Univ. (United Kingdom); Sergei Popov, Imperial College (United Kingdom); Wolfgang Drexler, Cardiff Univ. (United Kingdom)[7554-30]

9:00 am: Noninvasive assessment of biofilm growth in the middle ear using a portable low-coherence interferometry system, Stephen A. Boppart, Cac T. Nguyen, Haohua Tu, Eric J. Chaney, Univ. of Illinois at Urbana-Champaign (USA); Charles N. Stewart, Blue Highway, LLC (USA)[7554-31]

9:15 am: Design of a dual-modality imaging system using optical coherence tomography and fluorescence lifetime imaging for oral cancer detection, Sebina Shrestha, Brian E. Applegate, Paritosh Pande, Javier A. Jo, Texas A&M Univ. (USA)[7554-32]

9:30 am: Diagnosis of oral submucous fibrosis with optical coherence tomography, Cheng-Kuang Lee, National Taiwan Univ. (Taiwan); Meng-Tsan Tsai, Chang Gung Univ. (Taiwan); Hsiang-Chieh Lee, Hsin-Ming Chen, Chun-Pin Chiang, Yih-Ming Wang, Ting-Ta Chi, Kai-Min Yang, Chih-Chung Yang, National Taiwan Univ. (Taiwan)[7554-33]

9:45 am: Guidance of hard tissue ablation by forward-viewing optical coherence tomography, Paul J. L. Webster, Benjamin Y. Leung, Queen's Univ. (Canada); Victor X. D. Yang, Ryerson Univ. (Canada); James M. Fraser, Queen's Univ. (Canada)[7554-34]

Coffee Break10:00 to 10:30 am

SESSION 6

Room: 303 (Esplanade)..... Tues. 10:30 am to 12:00 pm

Doppler OCT

Session Chair: Rainer Andreas Leitgeb, Medizinische Univ. Wien (Austria)

10:30 am: Speckle variance OCT tracking of tumor angiogenesis and response to vascular targeted photodynamic therapy, Adrian Mariampillai, Mark T. Jarvi, Michael K. Leung, Kenneth K. C. Lee, Brian C. Wilson, I. Alex Vitkin, Univ. of Toronto (Canada); Victor X. Yang, Ryerson Univ. (Canada)[7554-35]

10:45 am: Optical micro-angiography detects angiogenesis in brain trauma, Yali Jia, Ruikang Wang, Oregon Health & Science Univ. (USA)[7554-36]

11:00 am: Influence of blood optical inhomogeneity on Doppler OCT signals, Danuta Bukowska, Anna Szkulmowska, Nicolaus Copernicus Univ. (Poland); Reiner A. Leitgeb, Medizinische Univ. Wien (Austria); Maciej Szkulmowski, Ireneusz Grulkowski, Szymon Tamborski, Andrzej A. Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland)[7554-37]

11:15 am: BM-mode scanning with parabolic phase modulation for full range Doppler optical tomography, Franck Jaillon, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan)[7554-38]

11:30 am: Real-time bulk motion insensitive flow segmentation algorithm for Doppler spectral optical coherence tomography, Maciej Szkulmowski, Anna Szkulmowska, Daniel Szlag, Ireneusz Grulkowski, Andrzej Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland)[7554-39]

11:45 am: High-resolution wide-field of view blood perfusion maps for retina and choroid with optical micro angiography, Lin An, David Wilson, Ruikang Wang, Oregon Health & Science Univ. (USA)[7554-40]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 7

Room: 303 (Esplanade) Tues. 1:30 to 3:30 pm

OCT New Technology

Session Chair: Guillermo J. Tearney, Wellman Ctr. for Photomedicine

1:30 pm: **FDML based multi-spot OCT at 4,100,000 A-scans and 4 Gvoxels per second**, Wolfgang Wieser, Benjamin R. Biedermann, Christoph M. Eigenwillig, Thomas Klein, Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany)[7554-41]

1:45 pm: **Coherent transfer functions and extended depth of field**, Martin L. Villiger, Christophe Pache, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Rainer A. Leitgeb, Medizinische Univ. Wien (Austria); Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7554-42]

2:00 pm: **Multichannel optical coherence tomography using a high-power telescope-less polygon-based swept laser in dual amplifier configuration**, Michael K. K. Leung, Adrian Mariampillai, Univ. of Toronto (Canada); Beau A. Standish, Ryerson Univ. (Canada); Kenneth K. C. Lee, Nigel R. Munce, I. Alex Vitkin, Univ. of Toronto (Canada); Victor X. D. Yang, Ryerson Univ. (Canada)[7554-43]

2:15 pm: **Design and performance of a novel sample arm for dynamic optical coherence elastography**, Brendan F. Kennedy, Timothy R. Hillman, Robert A. McLaughlin, Bryden C. Quirk, David D. Sampson, The Univ. of Western Australia (Australia)[7554-44]

2:30 pm: **Large field OCT by optical movement tracking of a single point probe**, Gereon Hüttmann, Björn Martensen, Eva M. Lankenau, Univ. zu Lübeck (Germany)[7554-45]

2:45 pm: **Integrated photonic circuit in silicon on insulator for Fourier domain optical coherence tomography**, Gunay Yurtsever, Pieter Dumon, Wim Bogaerts, Univ. Gent (Belgium) and IMEC (Belgium); Roel Baets, Univ. Gent (Belgium)[7554-46]

3:00 pm: **Novel continuous-wave supercontinuum light source with stable, broadband, and high-power spectrum for spectrally sampled OCT**, Eun Joo Jung, Pusan National Univ. (Korea, Republic of); Ju-Han Lee, The Univ. of Seoul (Korea, Republic of); Hyung Seok Lee, Myung Yung Jeong, Chang Seok Kim, Pusan National Univ. (Korea, Republic of)[7554-47]

3:15 pm: **Linear OCT system with multiple carrier frequency encoded reference beams for a discontinuous measurement range**, Gereon Hüttmann, Volker Hellemanns, Univ. zu Lübeck (Germany); Peter Koch, Thorlabs GmbH (Germany)[7554-48]

Coffee Break 3:30 to 4:00 pm

SESSION 8

Room: 303 (Esplanade) Tues. 4:00 to 6:00 pm

Swept Light Source New Technology

Session Chair: Zhongping Chen, Beckman Laser Institute and Medical Ctr.

4:00 pm: **Frequency comb swept lasers for optical coherence tomography**, Tsung-Han Tsai, Chao Zhou, Desmond C. Adler, James G. Fujimoto, Massachusetts Institute of Technology (USA)[7554-49]

4:15 pm: **Compact ultrafast reflective Fabry-Perot tunable lasers for OCT imaging applications**, Mark Kuznetsov, Walid Atia, Bart Johnson, Dale C. Flanders, Axsun Technologies Inc. (USA)[7554-50]

4:30 pm: **High-frequency driving vs. buffering: scaling the sweep speed of Fourier domain mode locked (FDML) lasers**, Benjamin R. Biedermann, Wolfgang Wieser, Christoph M. Eigenwillig, Thomas Klein, Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany)[7554-51]

4:45 pm: **Fiber-based swept source at 1060 nm using a tapered amplifier**, Sebastian Marschall, Christian Pedersen, Peter E. Andersen, Ole B. Jensen, Technical Univ. of Denmark (Denmark); Kevin Hsu, Micron Optics, Inc. (USA); Bernd Sumpf, Karl-Heinz Hasler, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany)[7554-52]

5:00 pm: **Ultrabroadband Fourier domain mode locked swept source based on dual SOAs and WDM couplers**, Jun Zhang, Gangjun Liu, Zhongping Chen, Univ. of California, Irvine (USA)[7554-53]

5:15 pm: **Multiband swept laser source for frequency domain optical coherence tomography**, Junfeng Jiang, Tianjin Univ. (China); Rongqing Hui, The Univ. of Kansas (USA)[7554-54]

5:30 pm: **Imaging with novel swept-source OCT system based on integrated thermo-optic tunable laser chip**, Jae Du Cho, Eun Joo Jung, Myung Yung Jeong, Chang Seok Kim, Pusan National Univ. (Korea, Republic of); Young-Ouk Noh, Hyung-Jong Lee, ChemOptics Inc. (Korea, Republic of); Min-Cheol Oh, ChemOptics Inc. (Korea, Republic of) and Pusan National Univ. (Korea, Republic of)[7554-55]

5:45 pm: **Wavelength swept amplified spontaneous emission source at 1060 nm with Yb doped fiber post-amplification**, Christoph M. Eigenwillig, Thomas Klein, Benjamin R. Biedermann, Wolfgang Wieser, Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany)[7554-56]

Wednesday 27 January

SESSION 9

Room: 303 (Esplanade) Wed. 8:30 to 10:00 am

PSOCT

Session Chair: Christoph K. Hitztenberger, Medizinische Univ. Wien (Austria)

8:30 am: **Polarization sensitive optical coherence tomography of melanin provides tissue inherent contrast based on depolarization**, Bernhard Baumann, Medical Univ. of Vienna (Austria); Stefan O. Baumann, Thomas Konegger, Vienna Univ. of Technology (Austria); Michael Pircher, Erich Götzinger, Harald Sattmann, Medical Univ. of Vienna (Austria); Marco Litschauer, Vienna Univ. of Technology (Austria); Christoph K. Hitztenberger, Medical Univ. of Vienna (Austria)[7554-57]

8:45 am: **Full range polarization-sensitive swept-source optical coherence tomography at 1 µm with polarization modulation and BM-mode scan**, Masahiro Yamanari, Shuichi Makita, Yi Heng Lim, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan)[7554-58]

9:00 am: **Single camera polarization sensitive spectral domain OCT by spatial frequency encoding**, Tilman Schmolli, Erich Götzinger, Michael Pircher, Christoph K. Hitztenberger, Rainer A. Leitgeb, Medizinische Univ. Wien (Austria)[7554-59]

9:15 am: **Polarization-sensitive optical frequency domain imaging based on depolarized light**, Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Charles Kerbage, Neuroptix Corp. (USA); Boris H. Park, Univ. of California, Riverside (USA); Yupeng Tu, Wang Yuhl W. Oh, Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands)[7554-60]

9:30 am: **High-speed spectral domain polarization-sensitive OCT using a single InGaAs line-scan camera and an optical switch**, Sang-Won Lee, Hyun-Woo Jeong, Beop-Min Kim, Korea Univ. (Korea, Republic of)[7554-61]

9:45 am: **Ultrahigh-resolution fiber-based polarization sensitive spectral domain optical coherence tomography**, Erich Götzinger, Bernhard Baumann, Michael Pircher, Christoph K. Hitztenberger, Medizinische Univ. Wien (Austria)[7554-62]

Coffee Break 10:00 to 10:30 am

SESSION 10

Room: 303 (Esplanade) Wed. 10:30 am to 12:00 pm

Signal/Image Processing

Session Chair: Ruikang K. Wang, Oregon Health & Science Univ.

10:30 am: **From controlling the shape of Talbot bands' visibility to improving the sensitivity decay with depth in FD-OCT**, Adrian G. Podoleanu, Michael R. Hughes, Adrian Bradu, Daniel Woods, Univ. of Kent (United Kingdom)[7554-63]

10:45 am: **Performance of reduced bit-depth acquisition for optical frequency domain imaging**, Brian D. Goldberg, Benjamin J. Vakoc, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard-MIT Div. of Health Sciences and Technology (USA); William W.-Y. Oh, Melissa J. Suter, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Sergio Wasman, Mark I. Freilich, Lahey Clinic (USA); Brett E. Bouma, Guillermo J. Tearney, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard-MIT Div. of Health Sciences and Technology (USA) [7554-64]

11:00 am: **Sonification of optical coherence tomography data and images**, Adeel Ahmad, Steven G. Adie, Yanzhu Wang, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA)[7554-65]

11:15 am: **Non-harmonic analysis for high-resolution optical coherence tomography**, Changho Chong, Atsushi Morosawa, Kouki Totsuka, Takuya Suzuki, Santec Corp. (Japan); Xu Cao, Shigeki Hirobayashi, Univ. of Toyama (Japan)[7554-66]

11:30 am: **Resolution improvement in optical coherence tomography by step-frequency encoding**, Evgenia Bousi, Ismini Charalambous, Costas Pitrís, Univ. of Cyprus (Cyprus)[7554-67]

11:45 am: **Twofold improvement in axial resolution of optical coherence tomography by four-pass sample probing**, Marcin Sylwestrzak, Ewa A. Kwiatkowska, Piotr Targowski, Nicolaus Copernicus Univ. (Poland)[7554-68]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 11

Room: 303 (Esplanade)Wed. 1:30 to 3:15 pm

Novel Contrast Mechanisms

Session Chair: Stephen A. Boppart,
Univ. of Illinois at Urbana-Champaign

1:30 pm: **Magnetomotive optical coherence tomography for in vivo molecular imaging of mammary tumors using targeted magnetic nanoprobcs**, Renu John, Robabeh Rezaeiipoor, Steven G. Adie, Eric J. Chaney, Bradley P. Sutton, Marina Marjanovic, Amy Oldenburg, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA)[7554-69]

1:45 pm: **The development of pump-probe optical coherence microscopy**, Qiujie Wan, Brian R. Applegate, Texas A&M Univ. (USA)[7554-70]

2:00 pm: **Magnetomotive optical coherence elastography for relating lung structure and function in cystic fibrosis**, Raghav K. Chhetri, Jerome Carpenter, Richard Superfine, Scott H. Randell, Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA)[7554-71]

2:15 pm: **Overcoming barriers in topical administration of gold nanoparticles for optical coherence tomography using multimodal delivery**, Chang Soo Kim, Petra Wilder-Smith, Yeh-Chan Ahn, Lih-Huei L. Liaw, Zhongping Chen, Beckman Laser Institute and Medical Ctr. (USA); Young Jik Kwon, Univ. of California, Irvine (USA)[7554-72]

2:30 pm: **Tissue differentiation in human lymph nodes using parameterized optical coherence tomography**, Robert A. McLaughlin, Loretta Scolaro, The Univ. of Western Australia (Australia); Peter Robbins, PathWest Lab. Medicine WA (Australia); Christobel Saunders, Sir Charles Gairdner Hospital (Australia) and The Univ. Western Australia (Australia); Steven L. Jacques, Oregon Health & Science Univ. (USA); David D. Sampson, The Univ. of Western Australia (Australia)[7554-73]

2:45 pm: **Reconstruction of absorption profiles of indocyanine green using spectral OCT**, Szymon Tamborski, Danuta Bukowska, Maciej Szkulmowski, Ireneusz Grulkowski, Andrzej Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland)[7554-74]

3:00 pm: **Monitoring small changes in blood hematocrit using phase sensitive spectral domain optical coherence tomography**, Kirill V. Larin, Venu G. R. Manne, Univ. of Houston (USA)[7554-75]

Coffee Break3:15 to 3:45 pm

SESSION 12

Room: 303 (Esplanade)Wed. 3:45 to 5:45 pm

Full Field/OCM/Phase Contrast

Session Chair: Valery V. Tuchin,
N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

3:45 pm: **Dark-field optical coherence microscopy**, Christophe Pache, Martin L. Villiger, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7554-77]

4:00 pm: **Ultra-high-speed phase mapping at 512,000 A-scan rate with line field Fourier domain optical coherence tomography**, Branislav Grajciar, Medical Univ. of Vienna (Austria); Yves Lehareinger, ETH Zurich (Switzerland); Adolf F. Fercher, Rainer A. Leitgeb, Medical Univ. of Vienna (Austria)[7554-78]

4:15 pm: **Crosstalk rejection in full-field optical coherence tomography using spatially incoherent illumination with a partially coherent source**, Al-Hafeez Z. Dhalla, Justin Migacz, Joseph A. Izatt, Duke Univ. (USA)[7554-79]

4:30 pm: **Breast cancer surgery and full-field OCT in the operating room**, Brigitte Sigal-Zafrani, Institut Curie (France); Sylvain Gigan, Ecole Supérieure de Physique et de Chimie Industrielles (France); Bertrand De Poly, Olivier De Witte, LLTech (France); Charles Brossollet, Ecole Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (France); Claude Boccara, Ecole Supérieure de Physique et de Chimie Industrielles (France)[7554-80]

4:45 pm: **Low-coherence enhanced backscattering imaging with simultaneous multiple spatial filters**, Jingjing Liu, Zhengbin Xu, Young L. Kim, Purdue Univ. (USA)[7554-81]

5:00 pm: **Double common-path phase microscopy for the use of high numerical aperture objective lens**, Jae Seok Park, Hyeon Don Kim, Myung Yung Jeong, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of)[7554-82]

5:15 pm: **The role of a detector dead time in phase-resolved Doppler analysis using spectral domain optical coherence tomography**, Julia Walther, Peter Cimalla, Edmund Koch, Technische Univ. Dresden (Germany)[7554-83]

5:30 pm: **Sub-cellular resolution imaging with Gabor domain optical coherence microscopy**, Panomsak Meemon, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Kye-Sung Lee, The Institute of Optics, Univ. of Rochester (USA); Supraja Murali, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and General Optics (Asia) Ltd. (India); Ilhan Kaya, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Kevin P. Thompson, Optical Research Associates (USA); Jannick P. Rolland, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and The Institute of Optics, Univ. of Rochester (USA)[7554-84]

Advanced Biomedical and Clinical Diagnostic Systems VIII

Conference Chairs: **Tuan Vo-Dinh**, Duke Univ.; **Warren S. Grundfest**, Univ. of California, Los Angeles; **Anita Mahadevan-Jansen**, Vanderbilt Univ.

Program Committee: **Maurice C. Aalders, Jr.**, Univ. van Amsterdam (Netherlands); **Jennifer K. Barton**, The Univ. of Arizona; **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign; **Laura Marcu**, Univ. of California, Davis; **Mary-Ann Mycek**, Univ. of Michigan; **Jianan Y. Qu**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Urs Utzinger**, The Univ. of Arizona; **Georges A. Wagnieres**, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Sunday 24 January

SESSION 1

Room: 220 (Mezzanine) Sun. 1:30 to 3:10 pm

Clinical Diagnostics Systems I

Session Chair: **Tuan Vo-Dinh**, Duke Univ.

1:30 pm: **Development of a multimodal tissue diagnostic system combining time-resolved fluorescence spectroscopy, high-resolution ultrasound, and photoacoustic imaging**, Yang Sun, Yinghua Sun, Douglas N. Stephens, Hongtao Xie, Matthew Lam, Univ. of California, Davis (USA); Jonathan M. Cannata, Univ. of Southern California (USA); Gregory Farwell M.D., Univ. of California, Davis (USA); Kirk Shung, Univ. of Southern California (USA); Laura Marcu, Univ. of California, Davis (USA) [7555-01]

1:50 pm: **Clinically compatible instrumentation for accurate detection of fluorescence intensity and lifetime in turbid media**, Ching-Wei Chang, William Lloyd, Robert Wilson, Univ. of Michigan (USA); Gregory Gillispie, Fluorescence Innovations (USA); Mary-Ann Mycek, Univ. of Michigan (USA) [7555-02]

2:10 pm: **Using Raman spectroscopy to detect cervical dysplasia in minority populations**, Elizabeth Vargis, Vanderbilt Univ. (USA); Teresa Byrd, Meharry Medical College (USA); Dineo Khabele, Vanderbilt Univ. (USA) and Meharry Medical College (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7555-03]

2:30 pm: **Optical fiber guided needle insertion to localize epidural space in porcine**, Yin Chang, National Yang-Ming University (Taiwan); Chien Kun Ting, Mei-Yung Tsou, Pin-Tarnng Chen, Kwok-Hon Chan, Taipei Veterans General Hospital (Taiwan) [7555-04]

2:50 pm: **Development of an accurate 3D blood vessel searching system using NIR light**, Yoshifumi Mizuno, Tsutao Katayama, Eiji Nakamachi, Doshisha Univ. (Japan) [7555-05]

Coffee Break 3:10 to 3:40 pm

SESSION 2

Room: 220 (Mezzanine) Sun. 3:40 to 5:20 pm

Clinical Diagnostics Systems II

Session Chair: **Tuan Vo-Dinh**, Duke Univ.

3:40 pm: **Comparison of image cytometry and flow cytometry for detection of DNA ploidy abnormalities in Barrett's oesophagus**, Laurence B. Lovat, Jason M. Dunn, Dahmane Oukrif, Univ. College London (United Kingdom); Peter S. Rabinovitch, Univ. of Washington (USA); Stephen G. Bown, Marco Novelli, Univ. College London (United Kingdom) [7555-06]

4:00 pm: **Imaging spectroscopy for substance identification in capillaries using dispersive gel grating Raman and absorption spectrometers**, Olga Pawluczyk, Romuald Pawluczyk, P&P Optica Inc. (Canada) [7555-07]

4:20 pm: **Development of a hyperspectral laparoscope system for intraoperative diagnosis of intestinal ischemia**, Vincent R. Sauvage, David James, Kevin Koh, Tobias Wood, Daniel S. Elson, Imperial College London (United Kingdom) [7555-08]

4:40 pm: **Real-time hyperspectral endoscope for early cancer diagnostics**, Robert Kester, Liang Gao, Tomasz S. Tkaczyk, Rice Univ. (USA) [7555-09]

5:00 pm: **Molecular nanoprobe for breast cancer gene diagnostics**, Hsin-Neng Wang, Tuan Vo-Dinh, Duke Univ. (USA) [7555-11]

Monday 25 January

SESSION 3

Room: 220 (Mezzanine) Mon. 8:40 to 10:00 am

Imaging Systems Using OCT

Session Chair: **Claude Boccara**,

Ecole Supérieure de Physique et de Chimie Industrielles (France)

8:40 am: **Extracting information from optical coherence tomography images of tissues: signal attenuation and fractal analysis of speckle pattern**, Dan P. Popescu, Costel Fluerau, Youxin Mao, Shoude Chang, Michael G. Sowa, National Research Council Canada (Canada) [7555-12]

9:00 am: **Full-field OCT and pathology diagnostics**, Charles Brossollet, Ecole Supérieure de Physique et de Chimie Industrielles (France); Bertrand De Poly, LLTech (France); Brigitte Sgal-Zafrani, Hopital Institut Curie (France); Sylvain Gigan, Ecole Supérieure de Physique et de Chimie Industrielles (France); Olivier De Witte, LLTech (France); Claude Boccara, Ecole Supérieure de Physique et de Chimie Industrielles (France) [7555-13]

9:20 am: **3D-OCT imaging of ex vivo human tissue using a novel rotating needle probe**, Bryden C. Quirk, Robert A. McLaughlin, Loretta Scolaro, The Univ. of Western Australia (Australia); Peter Robbins, PathWest Lab. Medicine WA (Australia); Christobel Saunders, Sir Charles Gairdner Hospital (Australia) and The Univ. of Western Australia (Australia); David D. Sampson, The Univ. of Western Australia (Australia) [7555-14]

9:40 am: **Quantitative tool for rapid disease mapping in OCT images of a mouse colorectal cancer model**, Amy M. Winkler, Photini F. S. Rice, The Univ. of Arizona (USA); Rebekah A. Drezek, Rice Univ. (USA); Jennifer K. Barton, The Univ. of Arizona (USA) [7555-15]

Coffee Break 10:00 to 10:30 am

SESSION 4

Room: 220 (Mezzanine) Mon. 10:30 am to 12:10 pm

Fluorescence Imaging Systems

Session Chair: **Laura Marcu**, Univ. of California, Davis

10:30 am: **Clinical multiphoton intravital tomography with submicron spatial resolution and spectral fluorescence lifetime imaging for the investigation of skin aging and atopic dermatitis**, Karsten König, Jens Müller, Reiner Bückle, Marcel Höfer, Martin Weinigel, JenLab GmbH (Germany); Volker Huck, Westfälische Wilhelms-Universität Münster (Germany); Christian Gorzelanny, Ruprecht-Karls-Universität Heidelberg (Germany); Kai Thomas, Thomas A. Luger, Westfälische Wilhelms-Universität Münster (Germany); Frank Fischer, Beiersdorf AG (Germany); Iris Riemann, Frank Stracke, Martin Schwarz, Fraunhofer-Institut für Biomedizinische Technik (Germany); Martin Kaatz, Friedrich-Schiller-Universität Jena (Germany); Stefan W. Schneider, Ruprecht-Karls-Universität Heidelberg (Germany) [7555-16]

10:50 am: **Detection of rheumatoid arthritis in humans by fluorescence imaging**, Bernd Ebert, Thomas Dziekan, Carmen Weissbach, Jan Voigt, Rainer Macdonald, Physikalisch-Technische Bundesanstalt (Germany); Malte L. Bahner, Marianne Mahler, Michael Schirmer, mivenion GmbH (Germany); Michael Berliner, HELIOS Klinikum Berlin-Buch (Germany); Birgitt Berliner, HELIOS Research Center (Germany); Daniel Bauer, HELIOS Klinikum Berlin-Buch (Germany) [7555-17]

11:10 am: **High-speed time- and wavelength-resolved fluorescence measurement for dynamic point spectroscopy and lifetime imaging**, Yinghua H. Sun, Yang Sun, Douglas N. Stephens, Hongtao Xie, Jennifer Phipps, Univ. of California, Davis (USA); Daniel S. Elson, Imperial College London (United Kingdom); Laura Marcu, Univ. of California, Davis (USA) [7555-18]

11:30 am: **Cancer diagnostics using spatially resolved fluorescence-based optical imaging**, Daniela Strat, Wolfgang S. L. Strauss, Raimund Hibst, Alwin Kienle, Univ. Ulm (Germany) [7555-19]

11:50 am: **Wide-field catadioptric system design for endoscopic autofluorescence imaging**, Roy Wang, Qiyin Fang, McMaster Univ. (Canada) [7555-20]

Lunch Break 12:10 to 1:20 pm

SESSION 5

Room: 220 (Mezzanine) Mon. 1:20 to 3:00 pm

Medical Imaging Techniques and Devices

Session Chair: Stephen Allen Boppart, Univ. of Illinois at Urbana-Champaign

1:20 pm: **Forward focused scanning magneto-motive optical Doppler tomography**, Jeehyun Kim, Unsang Jung, Mansik Jeon, Kyungpook National Univ. (Korea, Republic of); Junghwan Oh, Pukyong National Univ. (Korea, Republic of); Woonggyu Jung, Renu John, Vasilica Crecea, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA)[7555-21]

1:40 pm: **Step-FMCW signaling and target detection for ultrasound imaging systems with conformal transducer arrays**, Shyam Natarajan, Univ. of California, Los Angeles (USA); Rahul S. Singh, Univ. of California, Santa Barbara (USA) and Univ. of California, Los Angeles (USA); Michael Lee, Brian P. Cox, Univ. of California, Los Angeles (USA); Martin O. Culjat, Univ. of California, Los Angeles (USA) and Univ. of California, Santa Barbara (USA); Hua Lee, Univ. of California, Santa Barbara (USA); Warren S. Grundfest M.D., Univ. of California, Los Angeles (USA).[7555-22]

2:00 pm: **Imaging fine vascular details with no contrast agent injection by the Retinal Function Imager**, Amiram Grinvald, Weizmann Institute of Science (Israel); Darin A. Nelson, David Izhaky, Zvia Burgansky-Eliash M.D., Amit Ruf, Optical Imaging Ltd. (Israel).[7555-23]

2:20 pm: **Hemodynamic analysis of patients in intensive care unit based on diffuse optical spectroscopic imaging system**, Yao-Sheng Hsieh, Chun-Yang Wang, Yo-Wei Lin, National Chiao Tung Univ. (Taiwan); Ming-Lung Chuang, China Medical Univ. Hospital (Taiwan); Ching-Cheng Chuang, Jui-che Tsai, National Taiwan Univ. (Taiwan); Chih-Wei Lu, Industrial Technology Research Institute (Taiwan); Chia-Wei Sun, National Yang-Ming Univ. (Taiwan)[7555-24]

2:40 pm: **Fast coregistered breast imaging in vivo using a hand-held optical imager**, Sarah J. Erickson, Sergio Martinez, Joseph DeCerce, Lizeth Caldera, Anuradha Godavarty, Florida International Univ. (USA)[7555-25]

Coffee Break 3:00 to 3:30 pm

SESSION 6

Room: 220 (Mezzanine) Mon. 3:30 to 5:50 pm

Medical Guidance and Treatment Systems

Session Chair: Mary-Ann Mycek, Univ. of Michigan

3:30 pm: **Image guided intervention system for cancer diagnosis and therapy guidance**, Nicusor V. Iftimia, Mircea Mujat, Daniel Hammer, Daniel Ferguson, Physical Sciences Inc. (USA)[7555-26]

3:50 pm: **A microfluidic-photonics-integrated device with enhanced excitation power density**, Benjamin R. Watts, McMaster Univ. (Canada); Thomas Kowpak, Chang-Qing Xu, McMaster University (Canada)[7555-27]

4:10 pm: **Rapid optical heating of blood for clinical point of care diagnostics**, Brian E. Catanzaro, CFE Services (USA); Maya Kotob-Yahfoufi, Christopher Johnson, Kent Gandola, Accumetrics (USA).[7555-28]

4:30 pm: **Detection of endometriotic lesions by a polarization-based imaging system**, Jihoon Kim, Joseph T. Walsh, Magdy Milad, Northwestern Univ. (USA)[7555-29]

4:50 pm: **A near-infrared vessel imaging system, the VascuLuminator, to facilitate arterial puncture in young children**, Natascha Cuper, Jurgen C. de Graaff, Cor J. Kalkman, Rudolf M. Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands)[7555-30]

5:10 pm: **development of imaging system for use in real-time visualization of parathyroid glands in endocrine surgery**, Isaac J. Pence, Constantine Paras, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA).[7555-31]

5:30 pm: **Development of an imaging fluorescence system applied on HPV condyloma treatment by photodynamic therapy (Presentation Only)**, Mardoqueu M. Costa, Natalia Inada, Cristina Kurachi, Vanderlei S. Bagnato, Liliiane Ventura, Univ. de São Paulo (Brazil)[7555-32]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Percutaneous sensor platform for chronic biomarker monitoring in vivo, Kuo-Chih Liao, National Chung Hsing University (Taiwan); James O'Kelly, Cedars-Sinai Medical Center (USA); Laura Marcu, University of California Davis (USA); Theo Hogen-Esch, Frances Richmond, University of Southern California (USA); Yu-Hsiang Chou, National Chung Hsing University (Taiwan); Phillip Koeffler, Cedars-Sinai Medical Center (USA); Gerald Loeb, University of Southern California (USA)[7555-53]

5D-intravital tomography as a novel tool for non-invasive in-vivo analysis of human skin affected with Atopic Dermatitis, Karsten König, JenLab GmbH (Germany); Volker Huck, Westfälische Wilhelms-Univ. Münster (Germany); Christian Gorzelanny, Medizinischen Fakultät Mannheim (Germany); Kai Thomas, Thomas A. Luger, Westfälische Wilhelms-Univ Münster (Germany); Stefan W. Schneider, Medizinischen Fakultät Mannheim (Germany); Hauke Studier, JenLab GmbH (Germany)[7555-54]

Signal-to-noise analysis for 3D luminescence imaging of hypoxia in deep tissues, Rajan S. Gurjar, Madhavi Seetamraju, Radiation Monitoring Devices, Inc. (USA).[7555-55]

The design and implementation of a windowing interface pinch force measurement system, Tze-Yee Ho, Feng Chia University (Taiwan); Yuanu-Joan Chen, Ling Tung University (Taiwan)[7555-56]

Label-free diagnosis of human hepatocellular carcinoma by multiphoton autofluorescence microscopy, Tzu-Lin Sun, Chen-Yuan Dong, National Taiwan Univ. (Taiwan)[7555-57]

Calibration protocol for Fourier-domain OCT using optical fiber gratings, Tae Joong Eom, Gwangju Institute of Science and Technology (Korea, Republic of); Yeh-Chan Ahn, Univ. of California, Irvine (USA); Bong-Ahn Yu, Gwangju Institute of Science and Technology (Korea, Republic of); Eun Seo Choi, Chosun Univ. (Korea, Republic of); Chang-Seok Kim, Pusan National Univ. (Korea, Republic of); Zhongping Chen, Univ. of California, Irvine (USA)[7555-58]

Two-layer optical model of skin for diffuse reflectance spectroscopy, Dmitry Yudovsky, Laurent Pilon, Univ. of California, Los Angeles (USA)[7555-59]

In vivo Noninvasive Quantitative Evaluation of Human Skin, Anna N. Yaroslavsky, Elena Salomatina, Wellman Ctr. for Photomedicine (USA); Victor Neel,[7555-68]

In vitro and in vivo SORS measurements for breast tumor surgical margin analysis, Matthew D. Keller, Lockheed Martin Aculight (USA) and Vanderbilt Univ. (USA); Elizabeth Vargis, Vanderbilt Univ (USA); Nara Granja, Ingrid Meszoely, Mark Kelley, Vanderbilt Univ Medical Center (USA); Anita Mahadevan-Jansen, Vanderbilt Univ (USA)[7555-69]

Tuesday 26 January

SESSION 7

Room: 220 (Mezzanine) Tues. 8:40 to 10:00 am

Medical Techniques and Systems

Session Chair: Anita Mahadevan-Jansen, Vanderbilt Univ.

- 8:40 am: **Lung alveolar wall disruption in three-dimensional space identified using second-harmonic generation and multiphoton excitation fluorescence**, Thomas Abraham, James Hogg, St. Paul's Hospital (Canada) [7555-33]
- 9:00 am: **Application of laser diodes and LEDs in new diagnostic tools for noninvasive transcutaneous bilirubinometry of neonatal jaundice**, Mostafa Hamza, Mansoura Univ. (Egypt); Mohammad H. Sayed El-Ahl, Ahmed M. Hamza, Mohammed Yahya Hamza, Aya M. Hamza, Tabarak Children's Hospital (Egypt) [7555-34]
- 9:20 am: **Time-resolved near-infrared technique for bedside monitoring of absolute cerebral blood flow**, Mamadou Diop, Kenneth M. Tichauer, Jonathan Elliott, Lawson Health Research Institute (Canada); Ting-Yim Lee, Lawson Health Research Institute (Canada) and Robarts Research Institute (Canada); Keith St. Lawrence, Lawson Health Research Institute (Canada) [7555-35]
- 9:40 am: **Broad-beam fluctuation spectroscopy for non-flow cytometry and clinical diagnostics**, Michael J. Levene, Eben Olson, Richard Torres, Yale Univ. (USA) [7555-36]
- Coffee Break 10:00 to 10:30 am

SESSION 8

Room: 220 (Mezzanine) Tues. 10:30 to 11:50 am

Medical Treatment Systems

Session Chair: Anita Mahadevan-Jansen, Vanderbilt Univ.

- 10:30 am: **Optical wire guided lumpectomy: measuring distance in breast tissue**, Amanda Dayton, Niloy Choudhury, Scott A. Prahl, Oregon Health & Science Univ. (USA) [7555-37]
- 10:50 am: **Do radio frequencies of medical instruments common in the operating room interfere with near-infrared spectroscopy signals?**, Babak Shadgan, Behnam Molavi, Darlene Reid, Guy A. Dumont, Andrew J. Macnab, Peter J. O'Brien, The Univ. of British Columbia (Canada) [7555-38]
- 11:10 am: **THz imaging of skin hydration: motivation for the frequency band**, Rahul Singh, Univ. of California, Santa Barbara (USA) and Univ. of California, Los Angeles (USA); Zachary D. Taylor, Univ. of California, Santa Barbara (USA); Priyamvada Tewari, Univ. of California, Los Angeles (USA); Martin O. Culjat, Univ. of California, Los Angeles (USA) and Univ. of California, Santa Barbara (USA); Hua Lee, Elliott R. Brown, Univ. of California, Santa Barbara (USA); Warren S. Grundfest, Univ. of California, Los Angeles (USA) [7555-39]
- 11:30 am: **Optical model of skin for early, non-invasive detection of wound development on the diabetic foot**, Dmitry Yudovsky, Univ. of California, Los Angeles (USA); Kevin T. Schomacker, Hypermed, Inc (USA); Aksone Nouvong, Western Univ. of Health Sciences (USA); Laurent Pilon, Univ. of California, Los Angeles (USA) [7555-40]
- Lunch Break 11:50 am to 1:20 pm

SESSION 9

Room: 220 (Mezzanine) Tues. 1:20 to 3:00 pm

Biomedical Sensing and Bioanalysis I

Session Chair: Warren S. Grundfest, Univ. of California, Los Angeles

- 1:20 pm: **Gold thin layer assisted DNA immobilization for photoelectrochemical DNA sensor**, Shigeki Iwanaga, Seigo Suzuki, Nobuyasu Hori, Hiroya Kirimura, Sysmex Corp. (Japan) [7555-41]
- 1:40 pm: **Tissue differentiation by diffuse reflectance spectroscopy for automated oral and maxillofacial laser surgery: ex vivo pilot study**, Azhar Zam, Florian Stelzle, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Katja Tangermann-Gerk, BLZ Bayerisches Laserzentrum GmbH (Germany); Werner Adler, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Michael Schmidt, BLZ Bayerisches Laserzentrum GmbH (Germany); Emeka Nkenke, Alexandre Douplik, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [7555-42]
- 2:00 pm: **Fluorescence-free biochemical characterization of cells using modulated Raman spectroscopy**, Anna C. De Luca, Michael Mazilu, Andrew Riches, C. Simon Herrington, Kishan Dholakia, Univ. of St Andrews (United Kingdom) [7555-43]
- 2:20 pm: **Development of a compact high-throughput laser trap Raman system for fully automated single cell analysis**, Rui Liu, Tobias Moritz, Douglas Taylor, Dennis L. Matthews, Ctr. for Biophotonics Science and Technology (USA); James W. Chan, Lawrence Livermore National Lab (USA) [7555-44]
- 2:40 pm: **Assessment of the clinical application of near-infrared fluorescence for the detection of parathyroid glands**, Constantine Paras, Lisa White, James T. Broome, John E. Phay, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7555-45]
- Coffee Break 3:00 to 3:30 pm

SESSION 10

Room: 220 (Mezzanine) Tues. 3:30 to 5:50 pm

Biomedical Sensing and Bioanalysis II

Session Chair: Warren S. Grundfest, Univ. of California, Los Angeles

- 3:30 pm: **The cyanide detoxification effects are dependent on cobinamide administration routes as demonstrated by near-infrared spectroscopy**, Jae Gwan Kim, Jangwoen Lee, David Mukai, Sari Mahon, Beckman Laser Institute and Medical Clinic (USA); Gerry R. Boss, William Blackledge, Univ. of California, San Diego (USA); Steven Patterson, Univ. of Minnesota (USA); Othman Mohammad, Vijay S. Sharma, Univ. of California, San Diego (USA); Bruce J. Tromberg, Beckman Laser Institute and Medical Ctr. (USA); Matthew Brenner, Univ. of California, Irvine Medical Ctr. (USA) and Beckman Laser Institute and Medical Ctr. (USA) [7555-46]
- 3:50 pm: **In vivo rabbit traumatic lung injury detected by noninvasive near-infrared spectroscopy**, Jae Gwan Kim, Jangwoen Lee, Sari B. Mahon, Bruce J. Tromberg, Beckman Laser Institute and Medical Ctr. (USA); Matthew Brenner, Univ. of California, Irvine Medical Ctr. (USA) and Beckman Laser Institute and Medical Ctr. (USA) [7555-47]
- 4:10 pm: **Fiber spectroscopy of oxygen saturation of the gastric conduit during esophagectomy**, Daniel S. Gareau, John Hunter, Steven L. Jacques, Oregon Health & Science Univ. (USA) [7555-48]
- 4:30 pm: **Integrated micro-total analysis system (mTAS) for biophotonic enzymatic detections**, Arvind Chandrasekaran, Muthukumar Packirisamy, Concordia Univ. (Canada) [7555-49]
- 4:50 pm: **FCS measurement of von Willebrand Factor multimer distributions for coagulation disorder subtyping**, Richard Torres, Michael J. Levene, Yale Univ. (USA) [7555-50]
- 5:10 pm: **Correlation of morphological and molecular parameters for colon cancer**, Shuai Yuan, Univ. of Maryland, College Park (USA); Celeste A. Roney, National Institutes of Health (USA); Qian Li, Univ. of Maryland, College Park (USA); James Jiang, Alex Cable, Thorlabs Inc. (USA); Ronald M. Summers, National Institutes of Health (USA); Yu Chen, Univ. of Maryland, College Park (USA) [7555-51]
- 5:30 pm: **A non-contact optical measurement procedure for precise monitoring of respiration rate and flow**, Lorenzo Scalise, Paolo Marchionni, Univ. Politecnica delle Marche (Italy) [7555-52]

BIOS

Design and Quality for Biomedical Technologies III

Conference Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration; **Rongguang Liang**, Carestream Health, Inc.

Conference Co-Chair: **T. Joshua Pfefer**, U.S. Food and Drug Administration

Program Committee: **Anthony Joseph Durkin**, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine; **Kazuhiro Gono**, Olympus Medical Systems Corp. (Japan); **Jeeseong Hwang**, National Institute of Standards and Technology; **Stephen P. Morgan**, The Univ. of Nottingham (United Kingdom); **Jannick P. Rolland**, Univ. of Rochester; **Tomasz S. Tkaczyk**, Rice Univ.; **Rudolf M. Verdaasdonk**, Univ. Medical Ctr. Utrecht (Netherlands)

Monday 25 January

SESSION 1

Room: 307 (Esplanade). Mon. 8:30 to 10:10 am

Novel Imaging Technologies

Session Chair: **Rongguang Liang**, Carestream Health, Inc.

8:30 am: **Development and analysis of a polarized endoscopic hyperspectral reflection and fluorescence imaging system** (*Invited Paper*), Daniel S. Elson, Tobias Wood, Kevin Koh, Vincent Sauvage, Imperial College London (United Kingdom) [7556-01]

9:00 am: **Polarimetric signature imaging of the anisotropic bio-medical tissues**, Stewart H. Wu, National Yang-Ming Univ. (Taiwan); De-Ming Yang, Taipei Veterans General Hospital (Taiwan); Arthur E. T. Chiou, Soe-Mie F. Nee, Tsu-Wei Nee, National Yang-Ming Univ. (Taiwan) [7556-02]

9:20 am: **High count rate pseudo-random single photon counting system for time-resolved diffuse optical imaging**, Qiang Zhang, Nanguang Chen, National Univ. of Singapore (Singapore) [7556-03]

9:40 am: **Confocal microscopes for imaging skin cancers: translation from laboratory to clinic** (*Invited Paper*), Miliind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA) [7556-04]

Coffee Break 10:10 to 10:30 am

SESSION 2

Room: 307 (Esplanade). Mon. 10:30 am to 12:00 pm

Cost Effective Optics for Diagnostics

Session Chair: **Tomasz S. Tkaczyk**, Rice Univ.

10:30 am: **Low-cost, portable imaging systems for cancer detection** (*Invited Paper*), Mark C. Pierce, Kelsey Rosbach, Nadhi Thekkek, Rice Univ. (USA); Ann Gillenwater, MD Anderson Cancer Center (USA); Sharmila Anandasabapathy, Mt Sinai Hospital (USA); Rebecca Richards-Kortum, Rice Univ. (USA) [7556-05]

11:00 am: **Disposable low-cost video endoscopes for straight and oblique viewing direction with simplified integration**, Frank C. Wippermann, Erik Beckert, Peter Dannberg, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Bernhard Messerschmidt, Grintech GmbH (Germany); Gerrit Seyffert, Optikron GmbH (Germany) [7556-06]

11:20 am: **Portable, battery-operated, fluorescent field microscope for the developing world**, Andrew R. Miller, Gregory Davis, Beyond Traditional Borders, Rice University (USA); Z. Maria Oden, Rebecca Richards-Kortum, Department of Bioengineering, Rice University (USA) [7556-07]

11:40 am: **Cost assessment of disposable endo-microscopic objectives for medical diagnostics**, Robert T. Kester, Jiayi Sun, Tomasz Tkaczyk, Rice University (USA) [7556-08]

Lunch Break 12:00 to 1:00 pm

SESSION 3

Room: 307 (Esplanade). Mon. 1:00 to 3:00 pm

OCT Imaging Systems

Session Chair: **Jannick P. Rolland**, Univ. of Rochester

1:00 pm: **In vivo Gabor-Domain Optical Coherence Microscopy** (*Invited Paper*), Jannick P. Rolland, Panomsak Meemon, Supraja Murali, Kevin P. Thompson, Kye-Sung Lee, [7556-09]

1:30 pm: **Perspectives of optical scanning in OCT**, Virgil-Florin Duma, Aurel Vlaicu Univ. of Arad (Romania); Jannick Rolland, Univ. of Rochester (USA); Adrian G. Podoleanu, Univ. of Kent (United Kingdom) [7556-10]

1:50 pm: **Full-range frequency domain Doppler optical coherence tomography**, Panomsak Meemon, College of Optics and Photonics, Univ. of Central Florida (USA); Kye-Sung Lee, Jannick P. Rolland, Univ. of Rochester (USA) [7556-11]

2:10 pm: **Full-range k-domain linearization in spectral-domain optical coherence tomography**, Jeehyun Kim, Changho Lee, Mansik Jeon, Unsang Jung, Kyungpook National Univ. (Korea, Republic of); Woonggyu Jung, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) [7556-12]

2:30 pm: **Optical design of spectrometer and catheter probe in OCT** (*Invited Paper*), Zhilin Hu, Andrew M. Rollins, Case Western Reserve Univ. (USA) [7556-13]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 307 (Esplanade). Mon. 3:30 to 4:50 pm

Evaluation of Optical Components and Systems

Session Chair: **T. Joshua Pfefer**, U.S. Food and Drug Administration

3:30 pm: **Characterization and comparison of relative intensity noise in optical sources for optimizing performance of optical coherence tomography systems**, Sunghwan Shin, Beckman Institute for Advanced Science and Technology (USA) and Univ. of Illinois at Urbana-Champaign (USA); Utkarsh Sharma, Haohua Tu, Woonggyu Jung, Beckman Institute for Advanced Science and Technology (USA); Stephen A. Boppart, Beckman Institute for Advanced Science and Technology (USA) and Univ. of Illinois Urbana-Champaign (USA) [7556-14]

3:50 pm: **Fast-gated single-photon detectors boost dynamic range in NIR spectroscopy**, Alberto Tosi, Alberto Dalla Mora, Franco Zappa, Sergio Cova, Davide Contini, Lorenzo Spinelli, Antonio Pifferi, Alessandro Torricelli, Rinaldo Cubeddu, Politecnico di Milano (Italy) [7556-15]

4:10 pm: **Spectral calibration of an AOTF hyperspectral imaging system**, Jaka Katrašnik, Franjo Pernuš, Boštjan Likar, Univ. of Ljubljana (Slovenia) [7556-16]

4:30 pm: **Geometrical calibration of an AOTF hyperspectral imaging system**, Ziga Spiclin, Jaka Katrašnik, Miran Buermen, Bostjan Likar, Franjo Pernus, Univ. of Ljubljana (Slovenia) [7556-17]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Development of portable health monitoring system device for automatic self-blood sugar level measurement. Huijun Kim, Eiji Nakamachi, Morita Yusuke, Mizuno Yoshihumi, Doshisha Univ. (Japan) [7556-34]

Homogeneous UVA system for corneal cross-linking treatment. Fernando R. Ayres Pereira, Univ. of Sao Paulo (Brazil); Mario A. Stefani, José A. Otoboni, Eduardo H. Richter, Opto Eletronica SA (Brazil); Liliane Ventura, Univ. of Sao Paulo (Brazil) [7556-35]

Quality of clinical therapeutic tools and instrumentation for neonatal jaundice and advanced technologies of Laser phototherapy. Mostafa Hamza, Mansoura Univ (Egypt); Mohammad Hamza Sayed El-Ahl, Ahmed M. Hamza, Mohammed Yahya Hamza, Aya Mostafa Hamza, Tabarak Children's Hospital (Egypt) [7556-36]

Hamiltonian metric for tumor detection. Chung-Jen Ou, Hsiuping Institute of Technology (Taiwan) [7556-37]

Safe XML Software Standards. Robert C. Leif, Newport Instruments (USA) [7556-38]

The common-path optical frequency domain imaging for discriminating pearl's grading. Myeong Jin Ju, Seon Young Ryu, Jihoon Na, Hae Young Choi, Byeong Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [7556-39]

A practical approach to spectral calibration of short wavelength infrared hyperspectral imaging systems. Miran Bürmen, Franjo Pernuš, Boštjan Likar, Univ. of Ljubljana (Slovenia) [7556-40]

Tuesday 26 January

SESSION 5

Room: 307 (Esplanade). Tues. 9:00 to 10:00 am

Tissue Spectroscopy and Imaging

Session Chair: Ramesh Raghavachari, U.S. Food and Drug Administration

9:00 am: **In situ optical property measurement in layered tissue: theoretical and experimental assessment of an unconstrained approach.** Quanzeng Wang, U.S. Food and Drug Administration (USA); Karthik Shastri, Univ. of Virginia (USA); Anant Agrawal, Joshua Pfefer, U.S. Food and Drug Administration (USA) [7556-18]

9:20 am: **Assessment of pressure, angle, and temporal effects on polarization-gated spectroscopic probe measurements.** Sarah Ruderman, Valentina Stoyneva, Andrew J. Gomes, Jeremy D. Rogers, Vadim Backman, Northwestern Univ. (USA) [7556-19]

9:40 am: **A 3D fluorescence imaging system incorporating structured illumination technology.** Linda Antos, Qioptiq-linos, Inc. (USA); Patricia Heneka, Brandon Luquette, Benjamin McGee, Rochester Institute of Technology (USA); Dien Nguyen, Rochester Institute of Technology (USA); Aaron Phipps, Daniel B. Phillips, María Helguera, Rochester Institute of Technology (USA) [7556-21]

Coffee Break 10:00 to 10:35 am

SESSION 6

Room: 307 (Esplanade). Tues. 10:35 am to 12:15 pm

Novel Optical Measurement Systems

Session Chair: Anthony Joseph Durkin, Beckman Laser Institute and Medical Ctr.

10:35 am: **A laser reflectometry technique for on-device coating thickness measurements.** Stephen J. Morris, Nightingale-EOS, Ltd. (United Kingdom) [7556-22]

10:55 am: **A novel optical device for end tidal air sampling in breath analysis.** Claudio Loccioni, Loccioni Health Care (Italy); Lorenzo Scalise, Univ. Politecnica delle Marche (Italy) [7556-23]

11:15 am: **Opto-physiological modeling for tomographical blood perfusion assessment.** Sijung Hu, Jia Zheng, Vicente Azorin Peris, Angelos Echiadis, Ping Shi, Loughborough Univ. (United Kingdom) [7556-24]

11:35 am: **Research and development of an integrated multi-parameter quartz crystal microbalance and surface plasmon resonance system.** Yu-Chieh Lin, Ching-Sung Chen, Wei-Ting Yen, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [7556-25]

11:55 am: **Solid state light engines support bioanalytical instruments and biomedical devices.** Claudia B. Jaffe, Steven M. Jaffe, Lumencor, Inc. (USA) [7556-33]

Lunch Break 12:15 to 1:30 pm

SESSION 7

Room: 307 (Esplanade). Tues. 1:30 to 3:00 pm

Design of Preclinical Optical Platforms for Quantitative Molecular Detection and Screening

Session Chair: Jeeseong Hwang, National Institute of Standards and Technology

1:30 pm: **Two-Photon Probes for Bioimaging (Invited Paper).** Bong Rae Cho, Korea Univ. (Korea, Republic of) [7556-26]

2:00 pm: **Direct cell writing 3D tissue-on-a-chip as an in vivo tissue analog in optical imaging (Invited Paper).** Robert C. Chang, National Institute of Standards and Technology (USA) [7556-27]

2:30 pm: **Targeted delivery of cancer-specific multimodal contrast agents for intraoperative detection of tumor boundaries and therapeutic margins (Invited Paper).** Ronald X. Xu, Jeff S. Xu, Jiwei Huang, Carl Schmidt, Stephen P. Povoski, Edward W. M. Martin, Jr., The Ohio State Univ. (USA) [7556-28]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Room: 307 (Esplanade). Tues. 3:30 to 4:50 pm

Quality of Clinical Devices

Session Chair: Rudolf M. Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands)

3:30 pm: **Confirmation of uncontrolled flow dynamics in clinical simulated multi-infusion setups using absorption spectral photometry.** Annemoon Timmerman, Brechtje Riphagen, John Klaessens, Rudolf M. Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands) [7556-29]

3:50 pm: **Quantitative comparison of three electro-surgical smoke evacuation systems.** Tjeerd de Boorder, Stefan Been, Herke Jan Noordmans, Matthijs Grimbergen, Rudolf Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands) [7556-30]

4:10 pm: **Characterization of Intraocular lenses: a comparison of different measurement methods.** Iris Erichsen, Josef Heinisch, Simon Zilian, TRIOPTICS GmbH (Germany) [7556-31]

4:30 pm: **Validation of arterial oxygen saturation data in neonatal intensive care unit.** Lorenzo Scalise, Paolo Marchionni, Virgilio Carnielli, Polytechnic Univ. of Marche (Italy) [7556-32]

Multimodal Biomedical Imaging V

Conference Chairs: **Fred S. Azar**, Becton Dickinson & Co.; **Xavier Intes**, Rensselaer Polytechnic Institute

Program Committee: **Nicholas Ayache**, INRIA Sophia Antipolis (France); **David A. Boas**, Massachusetts General Hospital; **Britton Chance**, Univ. of Pennsylvania; **Sergio Fantini**, Tufts Univ.; **Gultekin Gulsen**, Univ. of California, Irvine; **Mario Khayat**, ART Advanced Research Technologies Inc. (Canada); **Dimitris N. Metaxas**, Rutgers Univ.; **Nassir Navab**, Technische Univ. München (Germany); **Tim Nielsen**, Philips Research (Germany); **Vasilis Ntziachristos**, Helmholtz Zentrum München, GmbH (Germany); **Brian W. Pogue**, Dartmouth College; **Birsen Yazici**, Rensselaer Polytechnic Institute; **Arjun G. Yodh**, Univ. of Pennsylvania; **Yu Chen**, University of Maryland

Saturday 23 January

SESSION 1

Room: 305 (Esplanade) Sat. 8:30 to 10:20 am

Diffuse Optical Tomography

Session Chairs: **Gultekin Gulsen**, Univ. of California, Irvine; **Xavier Intes**, Rensselaer Polytechnic Institute

8:30 am: **Diffuse optical methods for cancer therapy monitoring in vivo** (*Invited Paper*), Regine Choe, Univ. of Pennsylvania (USA) [7557-01]

9:00 am: **Image reconstruction for time-domain diffuse optical tomography based on multi-level three-dimensional wavelet domain decomposition**, Fang Yang, Pingqiao Ruan, Feng Gao, Tianjin Univ. (China) [7557-02]

9:20 am: **Time gated functional diffuse optical tomography based on Monte Carlo**, Jin Chen, Vivek Venugopal, Xavier Intes, Rensselaer Polytechnic Institute (USA) [7557-44]

9:40 am: **Multispectral red-shifted fluorescent protein tomography with autofluorescence subtraction**, Nikolaos C. Deliolanis, Helmholtz Zentrum München GmbH (Germany) and Massachusetts General Hospital (USA); Thomas Wurdinger, Bakhos Tannous, Massachusetts General Hospital (USA); Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany). [7557-03]

10:00 am: **Free-space fluorescence tomography using adaptive spatial sampling based on anatomical information from microCT**, Xiaofeng Zhang, Cristian Badea, G. Allan Johnson, Duke Univ. (USA) [7557-04]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 305 (Esplanade) Sat. 10:50 am to 12:40 pm

System - Instrumentation

Session Chairs: **Fred S. Azar**, Becton Dickinson & Co.; **Guoqiang Yu**, Univ. of Kentucky

10:50 am: **Image-guided surgery using diffuse near-infrared light** (*Invited Paper*), Sylvain Gioux, Beth Israel Deaconess Medical Ctr. (USA) [7557-05]

11:20 am: **A quantitative time domain functional imager for small animal studies**, Vivek Venugopal, Jin Chen, Xavier Intes, Rensselaer Polytechnic Institute (USA) [7557-45]

11:40 am: **Development of a bi-modality XCT-fDOT instrument**, Anne Koenig, Anne Planat-Chrétien, Jean-Guillaume Coutard, Lionel Hervé, Marco Brambilla, Jean-Marc Dinten, Lab. d'Electronique de Technologie de l'Information (France). [7557-06]

12:00 pm: **A hybrid fluorescence tomography and x-ray CT system for small animal molecular imaging**, Yuting Lin, Univ. of California, Irvine (USA); William C. Barber, DxRay Inc. (USA); Han Yan, Univ. of California, Irvine (USA); Jan S. Iwanczk, Einar Nygard, Nail Malakov, Neal E. Hartsough, Thulasidharan Gandhi, DxRay Inc. (USA); Werner W. Roeck, Orhan Nalcioglu, Gultekin Gulsen, Univ. of California, Irvine (USA) [7557-07]

12:20 pm: **A portable optical tissue flow-oximeter based on diffuse correlation spectroscopy**, Guoqiang Yu, Yu Shang, Youquan Zhao, Ran Cheng, Lixin Dong, Daniel Irwin, Univ. of Kentucky (USA) [7557-08]

Lunch/Exhibition Break 12:40 to 1:40 pm

SESSION 3

Room: 305 (Esplanade) Sat. 1:40 to 3:50 pm

OCT, Microscopy

Session Chairs: **Fred S. Azar**, Becton Dickinson & Co.; **Xavier Intes**, Rensselaer Polytechnic Institute

1:40 pm: **A multimodal contrast agent for simultaneous magnetic resonance and optical imaging of small animal** (*Invited Paper*), Mehmet B. Unlu, Yuting Ling, Univ. of California, Irvine (USA); Brian Grimmond, Anup Sood, Egidijus Uzgiris, GE Global Research (USA); Orhan Nalcioglu, Gultekin Gulsen, Univ. of California, Irvine (USA) [7557-09]

2:10 pm: **Integrated intravascular optical coherence tomography (OCT) ultrasound (US) imaging system**, Jiechen Yin, Univ. of California, Irvine (USA); Hao-Chung Yang, Changhong Hu, Qifa Zhou, K. Kirk Shung, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Ctr. (USA) [7557-10]

2:30 pm: **An intra-arterial catheter for simultaneous optical frequency domain imaging and near-IR fluorescence imaging**, Hongki Yoo, Milen Shishkov, Brett E. Bouma, Massachusetts General Hospital (USA) and Harvard Medical School (USA); George Mallas, Massachusetts General Hospital (USA); Farouc A. Jaffer, Guillermo J. Tearney, Massachusetts General Hospital (USA) and Harvard Medical School (USA). [7557-11]

2:50 pm: **Localization of fluorescence marked prostate tumor with time-resolved diffuse optical tomography**, Lionel Hervé, Laurent Guyon, Mathieu Debourseau, Jérôme Boutet, Jean-Marc Dinten, Lab. d'Electronique de Technologie de l'Information (France). [7557-12]

3:10 pm: **Developing handheld real time multispectral imager to clinically detect early stage pressure ulcer in darkly pigmented skin**, Linghua Kong, Stephen Sprigle, Dingrong Yi, Fengtao Wang, Chao Wang, Fuhua Liu, Georgia Institute of Technology (USA) [7557-13]

3:30 pm: **Computed Radiography Imaging Based on High-Density 670 nm VCSEL Arrays**, Matthew M. Dummer, Klein Johnson, William Hogan, Mikael Witte, Mary K. Hibbs-Brenner, Vixar (USA) [7557-14]

Coffee Break 3:50 to 4:20 pm

SESSION 4

Room: 305 (Esplanade) Sat. 4:20 to 6:10 pm

Diagnostic Imaging

Session Chairs: **Brian W. Pogue**, Dartmouth College; **Fred S. Azar**, Becton Dickinson & Co.

4:20 pm: **X-Ray and near-infrared imaging: similarities, differences and combinations** (*Invited Paper*), Brian W. Pogue, Dartmouth College (USA) [7557-15]

4:50 pm: **Dual-modal quantitative imaging of wound tissue oxygenation and perfusion**, Songbo Xu, Jiwei Huang, Joseph Ewing, Kun Huang, Chandan Sen, Ronald Xu, The Ohio State Univ. (USA). [7557-16]

5:10 pm: **Near-infrared spectroscopy with spectroscopic technique with wide range of wavelength information detects tissue oxygenation level clearly**, Hideo Eda, The Graduate School for the Creation of New Photonics Industries (Japan) and Photonics Innovations Co., Ltd. (Japan); Hiromichi Aoki, Shigeru Eura, The Graduate School for the Creation of New Photonics Industries (Japan). [7557-17]

5:30 pm: **Breast cancer detection using frequency-domain diffuse optical tomography with single source detector pair**, Anna G. Orlova, Institute of Applied Physics (Russian Federation); Anna V. Maslennikova, Nizhny Novgorod State Medical Academy (Russian Federation) and Institute of Applied Physics (Russian Federation); German Y. Golubiatnikov, Natalia M. Shakhova, Vladimir I. Plekhanov, Vladislav A. Kamensky, Ilya V. Turchin, Institute of Applied Physics (Russian Federation) [7557-18]

5:50 pm: **Multi-spectral skin imaging by a consumer photo-camera**, Janis Spigulis, Dainis Jakovels, Uldis Rubins, Univ. of Latvia (Latvia) [7557-19]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

A comparative investigation on linear inversion schemes in fluorescence lifetime tomography, Feng Gao, Tianjin Univ. (China); Patrick Polulet, Lab d'Imagerie et de Neurosciences Cognitives (France); Huijuan Zhao, Limin Zhang, Tianjin Univ. (China); Yukio Yamada, Univ. of Electro-Communications (Japan). [7557-20]

A fiber-based non-contact scheme for time-domain diffuse fluorescence tomography: methodology and simulative investigation, Feng Gao, Tianjin Univ. (China); Patrick Poulet, Univ. de Strasbourg (France) [7557-21]

Improving performance of time-domain optical mammography by Jacobian scaling method, Yiwen Ma, Feng Gao, Fang Yang, Huijuan Zhao, Tianjin Univ. (China) [7557-22]

Reconstructing three-dimensional fluorescent parameters using time-resolved data based on transmittance and reflection measurements, Limin Zhang, Feng Gao, Jiao Li, Huijuan Zhao, Tianjin Univ. (China) . . [7557-23]

Two-dimensional reconstruction of region boundaries and optical properties in shape-based diffuse optical tomography, Pingqiao Ruan, Fang Yang, Feng Gao, Huijuan Zhao, Meng Jin, Tianjin Univ. (China) . [7557-24]

A finite-difference-method solution to radiative transfer equation with natural boundary condition, Meng Jin, Feng Gao, Huijuan Zhao, Tianjin Univ. (China) [7557-25]

Fast reconstruction method based on graphic processing unit for fluorescence molecular tomography, Guotao Quan, Yong Deng, Hui Gong, Qingming Luo, Britton Chance Ctr. for Biomedical Optics, WNLO, Huazhong Univ. of Science and Technology (China) [7557-26]

Determination of female breast tumor and its parameter estimation by thermal simulation, Xinguang Chen, Aqing Xu, Hongqin Yang, Yuhua Wang, Shusen Xie, Fujian Normal Univ. (China) [7557-27]

Regularization in fluorescence diffuse optical tomography using prior information on the medium optical properties, Emilie Pery, CREATIS-LRMN (France); Lionel Herve, Jean-Marc Dinten, Lab. d'Electronique de Technologie de l'Information (France); Françoise Peyrin, CREATIS-LRMN (France) . [7557-28]

Combined swept-source optical coherence tomography and fluorescence spectroscopy system, Seon Young Ryu, Myeong Jin Ju, Kwan Seob Park, Joo Beom Eom, Byeong Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [7557-29]

A multidistance probe arrangement NIRS for detecting absorption changes in cerebral gray matter layer, Toru Yamada, Shinji Umeyama, Keiji Matsuda, National Institute of Advanced Industrial Science and Technology (Japan) [7557-30]

Line scan CCD image processing for biomedical application, Choon-Young Lee, Kyungpook National Univ. (Korea, Republic of) [7557-31]

A comparative performance study characterizing breast tissue microarrays using standard RGB and multispectral imaging, Xin Qi, William Cukierski, David J. Foran, Univ. of Medicine and Dentistry of New Jersey (USA) . [7557-32]

Widefield reflectance and fluorescence imaging device and digital image processing for the detection of skin and oral cancer, Sebastiao Prataveira, Paula Santos, Vanderlei Bagnato, Cristina Kurachi, Univ. de São Paulo (Brazil) [7557-33]

A dual agent dynamic contrast-enhanced MRI-DOT study for improved breast tumor characterization, David A. Thayer, Burcin Unlu, Jeon-Hor Chen, Min-Ying Su, Orhan Nalcioglu, Gultekin Gulsen, Univ. of California, Irvine (USA) [7557-34]

Bioluminescence tomography with structural and functional a priori information, Han Yan, Burcin Unlu, Orhan Nalcioglu, Gultekin Gulsen, Univ. of California, Irvine (USA) [7557-35]

The examination of an optimized video frequency with the visual stimulus experiment for fMRI, Kosuke Kiyohara, The Graduate School for the Creation of New Photonics Industries (Japan) and Deep Brain Inc. (Japan); Takahiro Ode, Motosuke Kiyohara, Kiyohara Optics Inc. (Japan); Hideo Eda, The Graduate School for the Creation of New Photonics Industries (Japan) and Photonics Innovations (Japan) [7557-36]

Contrast and resolution analysis of angular domain imaging for iterative optical projection tomography reconstruction, Eldon Ng, The Univ. of Western Ontario (Canada); Fartash Vasefi, Bozena Kaminska, Glenn Chapman, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, The Univ. of Western Ontario (Canada) [7557-37]

Evaluation of a multiwavelength laser array with frequency-domain diffuse optical tomography, Tiffany Zhou, Michael Ghijsen, David Thayer, Univ of California, Irvine (USA); Gultekin Gulsen, Univ. of California, Irvine (USA) [7557-38]

A multimodal based DOT system for in vivo small animal study, Steven X. Yi, Technest Holdings, Inc. (USA) [7557-39]

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Endoscopic Microscopy V

Conference Chairs: **Guillermo J. Tearney**, Massachusetts General Hospital; **Thomas D. Wang**, Univ. of Michigan

Program Committee: **David L. Dickensheets**, Montana State Univ.; **Arthur F. Gmitro**, The Univ. of Arizona; **Ralf Kiesslich**, Johannes Gutenberg Univ. Mainz (Germany); **Hiroshi Mashimo**, VA Boston Healthcare System; **Kenzi Murakami**, Olympus Corp. (Japan); **Norman S. Nishioka**, Massachusetts General Hospital; **Wibool Piyawattanametha**, Stanford Univ.; **Mark J. Schnitzer**, Stanford Univ. School of Medicine; **Peter T. C. So**, Massachusetts Institute of Technology; **Francois Lacombe**, Mauna Kea Technologies; **Stephen Lam**, BC Cancer Research Center (Canada)

Sunday 24 January

SESSION 1

Room: 304 (Esplanade) Sun. 8:30 to 9:50 am

Spectral Encoded Endoscopy

Session Chair: **Guillermo J. Tearney**, Wellman Ctr. for Photomedicine

8:30 am: **Spectrally encoded endoscopy through separated illumination and collection channels**, Dvir Yelin, Avraham Abramov, Technion-Israel Institute of Technology (Israel)[7558-01]

8:50 am: **Balloon catheter for comprehensive optical frequency domain imaging of the esophagus**, Hongki Yoo, Melissa J. Suter, Milen Shishkov, Benjamin J. Vakoc, Brett E. Bouma, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Norman S. Nishioka, Massachusetts General Hospital (USA); Guillermo J. Tearney, Massachusetts General Hospital (USA) and Harvard Medical School (USA)[7558-02]

9:10 am: **Color imaging in spectrally encoded endoscopy**, DongKyun Kang, Massachusetts General Hospital (USA); Dvir Yelin, Technion-Israel Institute of Technology (Israel); Brett E. Bouma, Guillermo J. Tearney, Massachusetts General Hospital (USA)[7558-03]

9:30 am: **Large luminal area imaging by spectrally encoded confocal microscopy**, DongKyun Kang, Hongki Yoo, Priyanka A. Jillella, Brett E. Bouma, Guillermo J. Tearney, Massachusetts General Hospital (USA)[7558-04]

Coffee Break9:50 to 10:20 am

SESSION 2

Room: 304 (Esplanade) Sun. 10:20 am to 12:00 pm

Endoscopic Scanners

Session Chair: **Thomas D. Wang**, Univ. of Michigan

10:20 am: **Wide-field fluorescence imaging in narrow passageways using scanning fiber endoscope technology**, Cameron M. Lee, Eric Seibel, Univ. of Washington (USA)[7558-05]

10:40 am: **Development of microactuators for improved spatial sampling in fiber bundle optical biopsy systems**, Matthew R. Kyriash, Robert Kester, Rebecca Richards-Kortum, Tomasz Tkaczyk, Rice Univ. (USA)[7558-06]

11:00 am: **Foveated endoscope objective design to combine high resolution with wide field of view**, Jeremy D. Rogers, Northwestern Univ. (USA); Tomasz S. Tkaczyk, Rice Univ. (USA); Michael R. Descour, College of Optical Sciences, The Univ. of Arizona (USA)[7558-07]

11:20 am: **A multipoint scanner for high frame rate confocal microendoscopy**, Andrew R. Rouse, Houssine Makhlof, Anthony A. Tanbakuchi, Arthur F. Gmitro, The Univ. of Arizona (USA)[7558-08]

11:40 am: **Simultaneous optical coherence tomography and laser induced fluorescence imaging in rat model of ovarian carcinogenesis**, Lida P. Hariri, Erica R. Liebmann, Samuel L. Marion, Patricia B. Hoyer, John R. Davis, The Univ. of Arizona (USA); Molly A. Brewer, Univ. of Connecticut (USA); Jennifer K. Barton, The Univ. of Arizona (USA)[7558-09]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 3

Room: 304 (Esplanade) Sun. 1:30 to 3:10 pm

Novel Methods

Session Chair: **Arthur F. Gmitro**, The Univ. of Arizona

1:30 pm: **Real-time monitoring of esophageal laser thermal therapy**, Lisa A. Bartlett, Ben Vakoc, Milen Shishkov, Andrew Soroka, Guillermo Tearney, Wellman Ctr. for Photomedicine (USA); Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) and HST Division of Harvard and MIT (USA)[7558-10]

1:50 pm: **Uniform illumination scheme for spiral-scanning based fiber optic two-photon fluorescence endomicroscopy**, Li Huo, Yicong Wu, Yongping Chen, Xingde Li, Johns Hopkins Univ. (USA)[7558-11]

2:10 pm: **Design, modeling, and pilot testing of a new prototype scanning CARS-based endoscope**, Paul Grenier, Michel Fortin, Pascal Gallant, INO (Canada); Ralph S. Da Costa, Brian C. Wilson, Univ. Health Network (Canada); Eric J. Seibel, Univ. of Washington (USA); Ozzy Mermut, Jean-François Cormier, INO (Canada)[7558-12]

2:30 pm: **Double-clad fiber coupler for endoscopy**, Maxime Rivard, Simon Lemire-Renaud, Dominic Morneau, Mathias Strupler, Nicolas Godbout, Caroline Boudoux, Ecole Polytechnique de Montréal (Canada)[7558-13]

2:50 pm: **A novel imaging system of optical detection on cancers and tissues in gastrointestinal endoscope using high-chroma white and color tunable LEDs**, Tsunemasa Taguchi, Yuji Uchida, Satoshi Kurai, Yamaguchi Univ. (Japan); Hideo Yanai, Kanmon National Hospital (Japan); Jun Nishikawa, Shuu Kiyotoki, Takeshi Okamoto, Shingo Higaki, Isao Sakaida, Graduate School of Medicine Yamaguchi Univ. (Japan)[7558-14]

Coffee Break3:10 to 3:40 pm

SESSION 4

Room: 304 (Esplanade) Sun. 3:40 to 5:40 pm

Endoscopic OCT

Session Chair: **Stephen Lam**, The BC Cancer Research Ctr. (Canada)

3:40 pm: **Numerical analysis of cascaded GRIN lens-based imaging probes for endoscopic optical coherence tomography**, Woongyu Jung, Wladimir Benalcazar, Utkarsh Sharma, Adeel Ahmad, Haohua Tu, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA)[7558-15]

4:00 pm: **Optical frequency domain imaging of the distal esophagus in Barrett's patients**, Melissa J. Suter, Priyanka A. Jillella, Hongki Yoo, Mari Mino-Kenudson, Gregory Y. Lauwers, Brett E. Bouma, Norman S. Nishioka, Guillermo J. Tearney, Harvard Medical School and Wellman Ctr. for Photomedicine (USA)[7558-16]

4:20 pm: **Optical frequency domain imaging as a tool for assessing the tissue response to radio-frequency ablation therapy for Barrett's esophagus**, Priyanka A. Jillella, Melissa J. Suter, Milen Shishkov, Brett E. Bouma, Norman S. Nishioka, Guillermo J. Tearney, Massachusetts General Hospital (USA)[7558-17]

4:40 pm: **Dual-beam functional FDOCT endoscope for phase stable imaging**, Cedric Blatter, Tilman Schmall, Medizinische Univ. Wien (Austria); Adrian Bachmann, Theo Lasser, EPFL (Switzerland); Rainer A. Leitgeb, Medizinische Univ. Wien (Austria)[7558-18]

5:00 pm: **A dual modality fluorescence confocal and optical coherence tomography microendoscope**, Houssine Makhlof, College of Optical Sciences, The Univ. of Arizona (USA); Andrew R. Rouse, Arthur F. Gmitro, The Univ. of Arizona (USA)[7558-19]

5:20 pm: **Endoscopic 3D-OCT reveals buried glands following radiofrequency ablation of Barrett's esophagus**, Chao Zhou, Desmond C. Adler, Tsung-Han Tsai, Hsiang-Chieh Lee, Massachusetts Institute of Technology (USA); Lauren Becker, VA Healthcare System Boston (USA); Joseph M. Schmitt, LightLab Imaging Inc. (USA); Qin Huang, VA Healthcare System Boston (USA); Hiroshi Mashimo, VA Healthcare System Boston (USA) and Harvard Medical School (USA)[7558-20]

Monday 25 January

SESSION 5

Room: 304 (Esplanade) Mon. 1:00 to 3:30 pm

MEMS and Miniaturized Scanners for Endomicroscopy

Joint Session with Conference 7594

Session Chair: David L. Dickensheets, Montana State Univ.

- 1:00 pm: **In vivo brain imaging using miniaturized one- and two-photon fluorescence microscopes** (*Invited Paper*), Mark J. Schnitzer, Stanford Univ. School of Medicine (USA) [7594-01]
- 1:30 pm: **MEMS-devices for laser camera systems for endoscopic applications** (*Invited Paper*), Christian Drabe, Harald Schenk, Thilo Sandner, Fraunhofer Institute for Photonic Microsystems (Germany); Richard A. James, Microvision, Inc. (USA) [7594-02]
- 2:00 pm: **Piezoelectric MEMS mirrors for forward-looking endoscopic imaging**, Sonia Grego, Kristin H. Gilchrist, RTI International (USA); Ryan P. McNabb, Joseph A. Izatt, Duke Univ. (USA) [7558-21]
- 2:20 pm: **Dual-axes confocal microendoscopy of gastrointestinal tract**, Wibool Piyawattanametha, NECTEC (Thailand) and Stanford Univ. (USA); Michael Mandella, Hyejun Ra, Stanford Univ. (USA); Q. Zhen, Univ. of Michigan (USA); Kevin Loewke, Jonathan Liu, Shai Frieland, Gordon Kino, Roy Soetikno, Stanford Univ. (USA); Thomas D. Wang, Univ. of Michigan (USA); Olav Solgaard, Christopher Contag, Stanford Univ. (USA) [7558-22]
- 2:40 pm: **A surgical confocal microscope utilizing a MEMS scanner and a GRIN relay lens for molecular image-guided brain tumor resection**, Jonathan T. C. Liu, Michael J. Mandella, Stanford Univ. (USA); Nathan O. Loewke, Univ. of California, Los Angeles (USA); Ellis Garai, Wibool Piyawattanametha, Hyejun Ra, Henry Haeberle, Olav Solgaard, Gordon S. Kino, Christopher H. Contag, Stanford Univ. (USA) [7558-23]
- 3:00 pm: **In vivo 3D and Doppler OCT imaging using electrothermal MEMS scanning mirrors** (*Invited Paper*), J. Sun, Lei Wu, Huikai Xie, Univ. of Florida (USA) [7594-03]
- Coffee Break 3:30 to 3:50 pm

SESSION 6

Room: 304 (Esplanade) Mon. 3:50 to 5:30 pm

Micro-optics for Endomicroscopy

Joint Session with Conference 7594

Session Chair: Wibool Piyawattanametha, Stanford Univ. and NECTEC (Thailand)

- 3:50 pm: **Improved chromatic performance of endomicroscope optics for broadband imaging**, Gabriel C. Birch, College of Optical Sciences, The Univ. of Arizona (USA); Brian McCall, Tomasz S. Tkaczyk, Rice Univ. (USA); Michael R. Descour, College of Optical Sciences, The Univ. of Arizona (USA) [7558-24]
- 4:10 pm: **Focused OCT and LIF endoscope**, R. Andrew Wall, The Univ. of Arizona (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Garret T. Bonnema, D4D Technologies, LLC (USA); Jennifer K. Barton, The Univ. of Arizona (USA) [7558-25]
- 4:30 pm: **High-resolution axicon based endoscopic FD OCT imaging with a large depth range**, Kye-Sung Lee, The Institute of Optics, Univ. of Rochester (USA); William Hurley, Rochester Precision Optics (USA); Jannick P. Rolland, The Institute of Optics, Univ. of Rochester (USA) [7558-26]
- 4:50 pm: **MEMS deformable mirrors for focus control in vital microscopy**, David L. Dickensheets, Sarah J. Lukes, Erwin Dunbar, Jeffrey Lutzenburger, Montana State Univ. (USA) [7594-04]
- 5:10 pm: **High-speed liquid lens with 2-ms response and 80.3-nm root-mean-square wave front error**, Hiromasa Oku, Masatoshi Ishikawa, The Univ. of Tokyo (Japan) [7594-05]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

- Design of small confocal endo-microscopic probe working under multiwavelength environment**, Young Duk Kim, Myoung Ki Ahn, Dae Gab Gweon, KAIST (Korea, Republic of) [7558-27]
- 360° endoscopy using panomorph lens technology**, Simon Thibault, Univ. Laval (Canada); Ronald Denis, Univ. de Montréal (Canada); Patrice Roulet, ImmerVision (Canada) [7558-28]
- Endoscopic OCT for early lung cancer detection and diagnosis**, Anthony Lee, The BC Cancer Research Ctr. (Canada) and Univ. of British Columbia (Canada); Adrian Mariampillai, Beau Standish, Univ. of Toronto (Canada); Antonio Mauro, Mark Harduar, Ryerson Univ. (Canada); Mark Cardeno, Pierre Lane, The BC Cancer Research Ctr. (Canada); Alex Vitkin, Univ. of Toronto (Canada); Victor Yang, Ryerson Univ. (Canada); Calum MacAulay, Stephen Lam, The BC Cancer Research Ctr. (Canada) [7558-29]

BIOS

Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications X

Conference Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

Program Committee: **James P. Clarkin**, Polymicro Technologies, A Subsidiary of Molex Incorporated; **Ilko K. Ilev**, U.S. Food and Drug Administration; **Jin Ung Kang**, The Johns Hopkins Univ.; **Karl-Friedrich Klein**, Fachhochschule Giessen-Friedberg (Germany); **Pierre Lucas**, The Univ. of Arizona; **Yuji Matsuura**, Tohoku Univ. (Japan); **Yi-Wei Shi**, Fudan Univ. (China); **Urs Utzinger**, The Univ. of Arizona

Saturday 23 January

SESSION 1

Room: 222 (Mezzanine) Sat. 8:30 to 10:10 am

Session Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

8:30 am: **Progress toward inexpensive endoscopic high-resolution common-path OCT (Invited Paper)**, Jin U. Kang, The Johns Hopkins Univ. (USA) [7559-24]

8:50 am: **Research on the FBG's high-temperature sustainability influenced by the doping process**, Feng Tu, Yangtze Optical Fibre and Cable Co., Ltd. (China) [7559-01]

9:10 am: **Efficiency of integrated waveguide probes in the detection of fluorescence and backscattered light**, Nur Ismail, Fei Sun, Fehmi Civitci, Kerstin Wörhoff, René M. de Ridder, Markus Pollnau, Alfred Driessen, Univ. of Twente (Netherlands) [7559-02]

9:30 am: **Transmission properties of dielectric-coated hollow optical fibers based on silver-cladding-stainless pipe**, Katsumasa Iwai, Sendai National College of Technology (Japan); Akihito Hongo, Hitachi Cable, Ltd. (Japan); Hiroyuki Takaku, Mitsunobu Miyagi, Sendai National College of Technology (Japan); Junichi Ishiyama, Miyagi National College of Technology (Japan); Yi-Wei Shi, Fudan University (China); Yuji Matsuura, Tohoku University (Japan) [7559-03]

9:50 am: **Time-resolved all fiber fluorescence spectroscopy system**, Andy Chen, Frederique Vanholsbeeck, The Univ. of Auckland (New Zealand); Dean Tai, Institute of Bioengineering and Nanotechnology (Singapore); Martin Svrcek, Brno Univ. of Technology (Czech Republic); Bruce Smaill, The Univ. of Auckland (New Zealand) [7559-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 222 (Mezzanine) Sat. 10:40 am to 12:20 pm

Session Chair: **Pierre Lucas**, The Univ. of Arizona

10:40 am: **Influence of polarization-gated probe geometry and scattering properties on penetration depth distributions in turbid media: a Monte Carlo and experimental analysis**, Andrew J. Gomes, Vladimir Turzhitzsky, Sarah Ruderman, Jeremy Rogers, Vadim Backman, Northwestern Univ. (USA) [7559-13]

11:00 am: **Hollow waveguide for urology treatment**, Helena Jelinková, Michal Nemeč, Petr Koranda, Czech Technical Univ. in Prague (Czech Republic); Jan Pokorný, Oto Kohler, Central Military Hospital (Czech Republic); Mitsunobu Miyagi, Katsumasa Iwai, Sendai National College of Technology (Japan); Yuji Matsuura, Tohoku Univ. (Japan) [7559-05]

11:20 am: **A Raman cell based on hollow optical fibers for breath analysis**, Yoshinari Okita, Takashi Katagiri, Yuji Matsuura, Tohoku Univ. (Japan) [7559-06]

11:40 am: **Low-temperature and UV curable sol-gel coatings for long lasting optical fiber biosensors**, Deitze Otaduy, Tekniker (Spain); Garikoitz Beobide, Eneko Gorritxategi, Raquel Prado, Arrate Marcaide, Fundacion Tekniker (Spain) [7559-07]

12:00 pm: **Skewmodes in specialty fibers with step-index profiles**, Karl-Friedrich Klein, Cornell P. Gonschior, Fachhochschule Giessen-Friedberg (Germany); Georg Hillrichs, Hochschule Merseburg (Germany); Hans Poisel, Martin Bloos, Univ. of Applied Sciences Nürnberg (Germany) [7559-34]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 3

Room: 222 (Mezzanine) Sat. 1:30 to 2:50 pm

Session Chair: **Yi-Wei Shi**, Fudan Univ. (China)

1:30 pm: **Dissociation constant measurement using combination tapered fiber optic biosensor (CTFOB) dip-probes**, Chun-Wei Wang, Rakesh Kapoor, The Univ. of Alabama at Birmingham (USA) [7559-27]

1:50 pm: **Homogeneous catheter for esophagus high-resolution manometry using fiber Bragg gratings**, Sebastian Voigt, Technische Univ. Chemnitz (Germany); Martin Becker, Manfred Rothhardt, IPHT Jena (Germany); Thomas Lüpke, Christoph Thieroff, Kunststoff-Zentrum in Leipzig gGmbH (Germany); Jan Mehner, Technische Univ. Chemnitz (Germany) [7559-11]

2:10 pm: **Transverse mode analysis of optofluidic intracavity spectroscopy of canine hemangiosarcoma**, Weina Wang, Douglas H. Thamm, Colorado State Univ. (USA); David W. Kisker, Eoptra LLC (USA); Kevin L. Lear, Colorado State Univ. (USA) [7559-12]

2:30 pm: **Demonstration of the immunoassay using local evanescent array coupled biosensor**, Rongjin Yan, Luke C. Kingry, Richard A. Slayden, Kevin L. Lear, Colorado State Univ. (USA) [7559-14]

Coffee Break 2:50 to 3:20 pm

SESSION 4

Room: 222 (Mezzanine) Sat. 3:20 to 5:00 pm

Session Chair: **Ronald W. Waynant**, U.S. Food and Drug Administration

3:20 pm: **Analysis of some substantial collimating lens functions in fiber optic confocal microscopy**, Do-Hyun Kim, Ilko K. Ilev, U.S. Food and Drug Administration (USA) [7559-26]

3:40 pm: **Experimental study on the durability of dielectric-coated silver hollow fibers for corrosive gas sensing**, Wen-Qing Shao, Qing-Yun Chen, Bang-Shan Sun, Xiao-Xu Wu, Yi-Wei Shi, Fudan Univ. (China) [7559-10]

4:00 pm: **Quantitative estimation of IL-6 in serum/plasma samples using a rapid and cost-effective fiber optic dip-probe**, Chun-Wei Wang, Upender Manne, Vishnu V. B. Reddy, Rakesh Kapoor, The Univ. of Alabama at Birmingham (USA) [7559-28]

4:20 pm: **New conducting telluride glasses for electrophoretic collection and IR sensing of proteins and viruses.**, Pierre Lucas, Zhiyong Yang, Allison Wilhelm, Mark Riley, Kelly Reynolds, The Univ. of Arizona (USA) [7559-29]

4:40 pm: **Optical microfabrication of tapers in low-loss chalcogenide fibers for fiber evanescent-wave spectroscopy.**, Pierre Lucas, Zhiyong Yang, The Univ. of Arizona (USA); Eric Lepine, The Univ. of Arizona (USA) and Univ. de Rennes 1 (France); Johann Troles, Xiang-Hua Zhang, Bruno Bureau, Yann Gueguen, Jean-Christophe Sangleboeuf, Univ. de Rennes 1 (France). [7559-30]

BiOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 5

Room: 222 (Mezzanine) Sun. 8:30 to 9:50 am

Session Chair: **Karl-Friedrich Klein**,
Fachhochschule Giessen-Friedberg (Germany)

8:30 am: **Minimal-invasive tissue photothermal oxygenation measurement through a fiber bundle**, Michal Tepper, Yonat Milstein, Moshe Ben-David, Udi Gal, Tel Aviv Univ. (Israel); James Harrington, Rutgers Univ. (USA); Israel Gannot, Tel Aviv Univ. (Israel)[7559-36]

8:50 am: **Thin film thickness measurement change using dual LEDs and reflectometric interference spectroscopy modeling in a biosensor**, Yunfeng Ling, Nan Wu, Wenhui Wang, Leslie Farris, Byungki Kim, Xingwei Wang, Melisenda McDonald, Univ. of Massachusetts Lowell (USA)[7559-16]

9:10 am: **Fabrication of Low Loss Alumina (Al₂O₃) Waveguides for Near-UV Biosensing Applications**, Mustafa M. Aslan, TUBITAK MAM Research Ctr. (Turkey); Courtney L. Byard, Nathan A. Webster, Rodrigo S. Wiederkehr, Sergio B. Mendes, Univ. of Louisville (USA)[7559-18]

9:30 am: **High-NA HPCS optical fibers for medical diagnosis and treatment**, Bolesh J. Skutnik, CeramOptec Industries, Inc. (USA)[7559-18]

Coffee Break9:50 to 10:20 am

SESSION 6

Room: 222 (Mezzanine) Sun. 10:20 am to 12:20 pm

Session Chair: **James P. Clarkin**, Polymicro Technologies,
A Subsidiary of Molex Incorporated

10:20 am: **Thermal imaging bundles for medical applications**, Israel Gannot, Tel Aviv Univ. (Israel); James Harrington, Carlos M. Bledt, Nicholas Syzonenko, Rutgers, The State Univ. of New Jersey (USA); Udi Gal, Michal Tepper, Moshe Ben-David, Tel Aviv Univ. (Israel)[7559-35]

10:40 am: **High-resolution SPR fiber sensing platform for in situ characterization of the deposition of nanoscale thickness polymer films**, Yanina Y. Shevchenko, Milad Dakka, Nur U. Ahamad, Graham Galway, Anatoli Ianoul, Jacques Albert, Carleton Univ. (Canada)[7559-21]

11:00 am: **Accurate in vivo NIR measurement of muscle SO₂ through fat**, Chunguang Jin, Fengmei Zou, Boyan Peshlov, Gwenn Ellerby, Peter Scott, Babs Soller, Univ. of Massachusetts (USA)[7559-22]

11:20 am: **Real-time association rate constant measurement using combination tapered fiber optic biosensor (CTFOB) dip-probes**, Boris Simmonds, Chun-Wei Wang, Rakesh Kapoor, The Univ. of Alabama at Birmingham (USA)[7559-23]

11:40 am: **FT-IR based loss-spectrum measuring system for infrared hollow waveguides**, Cong-Hui Yang, Hua Hua, Wei Tan, Yi-Wei Shi, Fudan Univ. (China); Katsumasa Iwai, Mitsunobu Miyagi, Sendai National College of Technology (Japan)[7559-09]

12:00 pm: **Fiber-coupled organic plastic scintillator for on-line dose rate monitoring in 6 MV x-ray beam for external radiotherapy**, L. R. Lindvold, Technical Univ. of Denmark (Denmark); A. R. Beierholm, C. E. Andersen, Risø National Lab. (Denmark)[7559-37]

Lunch/Exhibition Break12:20 to 1:30 pm

SESSION 7

Room: 222 (Mezzanine) Sun. 1:30 to 3:10 pm

Session Chair: **James A. Harrington**,
Rutgers, The State Univ. of New Jersey

1:30 pm: **A multichannel fiber optic photoluminescence based biosensor**, Zhangjing Yi, Zhong Zhong, Kenneth Reardon, Weina Wang, Manasi Katragadda, Kevin Lear, Colorado State Univ. (USA)[7559-20]

1:50 pm: **Suppression of Modal Noise in a Multimode Fiber-Optic Delivery Output from an Ultra-Broadband Supercontinuum Light Source**, Do-Hyun Kim, Ilko K. Ilev, U.S. Food and Drug Administration (USA); Karl-Friedrich Klein, Fachhochschule Giessen-Friedberg (Germany)[7559-33]

2:10 pm: **Highly specific detection of IL-8 protein using combination tapered fiber optic biosensor dip-probe**, Chun-Wei Wang, Rakesh Kapoor, The Univ. of Alabama at Birmingham (USA)[7559-25]

2:30 pm: **Polymer-functionalized microspheres for immunosensing applications**, Silvia Soria, Francesco Baldini, Simone Berneschi, Massimo Brenci, Franco Cosi, Ambra Giannetti, Gualtiero Nunzi conti, Stefano Pelli, Giancarlo C. Righini, IFAC-CNR Istituto di Fisica Applicata (Italy); Bruno Tiribilli, ISC-CNR, Istituto dei Sistemi Complessi (Italy)[7559-08]

2:50 pm: **Characterization of UV single-mode and low-mode fibers**, Karl-Friedrich Klein, Cornell Gonschior, Georg Hillrichs, Tommy Halim, Fachhochschule Giessen-Friedberg (Germany)[7559-17]

Wednesday 27 January

KEYNOTE PRESENTATION

Room: 307 (Esplanade) Wed. 5:10 pm

Near-field scanning optical microscope (Invited Paper)

Aaron Lewis, Hebrew Univ. of Jerusalem (Israel),

This keynote will be presented on Wednesday, 26 January, at 5:10 pm in the Optical Biopsy Conference (7561), Session 3, Room 307 (Esplanade).

Biomedical Vibrational Spectroscopy VI: Advances in Research and Industry

Conference Chairs: **Anita Mahadevan-Jansen**, Vanderbilt Univ.; **Wolfgang Petrich**, Roche Diagnostics GmbH (Germany)

Program Committee: **Andrew J. Berger**, Univ. of Rochester; **Max Diem**, Northeastern Univ.; **Airton Abrahao Martin**, Univ. do Vale do Paraiba (Brazil); **Michael D. Morris**, Univ. of Michigan; **Dieter Naumann**, Robert Koch-Institut (Germany); **Jürgen Popp**, Institute of Photonic Technology Jena e.V. (Germany); **Nicholas Stone**, Gloucestershire Royal Hospital (United Kingdom)

Saturday 23 January

SESSION 1

Room: 303 (Esplanade) Sat. 8:15 to 10:45 am

Raman Spectroscopy and Cancer

8:15 am: **How specific are Raman spectroscopic models are: a comparative study between different cancers**, S. P. Singh, Advanced Ctr. for Treatment Research and Education in Cancer (India); K. Kalyan Kumar, M. V. P. Chowdry, K. Maheedhar, Manipal Univ. (India); C. Murali Krishna, Advanced Ctr. for Treatment Research and Education in Cancer (India). [7560-03]

8:40 am: **NIR Raman spectroscopy integrated with multimodal endoscopic imaging techniques for improving early diagnosis of gastric malignancies**, Zhiwei Huang, SK Teh, W Zheng, Khek Yu Ho, Ming Teh, Khay Guan Yeoh, National Univ. of Singapore (Singapore) [7560-11]

9:05 am: **In vivo characterization of lung cancers using endoscopic Raman spectroscopy: a pilot study**, Michael A. Short, Stephen Lam, Annette McWilliams, Haishan Zeng, The BC Cancer Research Ctr. (Canada) . . . [7560-21]

9:30 am: **In vivo diagnosis of mammary adenocarcinoma using Raman spectroscopy: an animal model study**, Renata A. Bitar, Univ. Federal do ABC (Brazil); Dayana G. Ribeiro, Mario Augusto d. S. Martins, Edson Aparecido P. dos Santos, Kumiko K. Sakane, Univ. do Vale do Paraiba (Brazil); Leandro N. Z. Ramalho, Fernando S. Ramalho, Univ. de São Paulo (Brazil); Airton A. Martin, Univ. do Vale do Paraiba (Brazil); Herculano d. S. Martinho, Univ. Federal do ABC (Brazil) [7560-02]

9:55 am: **Development of a Raman based endoscopic imaging probe utilizing SERS nanoparticles for detection of early stage colon cancer**, Ellis Garai, Jonathan T. C. Liu, Michael J. Mandella, Cristina Zavaleta, Stanford Univ. (USA); Ian Walton, Oxonica (USA); Christopher H. Contag, Sanjiv S. Gambhir, Stanford Univ. (USA) [7560-19]

10:20 am: **FTIR, Raman and CARS microscopic imaging for histopathologic assessment of brain tumors**, Christoph Krafft, N. Bergner, Institute of Photonic Technology Jena e.V. (Germany); B. Romeike, R. Reichart, R. Kalff, Friedrich-Schiller-Univ. Hospital Jena (Germany); Benjamin Dietzek, Jürgen Popp, Institute of Photonic Technology Jena e.V. (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [7560-26]

Coffee Break 10:40 to 11:00 am

SESSION 2

Room: 303 (Esplanade) Sat. 11:05 am to 12:45 pm

Raman Spectroscopy and Cells

11:05 am: **In situ cell cycle phase determination using Raman spectroscopy**, Yusuke Oshima, Aoyama Gakuin Univ. (Japan) and RIKEN (Japan); Tatsuji Takenaka, Aoyama Gakuin Univ. (Japan); Hidetoshi Sato, Kwansu Gakuin Univ. (Japan) and RIKEN (Japan); Chie Furihata, Aoyama Gakuin Univ. (Japan) [7560-05]

11:30 am: **A system for the rapid detection of bacterial contamination in cell-based therapeutics**, Carsten Bolwien, Christian Erhardt, Sulz Gerd, Fraunhofer IPM (Germany); Hagen Thielecke, Robert Johann, Fraunhofer IBMT (Germany); Marieke Pudlas, Heike Mertsching, Steffen Koch, Fraunhofer IGB (Germany) [7560-06]

11:55 am: **Surface enhanced Raman spectroscopy for urinary tract infection diagnosis and antibiogram**, Evdokia Kastanos, Univ. of Nicosia (Cyprus); Katerina Hadjigeorgiou, Alexandros Kyriakides, Constantinos Pitriss M.D., Univ. of Cyprus (Cyprus) [7560-09]

12:20 pm: **Raman spectroscopic characterization of single cells**, Jürgen Popp, Institute of Photonic Technology Jena e.V. (Germany) [7560-28]

Lunch/Exhibition Break 12:40 to 1:50 pm

SESSION 3

Room: 303 (Esplanade) Sat. 1:50 to 3:05 pm

IR Spectroscopy

1:50 pm: **Gender determination of birds by Fourier transform infrared spectroscopic imaging**, Gerald Steiner, Edmund Koch, Technische Univ. Dresden (Germany); Thomas Bartels, Univ. Leipzig (Germany) [7560-10]

2:15 pm: **In vitro characteristics of a mid-infrared continuous glucose sensor**, Christian Vrancic, Carina Herrmann, Norbert Gretz, Sabine Hoecker, Annemarie Pucci, Wolfgang Petrich, Univ. of Heidelberg (Germany) . . . [7560-12]

2:40 pm: **Simultaneous observation of ultrafast ligand dissociation and docking-site trapping in heme proteins using upconversion infrared spectroscopy**, Patrick Nuernberger, Kevin F. Lee, Adeline Bonvalet, Antigoni Alexandrou, Marten H. Vos, Manuel Joffre, Lab. d'Optique et Biosciences, Ecole Polytechnique, (France) and Institut National de la Santé et de la Recherche Médicale (France) [7560-20]

Coffee Break 3:05 to 3:35 pm

SESSION 4

Room: 303 (Esplanade) Sat. 3:35 to 5:15 pm

Raman Spectroscopy and Non-Cancer Applications

3:35 pm: **Evaluation of thyroid tissue by Raman spectroscopy**, Airton A. Martin, Carolina S. B. Teixeira, Univ. do Vale do Paraiba (Brazil); Renata A. Bitar, Univ. Federal do ABC (Brazil); Andre B. O. Santos, Univ. do Vale do Paraiba (Brazil); Herculano S. Martinho, Univ. Federal do ABC (Brazil); Emilia A. L. Arisawa, Univ. do Vale do Paraiba (Brazil) [7560-04]

4:00 pm: **Detecting changes during pregnancy with Raman spectroscopy**, Elizabeth Vargis, Vanderbilt Univ. (USA); Kesha Robertson, Ayman Al-Hendy, Meharry Medical College (USA); Jeff Reese, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7560-18]

4:25 pm: **Near infra-red Raman spectroscopic study of reactive gliosis and the glial scar in injured rat spinal cords**, Tarun Saxena, Bin Deng, Kyle Hoellger, Eric Lewis-Clark, Julie M. Hasenwinkel, Joseph Chaiken, Syracuse Univ. (USA) [7560-23]

4:50 pm: **Label free investigation of bio-molecules on the nanometer scale using tip-enhanced Raman spectroscopy**, Tanja Deckert-Gaudig, Marc Richter, R. Treffer, X. Lin, IPHT Jena (Germany); Volker Deckert, IPHT Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [7560-25]

Sunday 24 January

SESSION 5

Room: 303 (Esplanade) Sun. 8:30 to 9:45 am

New Strategies in Technology

8:30 am: **A new strategy for noninvasive preclinical imaging in small animal models using Raman spectroscopy in conjunction with SERS nanoparticles**, Cristina Zavaleta, Keith Hartman, Bryan Smith, Adam de la Zorda, Zhen Cheng, Zhuang Liu, Hongjie Dai, Sanjiv S. Gambhir, Stanford Univ. (USA) [7560-17]

8:55 am: **Evaluation of intracoronary time-gated Raman spectroscopy**, Hao Wang, Boston Univ. (USA) and Massachusetts General Hospital (USA); Joseph A. Gardecki, Brett E. Bouma, Guillermo J. Tearney, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [7560-14]

9:20 am: **Automated system for gathering elastic and inelastic scattering data from single cells**, Andrew J. Berger, Dustin Shipp, Zachary J. Smith, Univ. of Rochester (USA) [7560-16]

Coffee Break 9:45 to 10:15 am

SESSION 6

Room: 303 (Esplanade) Sun. 10:15 to 11:30 am

New Strategies in Analysis

10:15 am: **Optical fiber bundle coupling errors in Raman spectra: correction via data processing**, Kathryn A. Dooley, Francis W. L. Esmonde-White, Michael D. Morris, Univ. of Michigan (USA) [7560-15]

10:40 am: **Direct noninvasive observation of near infrared photobleaching of autofluorescence in human volar side fingertips in vivo**, Bin Deng, Colin Wright, Eric Lewis-Clark, Syracuse Univ. (USA); George Shaheen, LightTouch Medical, Inc. (USA); Roman Greier, Joseph Chaiken, Syracuse Univ. (USA) [7560-24]

11:05 am: **Calibration of Raman systems for biomedical and clinical applications**, Harish Krishnamoorthi, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7560-22]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Influence of permanent magnetic field on dynamic aqueous glucose absorption, Xiqin Zhang, Choon Meng Ting, GlucoStats System Pte, Ltd. (Singapore); Wenjun Zhang, Mr (Singapore); Joon Hock Yeo, Nanyang Technological Univ. (Singapore) [7560-01]

In vivo Raman spectroscopy biochemical changes of human skin for cosmetic application, Maira G. Tosato, Edson P. dos Santos, Rani d. S. Alvez, Leandro Raniero, Airton A. Martin, Univ. of Paraíba Valley (Brazil); Odivanía Kruger, Priscila F. Menezes, Carlos E. d. O. Praes, O Boticário Franchising (Brazil) [7560-07]

FT-IR microspectroscopy for rapid identification of bacteria in mixed culture, Ingrid Fontoura, Kumiko K. Sakane, Maria Angélica G. Cardoso, Sônia Khouri, Mituo Uehara, Ricardo Belo, Leandro Raniero, Airton A. Martin, Univ. do Vale do Paraíba (Brazil) [7560-13]

Detecting early stage pressure ulcer on dark skin using multispectral imager, Linghua Kong, Stephen H. Sprigle, Dingrong Yi, Chao Wang, Fengtao Wang, Fuhua Liu, Georgia Institute of Technology (USA); Jiwu Wang, Futing Zhao, Beijing Bodian Optical Technology Co., Ltd. (China) [7560-27]

Optical Biopsy VIII

Conference Chair: **Robert R. Alfano**, City College/CUNY

Conference Co-Chair: **Stavros G. Demos**, Lawrence Livermore National Lab.

Program Committee: **Stefan K. Andersson**, Lund Univ. (Sweden); **Britton Chance**, Univ. of Pennsylvania; **Christopher H. Contag**, Stanford Univ. School of Medicine; **Amir H. Gandjbakhche**, National Institutes of Health; **Israel Gannot**, George Washington Univ. and Tel Aviv Univ. (Israel); **Richard B. Rosen**, The New York Eye and Ear Infirmary; **Masood Siddique**, City College/CUNY; **Urs Utzinger**, The Univ. of Arizona; **Wubao B. Wang**, City College/CUNY; **Webb W. Watt**, Cornell Univ.

Support for this Conference is provided by:



Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Diagnosis of inflammatory fibrous hyperplasia of buccal mucosa by high-wavenumber FT-Raman spectroscopy, Luis Felipe d. C. e. S. Carvalho, Erika T. Sato, ABC Federal Univ. (Brazil); Airtón A. Martin, Vale do Paraíba Univ. (Brazil); Janete D. Almeida, São Paulo State Univ. (Brazil); Herculano d. Silva Martinho, ABC Federal Univ. (Brazil) [7561-39]

Healing and evaluating guinea pig skin incision after surgical suture and laser tissue welding using in vivo Raman spectroscopy, A. Alimova, V. Sriramoju, R. Chakraverty, R. Muthukatti, R. Alfano, The City College of New York (USA) [7561-40]

Changes of collagen, elastin, and tryptophan fluorescence in laser welded porcine aorta tissues, Cheng-Hui Liu, Wubao Wang, V. Kartazhev, The City College of New York (USA); H. Savage M.D., The New York Eye and Ear Infirmary (USA); Robert R. Alfano, The City College of New York (USA) [7561-41]

Optical birefringence measurements of aorta tissues, G. C. Tang, W. B. Wang, Y. Pu, R. R. Alfano, Institute for Ultrafast Spectroscopy and Lasers (USA) [7561-42]

Development of optical mammography based on analysis of time-resolved photon path distribution, Yukio Ueda, Daisuke Yamashita, Kenji Yoshimoto, Etsuko Ohmae, Toshihiko Suzuki, Takeshi Yamanaka, Hamamatsu Photonics K.K. (Japan); Hiroyuki Ogura, Chikako Teruya, Hatsuko Nasu, Emiko Imai, Harumi Sakahara, Hamamatsu Univ. School of Medicine (Japan); Motoki Oda, Yutaka Yamashita, Hamamatsu Photonics K.K. [7561-43]

Application of NIR fluorescent markers to quantify expression level of HER2 receptors in carcinomas in vivo, Victor V. Chernomordik, Moinuddin Hassan, Sang-Bong Lee, Rafal Zielinski, Jacek Capala, Amir H. Gandjbakhche, National Institutes of Health (USA) [7561-50]

Wednesday 27 January

SESSION 1

Room: 307 (Esplanade). Wed. 8:00 am to 12:00 pm

Fluorescence and Raman Diagnosis I

Session Chair: **Stavros G. Demos**, Lawrence Livermore National Lab.

8:00 am: **Conjugated nanoparticle labeled three-dimensional cellular imaging using multiphoton endomicroscope**, Heejin Choi, Shih-Chi Chen, Massachusetts Institute of Technology (USA); Joong-ho Moon, Florida International University (USA); Martin L. Culpepper, Peter T. C. So, Massachusetts Institute of Technology (USA) [7561-01]

8:20 am: **Visualization of epithelial morphology using autofluorescence microscopy under ultraviolet excitation**, Bevin Lin, Univ. of California, Davis (USA); Shiro Urayama, Ramez M. G. Saroufeem, Univ. of California, Davis Medical Ctr. (USA); Dennis L. Matthews, Univ. of California, Davis (USA); Stavros G. Demos, Lawrence Livermore National Lab. (USA) and Univ. of California, Davis (USA) [7561-02]

8:40 am: **Advances in handheld spectral sensors and systems** (Invited Paper), Jason M. Eichenholz, Ocean Optics, Inc. (USA) [7561-03]

9:10 am: **Portable point-detection fluorescence spectroscopy system for brain cancer diagnostics**, Quan Liu, Jianjun Li, Duke Univ. (USA); Shuqin Li, Gerald Grant, Duke Univ. Medical Ctr. (USA); Tuan Vo-Dinh, Duke Univ. (USA) [7561-04]

9:30 am: **Spectral filtering modulation method for imaging hemoglobin concentration and oxygenation based on fluorescence ratios**, Quan Liu, Nanyang Technological Univ. (Singapore); Tuan Vo-Dinh, Duke Univ. (USA) [7561-05]

Coffee Break 9:50 to 10:20 am

10:20 am: **UV extended supercontinuum source for fluorescence detection of biological and chemical molecules**, Robert R. Alfano, Vladimir A. Kartazhev, Iosif S. Zeylikovich, Bidyut B. Das, The City College of New York (USA) [7561-06]

10:40 am: **Multi-excitation fluorescence spectroscopy for analysis of non-alcoholic fatty liver disease**, Vincent R. Sauvage, Imperial College London (United Kingdom); Hoa Nguyen Thanh, Imperial College London (United Kingdom) and Institut d'Alembert, École Normale Supérieure de Cachan (France); R. Hill, Danilo Concas, Adam Levene, Mark Thursz, Robert Goldin, Quentin Anstee, Daniel S. Elson, Imperial College London (United Kingdom) [7561-07]

11:00 am: **Optical spectroscopy approach for the predictive assessment of kidney functional recovery following ischemic injury**, Rajesh N. Raman, Lawrence Livermore National Lab. (USA); Christopher Pivetti, UC Davis Medical Ctr. (USA); Alexander Rubenchik, Lawrence Livermore National Lab. (USA); Dennis Matthews, Christoph Troppmann, UC Davis Medical Ctr. (USA); Stavros Demos, Lawrence Livermore National Lab. (USA) [7561-08]

11:20 am: **Rotational dynamics and polarization anisotropy of receptor-targeted contrast agents in cancerous and normal prostate tissues studied by time-resolved fluorescence polarization**, Yang Pu, Wubao Wang, R. Alfano, Institute for Ultrafast Spectroscopy and Lasers (USA) [7561-09]

11:40 pm: **Stokes shift spectroscopy for breast cancer diagnosis**, Ebenezar Jeyasingh, Jamal Mohamed College (India); Aruna Prakashrao, Ganesan Singaravelu, Anna Univ. (India) [7561-11]

Lunch Break 12:00 to 1:30 pm

SESSION 2

Room: 307 (Esplanade).....Wed. 1:30 to 3:00 pm

Quantum Coherent Effects in Biology and Medicine

Session Chair: Robert R. Alfano, New York State Ctr. for Advanced Technology in Photonics Applications and City College/CUNY

- 1:30 pm: **Excitation energy transfer in photosynthesis: coherent or incoherent or both** (*Invited Paper*), G Govindjee, Univ. of Illinois (USA)[7561-12]
- 2:00 pm: **Quantum effects in biological systems** (*Invited Paper*), Mohan Sarovar, Univ. of California, Berkeley (USA)[7561-13]
- 2:30 pm: **Coherent excitons in the primary PS units** (*Invited Paper*), Graham R. Fleming, Univ. of California, Berkeley (USA)[7561-14]
- Coffee Break3:00 to 3:30 pm

SESSION 3

Room: 307 (Esplanade).....Wed. 3:30 to 5:30 pm

Fluorescence and Raman Diagnosis II

Session Chair: Jason M. Eichenholz, Ocean Optics, Inc.

- 3:30 pm: **Multispectral imaging of tissue autofluorescence including UVB and UVC excitation**, Timothy Renkoski, Urs Utzinger, The Univ. of Arizona (USA)[7561-15]
- 3:50 pm: **Development of a multiview multispectral 3D tomographic small animal in vivo fluorescence imaging system**, James R. Mansfield, Richard M. Levenson, Craig M. Gardner, CRi (USA)[7561-16]
- 4:10 pm: **Telegrapher-based model for fluorescence enhanced optical tomography in small volume**, Ranadhir Roy, The Univ. of Texas-Pan American (USA)[7561-17]
- 4:30 pm: **Autofluorescence visualization of fallopian tube carcinogenesis**, Pierre M. Lane, Sylvia Au, BC Cancer Research Ctr. (Canada); Jessica McAlpine, University of British Columbia (Canada); Blake Gilks, Dianne Miller, The Univ. of British Columbia (Canada); Calum E. MacAulay, The BC Cancer Research Ctr. (Canada)[7561-18]
- 4:50 pm: **Polarized fluorescence study in human cervical tissue: change in autofluorescence through different excitation wavelengths**, Rajbeer Singh, Krishna K. S. Tomar, Prashant Shukla, Asima Pradhan, Indian Institute of Technology Kanpur (India); Rekha Gupta, Sonal Jain, Chayanika Pantola, Asha Agarwal, Kiran Pandey, Ganesh Shanker Vidhyarthi Memorial Medical College (India)[7561-19]
- 5:10 pm: **Near field scanning optical microscopy** (*Invited Paper*), Aaron Lewis, Hebrew Univ. of Jerusalem (Israel)[7561-20]

Thursday 28 January

SESSION 4

Room: 307 (Esplanade).....Thurs. 8:00 am to 12:10 pm

Imaging Diagnosis

Session Chair: Wubao Wang, City College/CUNY

- 8:00 am: **Photoacoustic tomography: high-resolution in vivo imaging of optical contrast at new depths** (*Invited Paper*), Lihong V. Wang, Washington Univ. in St. Louis (USA)[7561-21]
- 8:30 am: **Longitudinal optical imaging of tumor metabolism and hemodynamics**, Melissa C. Skala, Andrew Fontanella, Lan Lan, Joseph Izatt, Mark Dewhirst, Duke Univ. (USA)[7561-22]
- 8:50 am: **Multimodality optical imaging combining optical coherence tomography (OCT) and fluorescence lifetime imaging (FLIM) for morphological and biochemical tissue characterization**, Sebina Shrestha, Brian Applegate, Paritosh Pande, Javier A. Jo, Texas A&M Univ. (USA) [7561-23]
- 9:10 am: **Multispectral imaging techniques observing the dynamic changes in the hemoglobin concentrations as diagnostic tool for diseased tissues**, John H. Klaessens, Herke Jan Noordmands, Rowland de Roode, Rudolf M. Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands)[7561-24]
- 9:30 am: **Fast hyperspectral imaging system based on Fourier transform spectroscopy incorporating a coherent fiber bundle for early detection of squamous cell carcinoma (SCC)**, Te-Yu Tseng, Wei-Chen Hsu, Chun-Yu Chen, Kung-Bin Sung, National Taiwan Univ. (Taiwan)[7561-25]
- Coffee Break9:50 to 10:20 am

10:20 am: **Tissue characterization by using narrow band imaging** (*Invited Paper*), Kazuhiro Gono, Olympus Medical Systems Corp. (Japan)[7561-26]

10:50 am: **Automated algorithm for breast tissue differentiation in optical coherence tomography images and its potential for breast biopsy guidance**, Mircea Mujat, R. Daniel Ferguson, Daniel X. Hammer, Christopher Gittins, Nicusor Iftimia, Physical Sciences Inc. (USA)[7561-27]

11:10 am: **Lensless LEBS: a simplified geometry for low-coherence enhanced backscattering (LEBS)**, Jeremy D. Rogers, Valentina Stoyneva, Nikhil N. Mutyal, Vladimir M. Turzhitsky, Vadim Backman, Northwestern Univ. (USA)[7561-28]

11:30 am: **Diffuse reflectance spectroscopy of pre and post-treated oral submucous fibrosis: an in vivo study**, Sivabalan Shanmugam, Anna Univ. (India); Ponranjini Vedeswari C, Jayachandran S, Koteeswaran D, Pravda C, ; Aruna p, Ganesan S, Anna Univ. (India)[7561-29]

11:50 am: **Hyperspectral low-light camera for macroscopic imaging of biological samples**, Julio E. Hernandez, Norsk Elektro Optikk AS (Norway) and Univ. of Oslo (Norway); Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway); Torbjørn Skauli, Norwegian Defence Research Establishment (Norway); Ivar Baarstad, Trond Løke, Norsk Elektro Optikk AS (Norway)[7561-30]

Lunch Break12:20 to 1:30 pm

SESSION 5

Room: 307 (Esplanade).....Thurs. 1:30 to 5:30 pm

Biophotonic Approach for Disease and Virus Detection

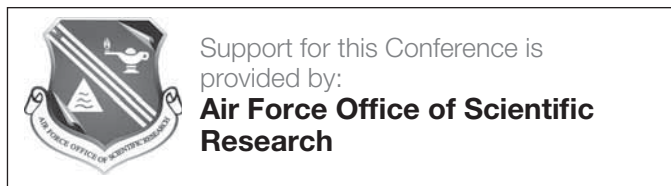
Session Chairs: Rajni Govindjee, Univ. of Illinois at Urbana-Champaign; Lihong V. Wang, Washington Univ. in St. Louis

- 1:30 pm: **Medical diagnostics via optical biopsy with multiphoton microscopic endoscopy** (*Invited Paper, Presentation Only*), Watt W. Webb, Cornell Univ. (USA)[7561-31]
- 2:00 pm: **Photonic approach to the selective inactivation of viruses with ultrashort pulsed lasers** (*Invited Paper*), Kong-Thon Tsen, Arizona State Univ. (USA); Shaw-Wei D. Tsen, School of Medicine, Washington Univ. in St. Louis (USA); Q Fu, S. M. Lindsay, Karen Kibler, Bert Jacobs, Arizona State Univ. (USA); Juliann G. Kiang, Uniformed Services Univ. of the Health Sciences (USA)[7561-32]
- 2:30 pm: **The importance of optical methods for noninvasive measurements in the skin care industry** (*Invited Paper*), Georgios N. Stamatias, Johnson & Johnson Consumer France (France)[7561-33]
- Coffee Break3:00 to 3:30 pm
- 3:30 pm: **Applications of biophotonics to point-of-care testing and clinical diagnosis** (*Invited Paper*), Dennis L. Matthews, UC Davis Medical Ctr. (USA)[7561-34]
- 4:00 pm: **Industrial biophotonics: an overview of biomedical optics research at GE** (*Invited Paper*), Siavash Yazdanfar, GE Global Research (USA) .[7561-35]
- 4:30 pm: **Quantitative multispectral imaging of skin chromophores**, Jana M. Kainerstorfer, Jason D. Riley, Franck Amyot, Moinuddin Hassan, Victor Chernomordik, National Institutes of Health (USA); Christoph K. Hitzemberger, Medical Univ. of Vienna (Austria); Amir H. Gandjbakhche, National Institutes of Health (USA)[7561-36]
- 4:50 pm: **Global convergence for inverse problems in optical tomography**, Michael V. Klibanov, The Univ. of North Carolina at Charlotte (USA) ...[7561-37]
- 5:10 pm: **Differentiation of normal and cancerous lung tissues by multiphoton imaging**, Chun-Chin Wang, Feng-Chieh Li, Wei-Chou Lin, Sung-Jan Lin, Chen-Yuan Dong, National Taiwan Univ. (Taiwan)[7561-38]

Optical Interactions with Tissues and Cells XXI

Conference Chairs: **E. Duco Jansen**, Vanderbilt Univ.; **Robert J. Thomas**, Air Force Research Lab.

Program Committee: **Randolph D. Glickman**, The Univ. of Texas Health Science Ctr. at San Antonio; **Steven L. Jacques**, Oregon Health & Science Univ.; **William P. Roach**, Air Force Research Lab.; **Jessica C. Ramella-Roman**, The Catholic Univ. of America; **Alfred Vogel**, Univ. zu Lübeck (Germany); **Gerald J. Wilmink**, Air Force Research Lab.; **Bruce E. Stuck**, U.S. Army Medical Research Detachment; **Michael Belkin**, Tel Aviv Univ. (Israel)



Support for this Conference is provided by:
Air Force Office of Scientific Research

Monday 25 January

SESSION 1

Room: 306 (Esplanade) Mon. 8:20 to 10:10 am

Spectroscopy, Optics, and Scattering I

Session Chair: **Jessica C. Ramella-Roman**,
The Catholic Univ. of America

8:20 am: **Rapid analysis of spectral images using a simplified light transport model** (*Invited Paper*), Steven L. Jacques, Oregon Health & Science Univ. (USA) [7562-01]

8:50 am: **Molecular delivery into live cells using gold nanoparticle arrays fabricated by polymer mold guided near-field photothermal annealing**, Ting-Hsiang Wu, Fan Xiao, Michael A. Teitell, Pei-Yu E. Chiou, Univ. of California, Los Angeles (USA) [7562-02]

9:10 am: **Spurious analyte calibration models from fluorescence quenched tissue Raman spectra**, Ishan Barman, Chae-Ryon Kong, Gajendra Singh, Ramachandra R. Dasari, Michael S. Feld, Massachusetts Institute of Technology (USA) [7562-03]

9:30 am: **Second harmonic generation imaging microscopy of ovarian cancer**, Ronald LaComb, Oleg Nadiarnykh, Univ. of Connecticut Health Ctr. (USA); Molly Brewer, Neag Cancer Ctr. (USA); Paul Campagnola, Univ. of Connecticut Health Ctr. (USA) [7562-04]

9:50 am: **A far-field superposition method for 3D FDTD simulations of light scattering from multiple biological cells**, Matthew S. Starosta, Consultant [7562-06]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 306 (Esplanade) Mon. 10:40 to 11:40 am

Spectroscopy, Optics, and Scattering II

Session Chair: **Jessica C. Ramella-Roman**,
The Catholic Univ. of America

10:40 am: **Modeling fluorescent light distributions in layered media**, Kevin G. Phillips, Steve Jacques, Oregon Health & Science Univ. (USA) [7562-07]

11:00 am: **Optical imaging of structures within highly scattering material using an incoherent beam and a spatial filter**, Nick Pfeiffer, Glenn H. Chapman, Bozena Kaminska, Simon Fraser Univ. (Canada) [7562-08]

11:20 am: **Angle-resolved diffused light spectroscopy using radial angular filter arrays**, Fartash Vasefi, Simon Fraser Univ. (Canada) and Lawson Health Research Institute (Canada); Mohamadreza Najiminaini, Bozena Kaminska, Simon Fraser Univ. (Canada); Haishan Zeng, The BC Cancer Research Ctr. (Canada); Glenn H. Chapman, Simon Fraser Univ. (Canada); Jeffrey J. Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada) [7562-09]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: 306 (Esplanade) Mon. 1:30 to 2:30 pm

Spectroscopy, Optics, and Scattering III

Session Chair: **Randolph D. Glickman**,
The Univ. of Texas Health Science Ctr. at San Antonio

1:30 pm: **Optical phase conjugation by dynamic holography for wavefront restoration in turbid media**, Noé Ortega-Quijano, Félix Fanjul-Vélez, Irene Salas-García, Univ. de Cantabria (Spain); Oleg G. Romanov, Dmitry V. Gorbach, Alexei L. Tolstik, Belarusian State Univ. (Belarus); José L. Arce-Diego, Univ. de Cantabria (Spain) [7562-10]

1:50 pm: **Spatiofrequency filters for imaging fluorescence in scattering media**, Polly B. Tsui, Gary Chiang, Glenn H. Chapman, Nick Pfeiffer, Bozena Kaminska, Simon Fraser Univ. (Canada) [7562-11]

2:10 pm: **Comparison of the near-infrared optical properties of excised and cultured human ocular tissues**, Brian G. Yust, Dhiraj K. Sardar, Andrew Tsin, The Univ. of Texas at San Antonio (USA) [7562-12]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 306 (Esplanade) Mon. 3:40 to 5:00 pm

Imaging and Applications

Session Chair: **Robert J. Thomas**, Air Force Research Lab.

3:40 pm: **Determination of the optical property changes by photodynamic therapy using inverse Monte Carlo method between 350 nm and 1000 nm**, Norihiro Honda, Takaya Terada, Takuya Nanjo, Katsunori Ishii, Kunio Awazu, Osaka Univ. (Japan) [7562-13]

4:00 pm: **In vivo comparison of near infrared laser lesions in the non-human primate retina using adaptive optics imaging**, Ginger M. Pocock, Jefferey W. Oliver, Aurora D. Shingledecker, Kurt Schuester, Benjamin A. Rockwell, Air Force Research Lab. (USA) [7562-14]

4:20 pm: **Effect of coating material on uptake of indocyanine green-loaded nanocapsules by normal and cancerous lung cells**, Bongsu Jung, Eulises Lomeli, Bahman Anvari, Univ. of California, Riverside (USA) [7562-15]

4:40 pm: **Label-free optical control of arterial contraction**, Myunghwan Choi, Jonghee Yun, Chulhee Choi, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7562-16]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

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Measurement of the temperature increase in the porcine cadaver iris during direct illumination by femtosecond laser pulses, Hui Sun, Ronald M. Kurtz, Tibor Juhasz, Univ. of California, Irvine (USA) [7562-43]

Analytical continuous-wave diffuse optical tomography in cylindrical geometry, Jun-Hui Ho, Jing Dong, Kijoon Lee, Nanyang Technological Univ. (Singapore) [7562-44]

Analytic reconstruction of absorption and scattering properties in parallel plate diffuse optical tomography, Kijoon Lee, Jun Hui Ho, Jing Dong, Nanyang Technological Univ. (Singapore) [7562-45]

The accuracy of a commercially spectrophotometer with an integrating sphere for measuring optical properties of turbid sample, Yang Zhang, Xiang Wen, Dan Zhu, Huazhong Univ. of Science and Technology (China) [7562-46]

Optical constants measurement of tissue for the laser coagulation by inverse Monte Carlo method, Takaya Terada, Takuya Nanjo, Norihiro Honda, Katsunori Ishii, Kunio Awazu, Osaka Univ. (Japan) [7562-47]

LED light source and secondary optics design for the efficient energy delivering on plant growth and the matching of the chlorophyll/ PAR spectrum, Chung-Jen Ou, Hsiuping Institute of Technology (Taiwan) . [7562-48]

Near-infrared measurement of porcine tissue optical properties using a dual-integrated sphere system, Chris A. Davis, Nichole Jindra, Air Force Research Lab. (USA) [7562-49]

Tuesday 26 January

SESSION 5

Room: 306 (Esplanade) Tues. 8:00 to 10:30 am

Terahertz Radiation Effects and Imaging

Session Chair: Gerald J. Wilmink, Air Force Research Lab.

8:00 am: **THz in biology and medicine: toward quantifying and understanding the interaction of millimeter- and submillimeter-waves with cells and cell processes** (*Invited Paper*), Peter H. Siegel, California Institute of Technology (USA); Victor Pikov, Huntington Medical Research Institute (USA) [7562-17]

8:30 am: **Metamaterial based devices for terahertz imaging**, Xomalin G. Peralta, The Univ. of Texas at San Antonio (USA) [7562-18]

8:50 am: **Measurement of the optical properties of skin using terahertz time-domain spectroscopic techniques**, Gerald J. Wilmink, Air Force Research Lab. (USA); Thomas Tongue, Zomega Terahertz Corp. (USA); Bennett L. Ibey, Air Force Research Lab. (USA); Brian Shulkin, Zomega Terahertz Corp. (USA); Xomalin Peralta, The Univ. of Texas at San Antonio (USA); Benjamin D. Rivest, Eric C. Haywood, William P. Roach, Air Force Research Lab. (USA) [7562-19]

9:10 am: **Determination of death thresholds and identification of terahertz (THz)-specific gene expression signatures**, Gerald J. Wilmink, Air Force Research Lab. (USA); Dawnlee Roberson, The Univ. of Texas at San Antonio (USA); Bennett L. Ibey, Benjamin Rivest, William P. Roach, Air Force Research Lab. (USA) [7562-20]

9:30 am: **Quantitative investigation of the bioeffects associated with terahertz radiation**, Benjamin D. Rivest, Gerald J. Wilmink, Luisiana X. Cundin, Jason Payne, Bennett L. Ibey, Dustin Mixon, William P. Roach, Air Force Research Lab. (USA) [7562-21]

9:50 am: **Damage thresholds for terahertz radiation**, Danielle R. Dalzell, Rebecca Vincelette, Bennet Ibey, Gerald J. Wilmink, W. P. Roach, Air Force Research Lab (USA) [7562-22]

10:10 am: **TBA**, H. L. Mosbacker, The Ohio State Univ. (USA) [7562-23]

Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 306 (Esplanade) Tues. 10:40 am to 12:00 pm

Photo-Thermal and Photo-Mechanical Interactions

Session Chair: William P. Roach, Air Force Research Lab.

10:40 am: **Interaction of temporal and spatial separated cavitation bubbles in water**, Nadine Tinne, Tammo Ripken, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7562-24]

11:00 am: **Analysis of the short-pulsed CO₂ laser ablation process for optimising the processing performance for cutting bony tissue**, Markus Mehrwald, Jessica Burgner, Christoph Platzek, Claus Feldmann, Jörg Raczkowsky, Heinz Woern, Univ. Karlsruhe (Germany) [7562-25]

11:20 am: **Selective mucosal ablation using CO₂ laser for the development of novel endoscopic submucosal dissection: comparison of continuous wave and nanosecond pulsed wave**, Katsunori Ishii, Satoshi Watanabe, Osaka Univ. (Japan); Daisuke Obata, Kobe Univ. (Japan); Hisanao Hazama, Osaka Univ. (Japan); Yoshinori Morita, Yuichiro Matsuoka, Hiromu Kutsumi, Takeshi Azuma, Kobe Univ. (Japan); Kunio Awazu, Osaka Univ. (Japan) [7562-26]

11:40 am: **Selective cancer therapy via IR-laser-excited gold nanorods**, Jui-teng Lin, Yu-lin Hong, Chun-Lin Chang, National Taiwan Univ. (Taiwan) [7562-27]

Lunch Break 12:00 to 1:30 pm

SESSION 7

Room: 306 (Esplanade) Tues. 1:30 to 4:20 pm

Photo-Thermal Interaction I

Session Chair: E. Duco Jansen, Vanderbilt Univ.

1:30 pm: **Nanorose and lipid detection in atherosclerotic plaque using dual-wavelength photothermal wave imaging**, Tianyi Wang, Jinze Qiu, Li L. Ma, Jingjing Sun, Seungyup Ryoo, The Univ. of Texas at Austin (USA); Xiankai Li, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Keith P. Johnston, The Univ. of Texas at Austin (USA); Marc D. Feldman, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Thomas E. Milner, The Univ. of Texas at Austin (USA) [7562-28]

1:50 pm: **Method for measuring ocular aberrations induced by thermal lensing in vivo**, Rebecca L. Vincelette, Jeffrey W. Oliver, Gary Noojin, Kurt Schuster, Aurora D. Shingledecker, Air Force Research Lab. (USA); Ashley J. Welch, Univ. of Texas at Austin (USA) [7562-29]

2:10 pm: **New method to visualize subsurface absolute temperature distributions and dynamics during laser-tissue interactions using thermo cameras**, Stefan Been, Tjeerd de Boorder, John Klaessens, Rudolf Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands) [7562-30]

2:30 pm: **Effects of temperature on fluorescence in human tissue**, Daniel B. Masters, Alex J. Walsh, Vanderbilt Univ. (USA); Ashley J. Welch, The Univ. of Texas at Austin (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7562-50]

2:50 pm: **Effect of temperature on fluorescence: an animal study**, Alex J. Walsh, Daniel B. Masters, Vanderbilt Univ. (USA); Ashley J. Welch, The Univ. of Texas at Austin (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [7562-31]

Coffee Break 3:10 to 3:40 pm

3:40 pm: **Collagen thermal denaturation study for thermal angioplasty based on modified kinetic model: relation between the artery mechanical properties and collagen denaturation rate.**, Natsumi Shimazaki, Tomoaki Hayashi, Mie Kunio, Tsunenori Arai, Keio Univ. (Japan) [7562-32]

4:00 pm: **Effects of laser parameters on propagation characteristics of laser-induced stress wave for gene transfer**, Takahiro Ando, Keio Univ. (Japan); Shunichi Sato, National Defense Medical College (Japan); Mitsuhiro Terakawa, Keio Univ. (Japan); Hiroshi Ashida, National Defense Medical College (Japan); Minoru Obara, Keio Univ. (Japan) [7562-33]

Wednesday 27 January

SESSION 8

Room: 306 (Esplanade) Wed. 8:20 to 9:40 am

Photo-Disruption Mechanisms

Session Chair: Robert J. Thomas, Air Force Research Lab.

8:20 am: **Picosecond laser tissue dissection with extended and multiple foci**, Ilya Toytman, Alexander S. Silbergleit, Stanford Univ. (USA); Dmitrii Simanovskii, Coherent, Inc. (USA); Daniel Palanker, Stanford Univ. (USA) [7562-34]

8:40 am: **Real-time OCT imaging of laser ablation of biological tissue**, Masato Ohmi, Makoto Ohnishi, Daisuke Takada, Masamitsu Haruna, Osaka Univ. (Japan) [7562-36]

9:00 am: **Cavitation induced by CW lasers in liquids**, Julio Cesar Ramirez-San-Juan, Enrique Rodríguez-Aboytes, Adriana Erica Martínez-Cantón, Oscar Baldovino-Pantaleón, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Susana Torres-Hurtado, Univ. de Sonora (Mexico); Arturo Robledo-Martinez, Univ. Autónoma Metropolitana (Mexico); Rubén Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7562-37]

9:20 am: **Photomechanical and thermomechanical response of nanosecond laser irradiated agar gel**, Francisco G. Perez-Gutierrez, Univ. of California, Riverside (USA); Rodger Evans, Santiago Camacho-Lopez, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); Guillermo Aguilar, Univ. of California, Riverside (USA) [7562-38]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 306 (Esplanade) Wed. 10:30 to 11:30 am

Laser and Noncoherent Light Ocular Effects

Session Chairs: Bruce E. Stuck, U.S. Army Medical Research Detachment; Michael Belkin, Tel Aviv Univ. (Israel)

10:30 am: **Retinal neuroprotection by intravitreal saline injections**, Michael Belkin M.D., Mark Belokopitov, Shiri Shulman, Galina Dubinsky, Mordechai Rosner, Tel Aviv University (Israel) [7562-39]

10:50 am: **Artificial haze scotoma-induced visual disorders in sensory and perceptual tasks: serial vs. parallel processing**, Rachel Brandeis, Inbal Egoz, David Peri, Joseph Turetz, Israel Institute for Biological Research (Israel) [7562-40]

11:10 am: **New methods in order to determine the extent of temporary blinding from laser and LED light and proposal how to allocate into blinding groups**, Hans-Dieter Reidenbach, Cologne University of Applied Sciences (Germany); Guenter Ott, FIOSH/BAuA (Germany); Martin Brose, BGETE (Germany); Klaus Dollinger, Cologne University of Applied Sciences (Germany) [7562-41]

Dynamics and Fluctuations in Biomedical Photonics VII

Conference Chairs: **Valery V. Tuchin**, Saratov State Univ. (Russian Federation); **Donald D. Duncan**, Oregon Health & Science Univ.; **Kirill V. Larin**, Univ. of Houston

Program Committee: **Vadim S. Anischenko**, Saratov State Univ. (Russian Federation); **Wei R. Chen**, Univ. of Central Oklahoma; **Joseph P. Culver**, Washington Univ. School of Medicine in St. Louis; **Jingying Jiang**, Tianjin Univ. (China); **Sean J. Kirkpatrick**, Oregon Health & Science Univ.; **Jürgen M. Lademann**, Charité Universitätsmedizin Berlin (Germany); **Martin J. Leahy**, Univ. of Limerick (Ireland); **Hong Liu**, Univ. of Oklahoma; **Qingming Luo**, Huazhong Univ. of Science and Technology (China); **Igor V. Meglinski**, Univ. of Otago (New Zealand); **Vladislav Y. Toronov**, Ryerson Univ. (Canada); **Lihong V. Wang**, Washington Univ. in St. Louis; **Ruikang Wang**, Oregon Health & Science Univ.; **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences; **Dmitry A. Zimnyakov**, Saratov State Univ. (Russian Federation)

Saturday 23 January

SESSION 1

Room: 206 (Mezzanine) Sat. 1:30 to 4:30 pm

Tissue Complex Structure Analysis

Session Chair: **Igor Meglinski**, Univ. of Otago (New Zealand)

1:30 pm: **Tissue viability imaging for quantification of skin erythema and blanching** (*Invited Paper*), Gert E. Nilsson, Linköping University (Sweden) and Wheelsbridge (Sweden); Martin J. Leahy, Univ. of Limerick (Ireland) ... [7563-02]

2:00 pm: **Tissue structural organization: measurement, interpretation, and modeling**, Donald D. Duncan, Oregon Health & Science Univ. (USA); David G. Fischer, NASA/Glenn Research Center (USA); Mehran Daneshbod, University of New Mexico (USA); Scott A. Prael, Oregon Medical Laser Center (USA) [7563-03]

2:20 pm: **Image quality comparison of high-energy phase contrast x-ray images with low-energy conventional images: phantom studies**, Molly Wong, Da Zhang, Hong Liu, Univ. of Oklahoma (USA) ... [7563-04]

2:40 pm: **Characterization of tissue scattering with speckle measurements under partial spatial coherence illumination**, Vladimir Turzhitsky, Nikhil N. Mutyal, Jeremy D. Rogers, Vadim Backman, Northwestern Univ. (USA) [7563-05]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **4D non-gated chicken embryo heart outflow imaging using spectral optical coherence tomography**, Aiping Liu, Zhenhe Ma, Kent Thornburg, Ruikang K. Wang, Sandra Rugonyi, Oregon Health & Science Univ. (USA) ... [7563-06]

3:50 pm: **Characterizing polarized autofluorescence of normal and benign tissues using singular value decomposition and wavelet transform**, Anita H. Gharekhan, C. U. Shah Science College (India); Siddharth Arora, University of Oxford (United Kingdom); Prasanta K. Panigrahi, Physical Research Laboratory (India) and Indian Institute of Science Education and Research (IISER) (India); Asima Pradhan, Indian Institute of Technology (India) ... [7563-08]

4:10 pm: **LED illumination effects on proliferation and survival of meningioma cellular cultures**, Efrain Solarte, Hernan Urrea, William Criollo, Oscar Gutierrez, Universidad del Valle (Colombia) ... [7563-12]

Keynote Presentation

Room: 206 (Mezzanine) Sat. 4:30 to 5:00 pm

Session Chair: **Valery V. Tuchin**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

4:30 pm: **Photoacoustic microscopy of vasculature: functional volumetric imaging in vivo** (*Invited Paper*), Lihong V. Wang, Washington Univ. in St. Louis (USA) ... [7563-01]

Sunday 24 January

SESSION 2

Room: 206 (Mezzanine) Sun. 9:00 to 10:10 am

Micro- and Nanoparticle Dynamics

Session Chair: **Martin J. Leahy**, Univ. of Limerick (Ireland)

9:00 am: **Medical application-oriented nanostructure design: physical basics and limitations** (*Invited Paper*), Leonid D. Shvartsman, Boris Laikhtman, The Hebrew Univ. of Jerusalem (Israel) ... [7563-09]

9:30 am: **Quantification of microbubbles in blood with phase-sensitive SSOCT**, Kirill V. Larin, Univ. of Houston (USA) ... [7563-10]

9:50 am: **Optical microscopy for gold nanoparticles temperature and velocity field visualization**, Ivan V. Fedosov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Igor S. Nefedov, Helsinki University of Technology (Finland); Boris N. Khebtsov, The Russian Academy of Sciences' Institute of Biochemistry and Physiology of Plants and Microorganism (Russian Federation); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) ... [7563-11]

Coffee Break 10:10 to 10:40 am

SESSION 3

Room: 206 (Mezzanine) Sun. 10:40 am to 12:10 pm

Blood Flow Measurement and Imaging

Session Chair: **Wiendelt Steenbergen**, Univ. Twente (Netherlands)

10:40 am: **High-resolution wide field of view blood perfusion maps for retina and choroid with optical micro-angiography** (*Invited Paper*), Lin An, David Wilson, Ruikang K. Wang, Oregon Health & Science Univ. (USA) [7563-13]

11:10 am: **Laser Doppler flowmetry for assessment of tissue microcirculation: 30 years to clinical acceptance**, Martin J. Leahy, Univ. of Limerick (Ireland) and RCSI and NBIPI (Ireland); Gert E. Nilsson, Linköping University (Sweden) and Wheelsbridge AB (Sweden) ... [7563-14]

11:30 am: **In vivo studies of skin blood microcirculation using dynamic light scattering**, Igor Meglinski, University of Otago (New Zealand); Vyacheslav Kalchenko, Alon Harmelin, Weizmann Institute of Science (Israel) ... [7563-15]

11:50 am: **In vivo assessment of speed distribution of red blood cells based on laser-Doppler spectrum decomposition**, Stanislaw Wojtkiewicz, Adam Liebert, Anna Zbiec, Roman Maniewski, Institute of Biocybernetics and Biomedical Engineering (Poland) ... [7563-16]

Lunch/Exhibition Break 12:10 to 1:30 pm

BIOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

SESSION 4

Room: 206 (Mezzanine) Sun. 1:30 to 2:40 pm

Blood Perfusion Imaging

Session Chair: Ruikang K. Wang, Oregon Health & Science Univ.

1:30 pm: **Comparison of scanning beam and whole field laser Doppler perfusion imaging** (*Invited Paper*), Wiendelt Steenbergen, Erwin Hondebrink, Ton G. Van Leeuwen, Univ. Twente (Netherlands); Matthijs J. Draijer, Spaarne Hospital (Netherlands)[7563-17]

2:00 pm: **Architectural and functional imaging of the microcirculation.** Martin J. Leahy, University of Limerick (Ireland)[7563-18]

2:20 pm: **Noise analysis in laser speckle contrast imaging**, Shuai Yuan, Univ. of Maryland, College Park (USA); Renee D. Naphas, Yu Chen, University of Maryland (USA); Andrew K. Dunn, University of Texas at Austin (USA); David A. Boas, Martinos Center for Biomedical Imaging (USA)[7563-19]

PANEL DISCUSSION

Room: 206 (Mezzanine) Sun. 2:40 to 3:00 pm

Blood Microcirculation and Perfusion Imaging Technologies: Where are we and which Applications are Winners?

Martin J. Leahy, Univ. of Limerick (Ireland);
Ruikang K. Wang, Oregon Health & Science Univ.;
David A. Boas, Massachusetts General Hospital;
Adam Liebert, Institute of Biocybernetics and Biomedical Engineering (Poland); **Gert E. Nilsson**, Univ. Hospital Linköping (Sweden);
Wiendelt Steenbergen, Univ. Twente (Netherlands);
Lihong V. Wang, Washington Univ. in St. Louis

Coffee Break :3:00 to 3:30 pm

SESSION 5

Room: 206 (Mezzanine) Sun. 3:30 to 4:50 pm

Skin Optics and Dynamics

Session Chair: Kirill V. Larin, Univ. of Houston

3:30 pm: **Temperature dependence of the optical properties of skin in vivo** (*Invited Paper*), Anna N. Yaroslavsky, Wellman Ctr. for Photomedicine (USA); Elena Salomatina, Massachusetts General Hospital (USA)[7563-31]

3:50 pm: **A gel-based skin and blood flow model for doppler optical coherence tomography (DOCT) imaging system** (*Invited Paper*), Kate Lawlor, Enock Jonathan, Martin J. Leahy, University of Limerick (Ireland)[7563-23]

4:10 pm: **Three dimensional dynamics of temperature fields in phantoms and biotissue under IR laser photothermal therapy using gold nanoparticles and ICG dye.**, Georgy G. Akchurin, Akchurin G. Garif, Maksimova L. Irina, Skaptsov A. Alexander, Jr., Saratov State University (Russian Federation); Terentyuk S. Georgy, Sr., First Veterinary Clinic (Russian Federation); Boris N. Khlebtsov, Sr., Institute of Biochemistry and Physiology of Plants (Russian Federation); Nikolai G. Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation); Valery V. Tuchin, Saratov State University (Russian Federation)[7563-27]

4:30 pm: **Measuring temporal autocorrelation functions and dermal perfusion using laser speckle contrast with multiple exposures**, Oliver B. Thompson, Industrial Research Ltd. (New Zealand) and Auckland Bioengineering Institute (New Zealand); Michael K. Andrews, Industrial Research Ltd. (New Zealand)[7563-07]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Analysis and modification of estimate error in optical properties measurement with the double-integrating-spheres system, Chenxi Li, Tianjin Univ. (China); Qiuyin Wang, Zhenzhi Shi, Tianjin University (China); Yunhan Luo, Jinan Univ. (China); Huijuan Zhao, Tianjin University (China); Kexin Xu, Tianjin Univ. (China)[7563-20]

Study of optical clearing effects by using tissue-like phantom, Jingying Jiang, Wei Chen, Qiliang Gong, Tianjin Univ. (China); Ruikang K. Wang, Origen Health and Science University (USA); Kexin Xu, Tianjin Univ. (China)[7563-21]

Design and development of an optimized TiVi light source for detection of oxygenated and deoxygenated haemoglobin, Susan D. Mc Elligott, University of Limerick, Limerick (Ireland); Paul M. McNamara, Univ. of Limerick (Ireland)[7563-22]

Study of the structural dynamics of proteins by the method of energy transfer., Andrey G. Melnikov, Saratov State University (Russian Federation)[7563-24]

Characterization of renal blood flow regulation using the discrete wavelet transform, Alexey N. Pavlov, Olga N. Pavlova, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Erik Mosekilde, Olga V. Sosnovtseva, Technical University of Denmark (Denmark)[7563-25]

Optical clearing of human dura mater by glucose solution, Alexey N. Bashkatov, Elina A. Genina, Yury P. Sinichkin, Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation)[7563-28]

OCT monitoring of diffusion of clearing agents within tooth dentin, Natalia A. Trunina, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Valery V. Tuchin, University (Russian Federation); Vladislav V. Lychagov, Saratov State University (Russian Federation)[7563-29]

Fat tissue staining and photodynamic/photothermal effects, Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Insitute of Precise Mechanics and Control (Russian Federation); Gregory B. Altshuler, Palomar Medical Technologies, Inc. (USA); Irina Y. Yanina, Georgy V. Simonenko, N.G. Chernyshevsky Saratov State Univ. (Russian Federation)[7563-30]

Tissue Viability (TiVi) imaging: following effects of local occlusion on the volar forearm, Paul M. McNamara, Jim O'Doherty, Marie-Louise O'Connell, Barry W. Fitzgerald, Chris D. Anderson, Univ. of Limerick (Ireland); Gert E. Nilsson, Univ. Hospital Linköping (Sweden); Rani Toll, Martin J. Leahy, Univ. of Limerick (Ireland)[7563-32]

Quantitative optical evaluation of malignancy risk related to cutaneous phototype, Ekaterina G. Borisova, Latchezar A. Avramov, Institute of Electronics (Bulgaria); Petya E. Pavlova, Technical Univ. Sofia (Bulgaria); Elmira N. Pavlova, Petranka Troyanova, National Oncological Ctr. (Bulgaria)[7563-33]

BIOS

Photons Plus Ultrasound: Imaging and Sensing 2010

Conference Chairs: **Alexander A. Oraevsky**, Fairway Medical Technologies, Inc.; **Lihong V. Wang**, Washington Univ. in St. Louis

Program Committee: **Mark A. Anastasio**, Illinois Institute of Technology; **Paul C. Beard**, Univ. College London (United Kingdom); **Claude Boccara**, Ecole Supérieure de Physique et de Chimie Industrielles (France); **Gerald J. Diebold**, Brown Univ.; **Charles A. DiMarzio**, Northeastern Univ.; **Stanislav Y. Emelianov**, The Univ. of Texas at Austin; **Rinat O. Esenaliev**, The Univ. of Texas Medical Branch at Galveston; **Martin Frenz**, Univ. Bern (Switzerland); **Steven L. Jacques**, Oregon Health & Science Univ.; **Robert A. Kruger**, OptoSonics, Inc.; **Pai-Chi Li**, National Taiwan Univ. (Taiwan); **Andreas Mandelis**, Univ. of Toronto (Canada); **Matthew O'Donnell**, Univ. of Washington; **Günther Paltauf**, Karl-Franzens-Univ. Graz (Austria); **Wiendelt Steenbergen**, Univ. Twente (Netherlands); **William M. Whelan**, Univ. of Prince Edward Island (Canada); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences; **Quing Zhu**, Univ. of Connecticut

Sunday 24 January

Introductory Remarks and Historical Overview

Room: 305 (Esplanade) Sun. 8:10 to 8:40 am

Session Chairs: **Alexander A. Oraevsky**, Fairway Medical Technologies, Inc.; **Lihong V. Wang**, Washington Univ. in St. Louis
 8:10 am: **Photons plus ultrasound: devices and systems bringing molecular sensitivity to ultrasound imaging** (*Invited Paper*), Matthew O'Donnell, Univ. of Washington (USA)[7564-134]

SESSION 1

Room: 305 (Esplanade) Sun. 8:40 to 10:10 am

Flow and Dynamic Imaging

Session Chairs: **Alexander A. Oraevsky**, Fairway Medical Technologies, Inc.; **Lihong V. Wang**, Washington Univ. in St. Louis
 8:40 am: **Transverse flow velocity measurement with photoacoustic Doppler bandwidth broadening**, Junjie Yao, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-01]
 8:55 am: **Ultrasound-array-based realtime photoacoustic microscopy for dynamic 3D imaging in both humans and small animals**, Liang Song, Chulhong Kim, Konstantin Maslov, Washington Univ. in St. Louis (USA); K. Kirk Shung, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-77]
 9:10 am: **Combined photoacoustic and high-frequency power Doppler ultrasound imaging**, Yan Jiang, Tyler Harrison, Janaka Ranasinghesagara, Roger Zemp, Univ. of Alberta (Canada)[7564-03]
 9:25 am: **Dynamic optical angiography of mouse anatomy using radial projections**, Robert A. Kruger, Richard B. Lam, Daniel R. Reinecke, Stephen P. DelRio, OptoSonics, Inc. (USA); Michael M. Thornton, Paul A. Picot, Timothy G. Morgan, Endra, Inc. (USA)[7564-04]
 9:40 am: **Serial determination of HIF-mediated multistage angiogenesis and microvascular network elaboration using optical-resolution photoacoustic microscopy**, Song Hu, Sunday Oladipupo, Junjie Yao, Andrea C. Santeford, Konstantin Maslov, Joanna Kovalski, Jeffrey M. Arbeit, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-05]
 9:55 am: **In vivo photoacoustic imaging of the vascular response to brain electrical stimulation**, Vassiliy Tsytarev, Song Hu, Junjie Yao, Christopher P. Favazza, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-06]
 Coffee Break10:10 to 10:35 am

SESSION 2

Room: 305 (Esplanade) Sun. 10:35 am to 12:05 pm

Intravascular and Endoscopic Imaging

Session Chairs: **Stanislav Y. Emelianov**, The Univ. of Texas at Austin; **Matthew O'Donnell**, Univ. of Washington
 10:35 am: **Integrated catheter for intravascular ultrasound and photoacoustic imaging**, Andrei B. Karpouk, Bo Wang, Stanislav Emelianov, The Univ. of Texas at Austin (USA)[7564-07]
 10:50 am: **Design and fabrication of an integrated intravascular ultrasound/photoacoustic scan head**, Bao-Yu Hsieh, National Taiwan Univ. (Taiwan); Sung-Liang Chen, Tao Ling, L. Jay Kuo, Univ. of Michigan (USA); Pai-Chi Li, National Taiwan Univ. (Taiwan)[7564-08]
 11:05 am: **Intravascular photoacoustic imaging of macrophages using molecular targeted gold nanoparticles: ex vivo study**, Bo Wang, Veronika Sapozhnikova, The Univ. of Texas at Austin (USA); James Amirian, The Univ. of Texas Health Science Ctr. at Houston (USA); Silvio H. Litovsky, The Univ. of Alabama at Birmingham (USA); Richard Smalling, The Univ. of Texas Health Science Ctr. at Houston (USA); Konstantin Sokolov, The Univ. of Texas at Austin (USA) and University of Texas M.D. Anderson Cancer Center (USA); Stanislav Emelianov, The Univ. of Texas at Austin (USA)[7564-09]
 11:20 am: **Application of limited-view image reconstruction to intravascular photoacoustic tomography**, Yae-Lin Sheu, Cheng-Ying Chou, Bao-Yu Hsieh, Pai-Chi Li, National Taiwan Univ. (Taiwan)[7564-10]
 11:35 am: **Photoacoustic imaging of lipid rich plaques in human aorta**, Thomas J. Allen, Paul C. Beard, Univ. College London (United Kingdom)[7564-11]
 11:50 am: **Volumetric photoacoustic endoscopy of internal organs**, Joon-Mo Yang, Konstantin Maslov, Washington Univ. in St. Louis (USA); Hao-Chung Yang, Ruimin Chen, Qifa Zhou, K. Kirk Shung, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-12]
 Lunch/Exhibition Break12:05 to 1:30 pm

SESSION 3

Room: 305 (Esplanade) Sun. 1:30 to 3:15 pm

Algorithms and Models

Session Chairs: **Mark A. Anastasio**, Illinois Institute of Technology; **Robert A. Kruger**, OptoSonics, Inc.
 1:30 pm: **Extracting quantitative information from photoacoustic images**, Benjamin T. Cox, Jan G. Laufer, Paul C. Beard, Univ. College London (United Kingdom)[7564-13]
 1:45 pm: **Monte Carlo modeling for photoacoustic-based transport-regime optical property estimation**, Janaka C. Ranasinghesagara, Roger J. Zemp, Univ. of Alberta (Canada)[7564-14]
 2:00 pm: **Photon propagation correction in 3D photoacoustic imaging using Monte Carlo simulation**, Keith M. Stantz, Purdue Univ. (USA)[7564-15]
 2:15 pm: **Photoacoustic image reconstruction for linear scanning geometry using particle swarm optimization with a K-space simulation scheme**, Yae-Lin Sheu, Weichung Wang, Yukai Hung, Pai-Chi Li, National Taiwan Univ. (Taiwan)[7564-16]
 2:30 pm: **k-Wave: a MATLAB toolbox for photoacoustic simulation and image reconstruction**, Bradley E. Treeby, Ben T. Cox, Univ. College London (United Kingdom)[7564-17]

2:45 pm: **Compressed sensing in photoacoustic tomography with in vivo experiments**, Zijian Guo, Changhui Li, Liang Song, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-18]

3:00 pm: **Prediction of sensitivity thresholds in optoacoustic tomography**, Daniel Razansky, John Baeten, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München, GmbH (Germany)[7564-20]
Coffee Break3:15 to 3:35 pm

SESSION 4

Room: 305 (Esplanade) Sun. 3:35 to 5:20 pm

Novel Detectors and Methods

Session Chairs: Günther Paltauf, Karl-Franzens-Univ. Graz (Austria); Wiendelt Steenbergen, Univ. Twente (Netherlands)

3:35 pm: **Polymer fiber detectors for photoacoustic imaging**, Hubert Grün, Thomas Berer, RECENDT GmbH (Austria); Günther Paltauf, Karl-Franzens-Univ. Graz (Austria); Peter Burgholzer, RECENDT GmbH (Austria)[7564-21]

3:50 pm: **Novel Fiber Optic Interferometric Sensors for Optoacoustic Imaging**, Horacio R. Lamela, Daniel Gallego, Univ. Carlos III de Madrid (Spain); Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (USA)[7564-22]

4:05 pm: **Image reconstruction in photoacoustic tomography using integrating detectors accounting for frequency-dependent attenuation**, Peter Burgholzer, Johannes Bauer-Marschallinger, RECENDT GmbH (Austria); Guenther Paltauf, Karl-Franzens-Univ. Graz (Austria)[7564-23]

4:20 pm: **Compensation for transducer effects in optoacoustic tomography**, Kun Wang, Mark A. Anastasio, Illinois Institute of Technology (USA); Sergey Ermilov, Hans-Peter Brecht, Richard Su, Alexander Oraevsky, Fairway Medical Technologies, Inc. (USA)[7564-24]

4:35 pm: **Using a phase contrast imaging method in photoacoustic tomography**, Robert Nuster, Karl-Franzens-Univ. Graz (Austria); Markus Haltmeier, Gerhard Zangerl, Otmar Scherzer, Univ. Innsbruck (Austria); Guenther Paltauf, Karl-Franzens-Univ. Graz (Austria)[7564-25]

4:50 pm: **Improved contrast optoacoustic imaging of deep breast tumors using displacement-compensated averaging: Phantom studies**, Michael Jaeger, Stefan Preisser, Martin Frenz, Univ. Bern (Switzerland)[7564-26]

5:05 pm: **Sparse signal representation at the service of quantitative optoacoustic tomography**, Amir Rosenthal, Daniel Razansky, Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany)[7564-27]

5:20 pm: **The integration of photoacoustic imaging and high intensity focused ultrasound**, Huizhong Cui, Jacob Staley, Xinmai Yang, The Univ. of Kansas (USA)[7564-28]

Monday 25 January

SESSION 5

Room: 305 (Esplanade) Mon. 8:10 to 10:10 am

3D Microscopy

Session Chairs: Paul C. Beard, Univ. College London (United Kingdom); Lihong V. Wang, Washington Univ. in St. Louis

8:10 am: **Simultaneous photoacoustic tomography and microscopy based on Fabry-Perot polymer film ultrasound sensors**, Paul C. Beard, Edward Zhang, Univ. College London (United Kingdom)[7564-29]

8:25 am: **Photoacoustic micro-tomography: system characterization and first results on biological specimens**, Günther Paltauf, Robert Nuster, Karl-Franzens-Univ. Graz (Austria); Markus Holotta, Innsbruck Medical Univ. (Austria); Harald Grossauer, Leopold-Franzens-Univ. Innsbruck (Austria)[7564-30]

8:40 am: **Photoacoustic microscopy with submicron resolution**, Konstantin Maslov, Geng Ku, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-31]

8:55 am: **High repetition rate passively Q-switched fiber and microchip lasers for optical resolution photoacoustic imaging**, Wei Shi, Ilya Utkin, Janaka Ranasinghesagara, Lei Pan, Yogesh Godwal, Roger J. Zemp, Robert Fedosejevs, Univ. of Alberta (Canada)[7564-32]

9:10 am: **Fine-resolution photoacoustic imaging of the eye**, Ronald H. Silverman, Weill Cornell Medical College (USA) and Riverside Research Institute (USA); Ying-Chih Chen, Fanting Kong, Hunter College, CUNY (USA); Harriet O. Lloyd, Weill Cornell Medical College (USA)[7564-33]

9:25 am: **In vivo functional human imaging using photoacoustic microscopy**, Christopher P. Favazza, Konstantin Maslov, Washington Univ. in St. Louis (USA); Lynn A. Cornelius, Washington Univ. School of Medicine (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-34]

9:40 am: **Off-axis photoacoustic microscopy**, Ryan L. Shelton, Brian E. Applegate, Texas A&M Univ. (USA)[7564-35]

9:55 am: **Gigahertz optoacoustic imaging for cellular imaging**, Sankar Narasimhan, Ryerson Univ. (Canada); Wolfgang Bost, Frank Stracke, Fraunhofer-Institut für Biomedizinische Technik (Germany); Eike Weiss, Kibero GmbH (Germany); Robert Lemor, Fraunhofer-Institut für Biomedizinische Technik (Germany); Michael C. Kolios, Ryerson Univ. (Canada)[7564-36]
Coffee Break10:10 to 10:35 am

SESSION 6

Room: 305 (Esplanade) Mon. 10:35 am to 12:05 pm

Contrast Agents and Nanoparticles

Session Chairs: Gerald J. Diebold, Brown Univ.; Pai-Chi Li, National Taiwan Univ. (Taiwan)

10:35 am: **Quantitative photoacoustic measurement of blood oxygen saturation in vivo aided by an optical contrast agent**, Justin R. Rajan, Paul L. Carson, Xueding Wang, Univ. of Michigan (USA)[7564-37]

10:50 am: **Enhanced detection of circulating melanoma cells using gold nanoparticles as photoacoustic contrast agents**, Devin McCormack, Kiran Bhattacharyya, Kattesh Katti, John A. Viator, Univ. of Missouri, Columbia (USA)[7564-38]

11:05 am: **In vivo integrated photoacoustic diagnostic and photothermal therapy of lymphatic system using novel molecular contrast agents**, Ekaterina I. Galanzha, Univ. of Arkansas for Medical Sciences (USA); Jin-Woo Kim, Univ. of Arkansas (USA); Evgeny V. Shashkov, Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (USA)[7564-39]

11:20 am: **Nanoparticle-targeted photoacoustic cavitation for tissue imaging**, James R. McLaughlan, Ronald A. Roy, Todd W. Murray, Boston Univ. (USA)[7564-40]

11:35 am: **Contrast enhancement using magnetic-force-induced motion in photoacoustic imaging**, Congxian Jia, Univ. of Michigan (USA); Sheng-Wen Huang, Yongdong Jin, Chi Hyung Seo, Lingyun Huang, Janet F. Eary, Xiaohu Gao, Matthew O'Donnell, Univ. of Washington (USA)[7564-41]

11:50 am: **Heating of nanoparticle thermal contrast agents at RF frequencies**, Darrin Byrd, George Hanson, Sarah Patch, Univ. of Wisconsin-Milwaukee (USA)[7564-42]
Lunch Break12:05 to 1:30 pm

SESSION 7

Room: 305 (Esplanade) Mon. 1:30 to 3:30 pm

Diagnostic Imaging

Session Chairs: Martin Frenz, Univ. Bern (Switzerland); Alexander A. Oraevsky, Fairway Medical Technologies, Inc.

1:30 pm: **In vivo photoacoustic and ultrasonic mapping of rat sentinel lymph nodes with a modified commercial ultrasound imaging system**, Todd N. Erpelding, Philips Research North America (USA); Chulhong Kim, Manojit Pramanik, Washington Univ. in St. Louis (USA); Zijian Guo, Washington University in St. Louis (USA); John Dean, Ladislav Jankovic, Philips Research North America (USA); Konstantin Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-43]

1:45 pm: **Imaging hypoxia using 3D photoacoustic spectroscopy**, Keith M. Stantz, Purdue Univ. (USA)[7564-44]

2:00 pm: **Multiwavelength photoacoustic imaging of vascular networks in transgenic mice**, Jan G. Laufer, Jon O. Cleary, Edward Z. Zhang, Mark F. Lythgoe, Paul C. Beard, Univ. College London (United Kingdom)[7564-45]

2:15 pm: **Optoacoustic imaging of a prostate cancer model**, Michelle P. Patterson, Michel Arsenault, Univ. of Prince Edward Island (Canada); Chris Riley D.V.M., Atlantic Veterinary College (Canada); Michael Kolios, Ryerson Univ. (Canada); William M. Whelan, Univ. of Prince Edward Island (Canada)[7564-46]

2:30 pm: **Photoacoustic diagnosis of edema in rat burned skin**, Ken Yoshida, Keio Univ. (Japan); Shunichi Sato, Kousuke Hatanaka, Daizoh Saitoh, Hiroshi Ashida, Toshihisa Sakamoto, National Defense Medical College Research Institute (Japan); Minoru Obara, Keio Univ. (Japan)[7564-47]

- 2:45 pm: **Detection and capture of single circulating melanoma cells using photoacoustic flowmetry**, Christine O'Brien, Jeffrey Mosely, John A. Viator, Univ. of Missouri, Columbia (USA)[7564-48]
- 3:00 pm: **Opto-acoustic 13C-breath test analyzer**, Hermann Harde, Guenther Helmrich, Helmut-Schmidt Univ. (Germany); Marcus Wolff, Hamburg Univ. of Applied Sciences (Germany)[7564-49]
- 3:15 pm: **Photoacoustic detection of hemozoin in human blood as an early indicator of malaria infection**, Jonathan Custer, Michael Kariuki, Brenda Beerntsen, John A. Viator, Univ. of Missouri, Columbia (USA)[7564-50]
- Coffee Break 3:30 to 3:55 pm

SESSION 8

Room: 305 (Esplanade)..... Mon. 3:55 to 5:55 pm
Sensing and Characterization

- Session Chairs: Rinat O. Esenaliev, The Univ. of Texas Medical Branch; Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences*
- 3:55 pm: **In vivo photoacoustic detection and photothermal eradication of circulating tumor cells**, Vladimir P. Zharov, Ekaterina I. Galanzha, Evgeny V. Shashkov, Dmitry Nedosekin, Mustafa Sarimollaoglu, Univ. of Arkansas for Medical Sciences (USA); Jin-Woo Kim, Univ. of Arkansas (USA)[7564-51]
- 4:10 pm: **Noninvasive optoacoustic monitoring platform: Clinical studies**, Rinat O. Esenaliev, Yuriy Petrov, Irina Y. H. Petrova, The Univ. of Texas Medical Branch (USA); Claudia S. Robertson M.D., Luciano Ponce, Baylor College of Medicine (USA); Michael Kinsky, Roger Seeton, Nan Henkel, Donald Prough, The Univ. of Texas Medical Branch (USA)[7564-52]
- 4:25 pm: **Novel, focused optoacoustic transducers for accurate monitoring of total hemoglobin concentration and oxyhemoglobin saturation: pre-clinical and clinical tests**, Emanuel Särchen, Irina Y. H. Petrova, Yuriy Y. Petrov, Donald Prough, Rinat O. Esenaliev, The Univ. of Texas Medical Branch (USA)[7564-53]
- 4:40 pm: **Effects of radiation on tumor hemodynamics and NF-kappaB in breast tumors**, Keith M. Stantz, Bo Liu, Purdue Univ. (USA); Minsong Cao, Indiana Univ. School of Medicine (USA); Ning Cao, Purdue Univ. (USA); Helen Chin-Sinex, Marc Mendonca, Indiana Univ. School of Medicine (USA); Jian Jian Li, Univ. of California-Davis (USA)[7564-54]
- 4:55 pm: **Broadband characterization of the ultrasonic attenuation in biological tissues using photoacoustics**, Bradley E. Treeby, Benjamin T. Cox, Univ. College London (United Kingdom)[7564-55]
- 5:10 pm: **Effects of optical energy distribution on the frequency spectrum of laser-induced acoustic waves**, André Conjusteau, Sergey A. Ermilov, Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (USA)[7564-56]
- 5:25 pm: **Toward characterizing the size of microscopic optical absorbers using optoacoustic emission spectroscopy**, Andreas G. Gertsch, Nigel L. Bush, David C. Birtill, Jeffrey Bamber, Institute of Cancer Research (United Kingdom)[7564-57]
- 5:40 pm: **Dynamics of thermoelastic expansion for native and coagulated ex vivo bovine liver tissues**, Behrouz Soroushian, Ryerson Univ. (Canada); William M. Whelan, Univ. of Prince Edward Island (Canada); Michael C. Kolios, Ryerson Univ. (Canada)[7564-58]

POSTER SESSION

Room: 103/104 (Exhibit Level)..... Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

- Novel laser-induced cavitation: the constrained ring bubble**, Paul A. Prentice, Svetlana Zolotovskaya, Edik Rafailov, Univ. of Dundee (United Kingdom)[7564-87]
- Acousto-optical coherence tomography using random phase jumps on ultrasound and light**, Salma Farahi, Max Lesaffre, Ecole Supérieure de Physique et de Chimie Industrielles (France); Michel Gross, Ecole Normale Supérieure (France); Philippe Delaye, Univ. Paris-Sud 11 (France); Claude Boccara, François Ramaz, Ecole Supérieure de Physique et de Chimie Industrielles (France)[7564-88]
- Photoacoustic Correlation Technique for Low-speed Flow Measurement**, Sung-Liang Chen, Tao Ling, Univ. of Michigan (USA); Sheng-Wen Huang, Univ. of Washington (USA); Hyoung Won Baac, Univ. of Michigan (USA); Yu-Chung Chang, National Changhua Univ. of Education (Taiwan); L. J. Guo, Univ. of Michigan (USA)[7564-89]
- Stimulated Raman scattering based photoacoustic microscopy**, Han-Wei Wang, Ning Chai, Purdue Univ. (USA); Song Hu, Lihong V. Wang, Washington Univ. in St. Louis (USA); Robert P. Lucht, Ji-Xin Cheng, Purdue Univ. (USA)[7564-90]
- Evans blue dye-enhanced capillary-resolution photoacoustic microscopy in vivo**, Junjie Yao, Konstantin Maslov, Song Hu, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-91]
- Comparison of ultrasonic medical imaging and multiphoton laser scanning tomography**, Karsten König, Saarland Univ. (Germany); Marco Speicher, Hans G. Breunig, JenLab GmbH (Germany); Martin Kaatz, Univ. Hospital Jena (Germany)[7564-92]
- Intravascular photoacoustic imaging of coronary artery stents**, Jimmy L. Su, Bo Wang, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA)[7564-95]
- Photo-acoustic concave transmitter for generating high frequency focused ultrasound**, Hyoung Won Baac, Tao Ling, Shai Ashekenazi, Sheng-Wen Huang, L. Jay Guo, Univ. of Michigan (USA)[7564-96]
- Design of acoustic 4f imaging system by using an optical microring ultrasound detector**, Hyoung Won Baac, Tao Ling, L. Jay Guo, Univ. of Michigan (USA)[7564-97]
- Frequency-selective multiphoton-excitation-induced photoacoustic imaging to visualize the cross sections of dense objects**, Yoshihisa Yamaoka, Mika Nambu, Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan)[7564-98]
- Photoacoustic and ultrasound imaging contrast enhancement using remotely triggered nanocarriers**, Katherine E. Wilson, Kimberly Homan, Stanislav Emelianov, The Univ. of Texas at Austin (USA)[7564-99]
- Photoacoustic microscopy of collagenase-induced Achilles tendinitis in a mouse model**, Po-Hsun Wang, National Tsing Hua Univ. (Taiwan); Wen-Shiang Chen, National Taiwan Univ. Hospital (Taiwan); Meng-Lin Li, National Tsing Hua Univ. (Taiwan)[7564-100]
- Tissue classification by wavelet modified generic Fourier descriptor and their recognition using hybrid correlator**, Raj B. Yadav, The Univ. of Electro-Communications (Japan); Arun K. Gupta, Instruments Research and Development Establishment (India)[7564-101]
- Reconstruction of photoacoustic tomography with finite-aperture detectors: deconvolution of the spatial impulse response**, Meng-Lin Li, Chung-Chih Cheng, National Tsing Hua Univ. (Taiwan)[7564-102]
- Multispectral photoacoustic microscopy using a photonic crystal fiber supercontinuum source**, Yazan N. Billeh, Imperial College London (United Kingdom); Mengyang Liu, Takashi Burma, Univ. of Delaware (USA)[7564-103]
- Photoacoustic micro-imaging of focused-ultrasound induced blood-brain-barrier opening in a rat model**, Po-Hsun Wang, National Tsing Hua Univ. (Taiwan); Po-Hung Hsu, Hao-Li Liu, Chang Gung Univ. (Taiwan); Chung-Ren C. Wang, National Chung-Cheng Univ. (Taiwan); Meng-Lin Li, National Tsing Hua Univ. (Taiwan)[7564-104]
- Multicolor photoacoustic imaging by a single transducer with piezoelectric copolymer film in a wide frequency range**, Tsutomu Ohmori, Miya Ishihara, Isao Bansaku, Makoto Kikuchi, National Defense Medical College (Japan)[7564-105]

In vivo dual-modality imaging of lymphatic systems using indocyanine green in rats: three-dimensional photoacoustic imaging and planar fluorescence imaging. Chulhong Kim, Kwang Hyun Song, Lihong V. Wang, Washington Univ. in St. Louis (USA) [7564-106]

Monte Carlo simulations of acousto-optics with microbubbles. Terence S. Leung, Jack Honeysett, Eleanor Stride, Paul Beard, Univ. College London (United Kingdom). [7564-107]

Photoacoustic tomography of pathological tissue in ex vivo mouse hearts. Markus Holotta, Innsbruck Medical Univ. (Austria); Harald Grossauer, Leopold-Franzens-Univ. Innsbruck (Austria); Christian Kremser, Pavle Torbica, Jakob Vökl, Regina Esterhammer M.D., Innsbruck Medical Univ. (Austria); Robert Nuster, Günther Paltauf, Karl-Franzens-Univ. Graz (Austria); Werner Jaschke M.D., Innsbruck Medical Univ. (Austria) [7564-108]

Ultrasound-modulated optical tomography using amplitude modulated ultrasound signals. Rui Li, Lippei Song, Daniel Elson, Christopher Dunsby, Robert Eckersley, Mengxing Tang, Imperial College London (United Kingdom). [7564-109]

Multiparametric optimization of multispectral opto-acoustic tomography for deep tissue imaging. Nikolaos C. Deliolanis, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany); Lu Ding, Helmholtz Zentrum München (Germany) and Technische Univ. München (Germany); Adrian Taruttis, Amir Rosenthal, Daniel Razansky, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany). [7564-110]

Photoacoustic quantification of the optical absorption cross-sections of gold nanostructures. Chulhong Kim, Eun Chul Cho, Washington Univ. in St. Louis (USA); Fei Zhou, Institute of Physics, CAS (China); Claire M. Cobley, Kwang Hyun Song, Jingyi Chen, Washington Univ. in St. Louis (USA); Zhi-Yuan Li, Institute of Physics, CAS (China); Younan Xia, Lihong V. Wang, Washington Univ. in St. Louis (USA) [7564-111]

Optimization of the acousto-optic signal detection in cylindrical and hemispherical geometries: from transmission to reflection. Sonny Gunadi, Clare E. Elwell, Paul C. Beard, Terence S. Leung, Univ. College London (United Kingdom). [7564-112]

Characterization of a 2D sparse detector array for analysis via singular value decomposition. Michael Roumeliotis, Pinhas Ephrat, Andrea Immucci, Jeffrey J. Carson, Lawson Health Research Institute (Canada) [7564-113]

Combined photoacoustic and magneto-motive ultrasound imaging. Min Qu, Mohammad Mehrmohammadi, Srivalleesha Mallidi, The Univ. of Texas at Austin (USA); Pratixa Joshi, The Univ. of Texas Health Science Ctr. at Houston (USA); Yun-Sheng Chen, Kimberly Homan, Stanislav Emelianov, The Univ. of Texas at Austin (USA) [7564-114]

Comparison of reconstruction algorithms for sparse-array detection photoacoustic tomography. Govind Chaudhary, Mark A. Anastasio, Illinois Institute of Technology (USA); Michael Roumeliotis, Jeffrey J. L. Carson, The Univ. of Western Ontario (Canada) [7564-115]

Evaluation of Her2 status using photoacoustic spectroscopic CT techniques. Michael R. Shaffer, Ning Cao, Purdue Univ. (USA); Helen J. Chin-Sinex, Marc S. Mendonca, Indiana Univ. School of Medicine (USA); Robert Kruger, OptoSonics, Inc. (USA); Keith Stantz, Purdue Univ. (USA) . . . [7564-116]

Fluorescence response to hydrostatic pressure using fluorophore-quencher labeled microbubbles. Baohong Yuan, Patrick M. Mehl, Yuan Liu, The Catholic Univ. of America (USA). [7564-117]

Biodegradable plasmonic nanoclusters as contrast agent for photoacoustic imaging. Soon Joon Yoon, Jasmine Tam, Justina Tam, Avinash Murthy, Pratixa Joshi, Srivalleesha Mallidi, Keith Johnston, The Univ. of Texas at Austin (USA); Konstantin Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Stanislav Emelianov, The Univ. of Texas at Austin (USA) . . [7564-118]

Characterization of sparse-array detection photoacoustic tomography using the singular value decomposition. Govind Chaudhary, Illinois Institute of Technology (USA); Michael Roumeliotis, Pinhas Ephrat, Robert Z. Stodilka, Jeffrey J. L. Carson, The Univ. of Western Ontario (Canada); Mark A. Anastasio, Illinois Institute of Technology (USA). [7564-119]

Monitor hemoglobin concentration and oxygen saturation in living mouse tail using Photoacoustic CT scanner. Bo Liu, Keith M. Stantz, Purdue Univ. (USA); Robert Kruger, Daniel Reinecke, OptoSonics, Inc. (USA) [7564-120]

Ex vivo hemoglobin status study using photoacoustic computed tomography small animal scanner. Bo Liu, Keith M. Stantz, Purdue Univ. (USA); Robert A. Kruger, Daniel R. Reinecke, OptoSonics, Inc. (USA) . [7564-121]

In vivo multimodality photoacoustic tracking of prostate tumor growth using a window chamber. Daniel R. Bauer, Ragnar Olafsson, The Univ. of Arizona (USA); Leonardo G. Montilla, College of Optical Sciences, The Univ. of Arizona (USA); Russell Witte, The Univ. of Arizona (USA) [7564-122]

Real-Time Pulse Echo and Photoacoustic Imaging Using an Ultrasound Array and Inline Reflective Illumination. Leonardo G. Montilla, College of Optical Sciences, The Univ. of Arizona (USA); Ragnar Olafsson, Russell Witte, The Univ. of Arizona (USA) [7564-123]

In vivo detection of amyloid-beta deposits by optical-resolution photoacoustic microscopy. Song Hu, Ping Yan, Konstantin Maslov, Jin-Moo Lee, Lihong V. Wang, Washington Univ. in St. Louis (USA) [7564-124]

In vivo photoacoustic microscopy of anterior ocular segment in small animals. Bin Rao, Song Hu, Li Li, Konstantin Maslov, Lihong Wang, Washington Univ. at St. Louis (USA) [7564-125]

In vivo functional photoacoustic micro-imaging of the electrically stimulated rat brain with multiwavelengths. Lun-De Liao, National Chiao Tung Univ. (Taiwan); Meng-Lin Li, National Tsing Hua Univ. (Taiwan); Hsin-Yi Lai, You-Yin Chen, Paul C.-P. Chao, National Chiao Tung Univ. (Taiwan); Po-Hsun Wang, National Tsing Hua Univ. (Taiwan) [7564-126]

Photoacoustic characterization of human ovarian tissue. Andres Aguirre, Yasaman Ardeshipour, Univ. of Connecticut (USA); Mary M. Sanders, Molly Brewer, Univ. of Connecticut Health Ctr. (USA); Quing Zhu, Univ. of Connecticut (USA) [7564-127]

Photoacoustic tomography of foreign bodies in soft biological tissue. Xin Cai, Chulhong Kim, Manojit Pramanik, Lihong V. Wang, Washington Univ. in St. Louis (USA) [7564-128]

Optoacoustic visualization of HIFU-induced thermal lesions in live tissue. Parag V. Chitnis, Riverside Research Institute (USA); Hans-Peter Brecht, Richard Su, Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (USA) [7564-129]

Effect of ultrasound transducer color on light fluence distribution in photoacoustic imaging. Behnoosh Tavakoli, Patrick D. Kumavor, Andres Aguirre, Quing Zhu, Univ. of Connecticut (USA) [7564-130]

Background reduction in optoacoustic imaging based on tissue deformation: Quantitative analysis. Michael Jaeger, Stefan Preisser, Martin Frenz, Univ. Bern (Switzerland) [7564-131]

Photothermoacoustic imaging comparison of pulsed laser and frequency-domain (radar) modalities: signal-to-noise ratio, contrast, and resolution enhancement using nonlinear chirp modulation. Sergey A. Telenkov, Bahman Lashkari, Andreas Mandelis, Univ. of Toronto (Canada) [7564-144]

Wavelength-modulated differential photothermal radiometry for non-invasive blood glucose detection. X. Guo, A. Mandelis, A. Matvienko, K. Sivagurunathan, B. Zinman, Univ. of Toronto (Canada) [7564-145]

Tuesday 26 January

SESSION 9

Room: 305 (Esplanade). Tues. 8:10 to 10:10 am

Molecular Imaging

Session Chairs: **Vasilis Ntziachristos**, Massachusetts General Hospital; **William M. Whelan**, Univ. of Prince Edward Island (Canada)

8:10 am: **Molecular imaging of NPR-1 using photoacoustic spectroscopy.** Keith M. Stantz, Purdue Univ. (USA); Minsong Cao, Indiana Univ. School of Medicine (USA); Bo Liu, Purdue Univ. (USA); Robert Kruger, OptoSonics, Inc (USA); Kathy D. Miller, Indiana Univ. School of Medicine (USA); Lili Guo, Eli Lilly and Co. (USA) [7564-59]

8:25 am: **Multiwavelength approach to quantitative photoacoustic molecular imaging (PMI) using the Cramer-Rao lower bound.** Dimple Modgil, Patrick J. La Riviere, The Univ. of Chicago (USA) [7564-60]

8:40 am: **Stability of molecular therapeutic agents for noninvasive photoacoustic and ultrasound image-guided photothermal therapy.** Yun-Sheng Chen, Pratixa P. Joshi, Seungsoo Kim, Kimberly Homan, Wolfgang Frey, The Univ. of Texas at Austin (USA); Konstantin Sokolov, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Stanislav Emelianov, The Univ. of Texas at Austin (USA) [7564-61]

8:55 am: **Fluorescent protein imaging with multispectral optoacoustic tomography.** Daniel Razansky, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Martin Distel, Helmholtz Zentrum München GmbH (Germany); Claudio Vinegoni, Harvard Medical School (USA); Reinhard Koester, Helmholtz Zentrum München (Germany); Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany). [7564-62]

9:10 am: **Design and synthesis of new gold nanoparticles for enhanced photoacoustic response**, Chen-Wei Wei, National Taiwan Univ. (Taiwan); Carolina Poe, Chi-Meng Chen, National Chung-Cheng Univ. (Taiwan); Churng-Ren C. Wang, National Chung Cheng Univ. (Taiwan); Pai-Chi Li, National Taiwan Univ. (Taiwan)[7564-63]

9:25 am: **In vitro imaging of a protease-sensitive optoacoustic molecular imaging agent**, Anthony Green, The Univ. of Chicago (USA); Zhixing Xie, Hao F. Zhang, Univ. of Wisconsin-Milwaukee (USA); Patrick J. La Riviere, The Univ. of Chicago (USA)[7564-64]

9:40 am: **Multi-wavelength photoacoustic imaging for monitoring nano-molecular interactions in-vivo**, Srivalleesha Mallidi, Andrei Karpiouk, Seungsoo Kim, Pratixa Joshi, Konstantin Sokolov, Stanislav Emelianov, The Univ. of Texas at Austin (USA)[7564-65]

9:55 am: **Molecular photoacoustic imaging using targeted gold nanoparticles as a contrast agent**, Chulhong Kim, Eun Chul Cho, Jingyi Chen, Kwang Hyun Song, Leslie Au, Christopher P. Favazza, Qiang Zhang, Claire M. Copley, Younan Xia, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-66]

Coffee Break 10:10 to 10:35 am

SESSION 10

Room: 305 (Esplanade). Tues. 10:35 am to 12:05 pm

Multimodality Imaging

Session Chairs: **Stanislav Y. Emelianov**, The Univ. of Texas at Austin; **Martin Frenz**, Univ. Bern (Switzerland)

10:35 am: **Real-time optoacoustic imaging of breast cancer using an interleaved two laser imaging system coredgistered with ultrasound**, Matthew P. Fronheiser, Seno Medical Instruments, Inc. (USA); Sergey A. Ermilov, Fairway Medical Technologies (USA); Hans-Peter Brecht, Richard Su, André Conjusteau, Ketan Mehta, Fairway Medical Technologies, Inc. (USA); Pamela Otto, The Univ. of Texas Health Science Ctr. at Houston (USA); Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (USA)[7564-67]

10:50 am: **Fast-scanning ultrasonic-photoacoustic biomicroscope: in vivo performance**, Tyler Harrison, Huihong Lu, Janaka Ranasinghesagara, Roger J. Zemp, Univ. of Alberta (Canada)[7564-68]

11:05 am: **Tissue temperature monitoring using thermoacoustic and photoacoustic techniques**, Manojit Pramanik, Washington Univ. in St. Louis (USA); Todd N. Erpelding, Ladislav Jankovic, Philips Research North America (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-69]

11:20 am: **Fast-scanning reflection-mode integrated optical-coherence and photoacoustic microscopy**, Li Li, Bin Rao, Konstantin Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-70]

11:35 am: **Simultaneous photo- and thermoacoustic CT of mouse anatomy**, Robert A. Kruger, Richard B. Lam, Stephen P. DelRio, Daniel R. Reinecke, OptoSonics, Inc. (USA)[7564-71]

11:50 am: **Integrated photoacoustic and oblique incidence diffuse reflectance for quantitative optical sensing in turbid media**, Janaka C. Ranasinghesagara, Roger J. Zemp, Univ. of Alberta (Canada)[7564-72]

Lunch Break 12:05 to 1:30 pm

SESSION 11

Room: 305 (Esplanade). Tues. 1:30 to 3:30 pm

Computed Tomography

Session Chairs: **Steven L. Jacques**, Oregon Health & Science Univ.; **Mark A. Anastasio**, Illinois Institute of Technology

1:30 pm: **In vivo 3D visualization of peripheral circulatory system using linear optoacoustic array**, Sergey A. Ermilov, Fairway Medical Technologies, Inc. (USA); Matthew P. Fronheiser, Seno Medical Instruments, Inc. (USA); Richard Su, Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (USA)[7564-73]

1:45 pm: **Functional Imaging using the Optoacoustic 3D Whole-Body Tomography system**, Hans-Peter F. Brecht, Richard Su, André Conjusteau, Sergey A. Ermilov, Fairway Medical Technologies, Inc. (USA); Matthew P. Fronheiser, Seno Medical Instruments, Inc. (USA); Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (USA)[7564-74]

2:00 pm: **A high-speed photoacoustic tomography system based on a commercial ultrasound and a custom transducer array**, Xueding Wang, J. Brian Fowlkes, Paul Carson, David Chamberland, Univ. of Michigan (USA); Larry Mo, Derek DeBusschere, ZONARE Medical Systems, Inc. (USA); Changhong Hu, Jonathan Cannata, The Univ. of Southern California (USA)[7564-75]

2:15 pm: **In Vivo optoacoustic 3D whole-body measurement using a commercial ultrasound scanner: Experiments in nude mice**, Stefan Preisser, Michael Jaeger, Martin Frenz, Univ. Bern (Switzerland)[7564-76]

2:30 pm: **Pulsed photoacoustic Doppler flowmetry using a cross correlation method**, Joanna Brunker, Paul Beard, Univ. College London (United Kingdom)[7564-02]

2:45 pm: **Real-time monitoring of small animal cortex hemodynamics by photoacoustic tomography**, Changhui Li, Washington Univ. in St. Louis (USA); Andres Aquirre, John Gamelin, Qing Zhu, Univ. of Connecticut (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA)[7564-78]

3:00 pm: **Point spread function of arc-array transducers in 2D optoacoustic tomography**, Ivan M. Pelivanov, Lomonosov Moscow State Univ. (Russian Federation); Tatiana D. Khokhlova, Univ. of Washington (USA); Varvara A. Simonova, Alexander A. Karabutov, Lomonosov Moscow State Univ. (Russian Federation)[7564-79]

3:15 pm: **Continuous acquisition scanner for whole-body multispectral optoacoustic tomography**, Rui Ma, Vasilis Ntzichristos, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany)[7564-80]

Coffee Break 3:30 to 3:55 pm

SESSION 12

Room: 305 (Esplanade). Tues. 3:55 to 5:25 pm

Novel Systems and Applications

Session Chairs: **Claude Boccara**, Ecole Supérieure de Physique et de Chimie Industrielles (France); **Charles A. DiMarzio**, Northeastern Univ.

3:55 pm: **Spatial resolution of ultrasound-modulated optical tomography used for the detection of absorbing and scattering objects in thick scattering media**, Guy Rousseau, Alain Blouin, Jean-Pierre Monchalin, National Research Council Canada (Canada)[7564-81]

4:10 pm: **Real-time monitoring of high intensity focused ultrasound therapy using acousto-optic imaging**, Puxiang Lai, Andrew Draudt, Robin O. Cleveland, Todd W. Murray, Ronald A. Roy, Boston Univ. (USA)[7564-82]

4:25 pm: **Ultrasound-modulated fluorescence**, Baohong Yuan, Patrick M. Mehl, Yuan Liu, Joseph Vignola, The Catholic Univ. of America (USA) .[7564-83]

4:40 pm: **Polarization effects in thermoacoustic CT of biologic tissue at 434 MHz**, Robert A. Kruger, Richard B. Lam, Daniel R. Reinecke, Stephen P. DelRio, OptoSonics, Inc. (USA)[7564-84]

4:55 pm: **Femtosecond Photoacoustics**, Martijn E. van Raaij, Bojana Stefanovic, F. Stuart Foster, Sunnybrook Health Sciences Ctr. (Canada)[7564-85]


5:10 pm: **Photothermal phase imaging of semiconducting and metallic nanomaterials**, Yookyung Jung, Chen Yang, Ji-Xin Cheng, Purdue Univ. (USA)[7564-86]

Best Oral and Poster Presentation Award

Room: 305 (Esplanade) Tues. 5:25 to 5:55 pm

Session Chairs: **Alexander A. Oraevsky**, Fairway Medical Technologies, Inc.; **Lihong V. Wang**, Washington Univ. in St. Louis

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Biophotonics and Immune Responses V

Conference Chair: **Wei R. Chen**, Univ. of Central Oklahoma

Program Committee: **Samuel Achilefu**, Washington Univ. School of Medicine in St. Louis; **Gianfranco L. Canti**, Univ. degli Studi di Milano (Italy); **Yuncheng Ge**, Beijing Glass Research Institute (China); **Sandra O. Gollnick**, Roswell Park Cancer Institute; **Tomas Lars Mikael Hode**, ImmunoPhotonics, Inc.; **Michael R. Hamblin**, Massachusetts General Hospital; **Zheng Huang**, Univ. of Colorado at Denver and Health Sciences Ctr.; **Mladen Korbelik**, British Columbia Cancer Agency (Canada); **Mark F. Naylor**, Univ. of Oklahoma; **Karl-Goran Tranberg**, Lund Univ. (Sweden); **Xunbin Wei**, Fudan Univ. (China); **Xing Da**, South China Normal Univ. (China); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences

Monday 25 January

SESSION 1

Room: 208/210 (Mezzanine) Mon. 9:00 to 10:20 am

PDT and Immune Responses

Session Chairs: **Mladen Korbelik**, The BC Cancer Research Ctr. (Canada); **Michael R. Hamblin**, Massachusetts General Hospital

9:00 am: **Tumor PDT-associated immune response: relevance of sphingolipids** (*Invited Paper*), Mladen Korbelik, Soroush Merchant, British Columbia Cancer Agency (Canada); Duska Separovic, Wayne State Univ. (USA) [7565-01]

9:30 am: **Photodynamic therapy for cancer and activation of immune response** (*Invited Paper*), Michael R. Hamblin, Pawel Mroz, Massachusetts General Hospital (USA) [7565-02]

10:00 am: **Can the dendritic cells see light?**, Aaron Chen, Wellman Ctr. for Photomedicine (USA); Roger W. Sands, Harvard Univ. (USA); Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) [7565-03]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 208/210 (Mezzanine) Mon. 10:50 am to 12:10 pm

Photoimmunotherapy: Clinical

Session Chairs: **Mark F. Naylor**, Univ. of Oklahoma; **Murad Alam**, Northwestern Univ.

10:50 am: **In-situ photoimmunotherapy: a tumor-directed approach to the treatment of advanced melanoma with cutaneous metastases: preliminary data** (*Invited Paper*), Murad Alam, Stephanie A. St. Pierre, Jenneé Rommel, Northwestern Univ. (USA); Ana M. Ciurea, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Douglas Fife, Mary Martini, Simon S. Yoo, Timothy Kuzel, Jeffrey Wayne, Alfred Rademaker, Dennis P. West, Northwestern Univ. (USA) [7565-04]

11:20 am: **Preliminary results of a phase I/II clinical trial using in situ photoimmunotherapy combined with imiquimoid for metastatic melanoma patients** (*Invited Paper*), Xiaosong Li, Chinese PLA General Hospital (China) and Univ. of Central Oklahoma (USA); Wei R. Chen, Univ. of Central Oklahoma (USA); Mark F. Naylor, Univ. of Oklahoma (USA); Robert E. Nordquist, Wound Healing of Oklahoma (USA) [7565-05]

11:50 am: **Laser-assisted immunotherapy: initial results from a phase II human breast cancer trial**, Maria Guerra, Immunophotonics Inc. (USA); John A. Lunn, International Strategic Cancer Alliance (USA); Wei R. Chen, Univ. of Central Oklahoma (USA); Tomas Hode, Immunophotonics Inc. (USA); Orn Adelsteinsson, International Strategic Cancer Alliance (USA); Robert E. Nordquist, Immunophotonics Inc. (USA) [7565-06]

Lunch Break 12:10 to 2:00 pm

SESSION 3

Room: 208/210 (Mezzanine) Mon. 2:00 to 3:40 pm

Photoimmunotherapy: Pre-clinical

Session Chairs: **Wei R. Chen**, Univ. of Central Oklahoma; **Ekaterina I. Galanzha**, Univ. of Arkansas for Medical Sciences

2:00 pm: **Effect of laser immunotherapy and surgery in the treatment of mouse mammary tumors**, Vivian A. Chen, Henry Le, Univ. of Central Oklahoma (USA); Xiaosong Li, Chinese PLA General Hospital (China) and Univ. of Central Oklahoma (USA); Akhee Sarkar, Halie Ferguson, Univ. of Central Oklahoma (USA); Hong Liu, Univ. of Oklahoma (USA); Robert E. Nordquist, Wound Healing of Oklahoma (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . [7565-07]

2:20 pm: **Topical photosan-mediated photodynamic therapy for DMBA-induced hamster buccal pouch premalignant lesions: an in vivo study**, Yih-Chih Hsu, Chung Yuan Christian Univ. (Taiwan); Chung-Pin Chiang, National Taiwan Univ. (Taiwan); Jian Wen Chen, Bugi R. Budiarto, Meng-Kai Tseng, Chung Yuan Christian Univ. (Taiwan); Jeng-Woei Lee, Tzu Chi Univ. (Taiwan) [7565-08]

2:40 pm: **In-vivo targeted photothermal purging of metastasis in sentinel lymph nodes guided by fiber-based multicolor photoacoustic lymphography**, Ekaterina I. Galanzha, Univ. of Arkansas for Medical Sciences (USA); Jin-Woo Kim, Univ. of Arkansas (USA); Valery Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Mimi S. Koskoska, Indiana Univ. School of Medicine (USA); Evgeny Shashkov, Zharov Vladimir, Univ. of Arkansas for Medical Sciences (USA) [7565-09]

3:00 pm: **Novel applications of diagnostic x-rays in activating photo-agents through x-ray induced visible fluorescence from rare-earth particles: an in-vitro study**, Darrell B. Tata, Ronald W. Waynant, U.S. Food and Drug Administration (USA); Joshua E. Collins, Joseph S. Friedberg, Univ. of Pennsylvania (USA); Ajith Kumar, Howard Bell, Sunstone Biosciences, Inc. (USA) [7565-10]

3:20 pm: **The role of temperature increase rate in combinational hyperthermia chemotherapy treatment**, Yuan Tang, Anthony J. McGoron, Florida International Univ. (USA) [7565-11]

Coffee Break 3:40 to 4:10 pm

SESSION 4

Room: 208/210 (Mezzanine) Mon. 4:10 to 6:00 pm

Detection of Immune Activities

Session Chairs: **Xunbin Wei**, Fudan Univ. (China); **Zheng Huang**, Univ. of Colorado Denver and Health Sciences Ctr.

4:10 pm: **Monitoring hepatocellular carcinoma metastasis by in-vivo flow cytometer** (*Invited Paper*), Xunbin Wei, Yan Li, Jin Guo, Guangda Liu, Yun Chen, Fudan Univ. (China) [7565-12]

4:40 pm: **Differences in HMME-mediated photodynamic therapy sensitivity for C666-1 and CNE2 cells**, Buhong Li, Zheng Chen, Huiyun Lin, Lina Liu, Shusen Xie, Fujian Normal Univ. (China) [7565-13]

5:00 pm: **A fluorescence-based centrifugal microfluidic system for parallel detection of multiple allergens**, Qiu-Lan Chen, Ho-pui Ho, Yick-Keung Suen, Siu-Kai Kong, Ka-Lun Cheung, Wen Jung Li, Chun-Kwok Wong, The Chinese Univ. of Hong Kong (Hong Kong, China) [7565-14]

5:20 pm: **Preliminary study of antibacterial effect of glycosylated chitosan**, Christine M. N. Yow, Chi M. Cheung, Hong Kong Polytechnic Univ. (China); Wei R. Chen, Univ. of Central Oklahoma (USA); Zheng Huang, Univ. of Colorado Denver (USA) [7565-15]

5:40 pm: **Comparison of different light irradiation modalities in light intensity distribution in blood**, Xiaosong Li, Chinese PLA General Hospital (China); Gang Cheng, Beijing Institute of Technology (China); Naiyan Huang, Lei Wang, Fanguang Liu, Ying Gu, Chinese PLA General Hospital (China) . [7565-16]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Artemisinin induces ROS-mediated caspase 3 activation in ASCT-a-1 cells, Fenglian Xiao, South China Normal Univ. (China)[7565-17]

Taxol induces concentration-dependent phosphatidylserine (PS) externalization and cell cycle arrest in ASTC-a-1 cells, Wenjing Guo, South China Normal Univ. (China)[7565-18]

Bax translocation to mitochondria during curcumin-induced apoptosis in human lung adenocarcinoma cells, Weiwei Zhang, South China Normal Univ. (China); Zhiping Wang, Guangzhou Univ. of TCM (China); Tongsheng Chen, South China Normal Univ. (China)[7565-19]

Involvement of ASK1 activation in apoptosis induced by NPe6-PDT, Lei Liu, South China Normal Univ. (China)[7565-20]

Low-power laser irradiation inhibits cytosolic translocation of SIRT1, Chengbo Meng, Da Xing, Shengnan Wu, Lei Huang, South China Normal Univ. (China)[7565-21]

Spatial-temporal changes of cardiolipin subcellular localization at the early stage of apoptosis, Zhi-yong He, Da Xing, Lei Liu, South China Normal Univ. (China)[7565-22]

Analysis of GFP-FOXO3a nuclear-cytoplasmic shuttling in ASTC-a-1 cells under growth factor stimulation, Xianwang Wang, Xing Da, South China Normal Univ. (China); Wei R. Chen, Univ. of Central Oklahoma (USA) and South China Normal Univ. (China); Hui Li, South China Normal Univ. (China) .[7565-23]

Study of MR imaging in labeled human lung adenocarcinoma cells with ENDOREM in vivo, Wen Li Chen, Mingxi Yu, South China Normal Univ. (China)[7565-24]

DC-mediated anti-tumor responses of NK cells, Giuseppe Chirico, Michele Caccia, Tatiana Gorletta, Francesca Granucci, Maddalena Collini, Univ. degli Studi di Milano-Bicocca (Italy)[7565-25]

Photonics West maps:

- Moscone Maps pp. 2–5
- Hilton Hotel Map p. 3
- Area Map p. 322

Optics in Tissue Engineering and Regenerative Medicine IV

Conference Chairs: **Sean J. Kirkpatrick**, Oregon Health & Science Univ.; **Ruikang Wang**, Oregon Health & Science Univ.

Program Committee: **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign; **Irene Georgakoudi**, Tufts Univ.; **Miya Ishihara**, National Defense Medical College (Japan); **Stephen P. Morgan**, The Univ. of Nottingham (United Kingdom); **Ying Yang**, Keele Univ. (United Kingdom)

Sunday 24 January

SESSION 1

Room: 234 (Mezzanine) Sun. 8:30 to 9:50 am

Multimodal Imaging in Tissue Engineering

Session Chair: **Sean J. Kirkpatrick**, Oregon Health & Science Univ.

8:30 am: **Monitoring adipose-derived stem cells within 3D carrier by combined dielectric spectroscopy and spectral domain optical coherence topography**, Pierre-Olivier Bagnaninchi, The Univ. of Edinburgh (United Kingdom)[7566-01]

8:50 am: **Investigation of pore structure and cell distribution in EH-PEG hydrogel scaffold using optical coherence tomography and fluorescence confocal microscopy**, Chaowei Chen, Martha Betz, John Fisher, Andrew Paek, Univ. of Maryland, College Park (USA); James Jiang, Hongzhou Ma, Alex Cable, Thorlabs (USA); Yu Chen, Univ. of Maryland, College Park (USA)[7566-02]

9:10 am: **Combined optical coherence phase microscopy and impedance sensing measurements of differentiating adipose derived stem cells**, Pierre-Olivier Bagnaninchi, Univ. of Edinburgh (United Kingdom)[7566-03]

9:30 am: **Noninvasive system for the evaluation of bioengineered tissue constructs combining time-resolved fluorescence and ultrasound imaging**, Brett Z. Fite, Martin Decaris, Yinghua Sun, Yang Sun, Clark Ki Lok Ho, Kent Leach, Laura Marcu, Univ. of California, Davis (USA)[7566-04]

Coffee Break9:50 to 10:30 am

SESSION 2

Room: 234 (Mezzanine) Sun. 10:30 am to 12:10 pm

Spectroscopy and Polarization

Session Chair: **Ying Yang**, Keele Univ. (United Kingdom)

10:30 am: **Development of the hyperspectral cellular imaging system to apply to regenerative medicine**, Miya Ishihara, National Defense Medical College (Japan) and Tokai Univ. (Japan); Masato Sato, Tokai Univ. (Japan); Kouji Matsumura, National Defense Medical College (Japan); Junya Toguchida, Kyoto Univ. (Japan); Joji Mochida, Tokai Univ. (Japan); Makoto Kikuchi, National Defense Medical College (Japan)[7566-05]

10:50 am: **Raman spectroscopy as a noninvasive analysis tool for living cells**, Marieke Pudlas, Fraunhofer-Institut für Grenzflächen- und Bioverfahrenstechnik (Germany) and Univ. of Stuttgart (Germany); Steffen Koch, Univ. of Stuttgart (Germany); Heike Mertsching, Fraunhofer Institute for Interfacial Engineering and Biotechnology (Germany)[7566-06]

11:10 am: **Using PS-OCT to investigate regional properties of peripheral nerve**, Jamie Harle, The Open Univ. (United Kingdom) and Univ. of Liverpool (United Kingdom); Sarah Mason, James Phillips, The Open Univ. (United Kingdom); Ying Yang, Keele Univ. (United Kingdom)[7566-07]

11:30 am: **Spectral imaging polarimetry to assess structural organization in biological tissue**, James C. Gladish, Donald D. Duncan, Oregon Health & Science Univ. (USA)[7566-08]

11:50 am: **Investigation of a tissue engineered tendon model by PS-OCT**, Ying Yang, Mark Ahearne, Ian Wimpenny, Juan Guijarro-Leach, Keele Univ. (United Kingdom); Jim Torbet, Grenoble High Magnetic Field Lab. (France)[7566-09]

Lunch/Exhibition Break12:10 to 1:40 pm

SESSION 3

Room: 234 (Mezzanine) Sun. 1:40 to 3:20 pm

Novel Optical Techniques for Tissue Engineering

Session Chair: **Miya Ishihara**, National Defense Medical College (Japan)

1:40 pm: **Multiphoton fabrication of crosslinked fibronectin for tissue engineering applications**, Paul J. Campagnola, Yuan-Deng Su, Xiyi Chen, Univ. of Connecticut Health Ctr. (USA)[7566-10]

2:00 pm: **Concentration distribution of nanoparticles in biological tissues measured with Schlieren visualization technique**, Alexander I. Omelchenko, Emil N. Sobol, Institute on Laser and Information Technologies (Russian Federation)[7566-11]

2:20 pm: **Confocal mosaicing of engineered tissues**, Ardalan Ardeshiri, David Levitz, Dan Gareau, Steve Jacques, Oregon Health & Science Univ. (USA)[7566-12]

2:40 pm: **HMC and fibroblast illuminating experiments using microdisplay**, Chung-Jen Ou, Hsiuping Institute of Technology (Taiwan)[7566-13]

3:00 pm: **Improvement of the frequency domain inverse Monte Carlo simulation**, Huijuan Zhao, Shuying Zhang, Julian Liang, Zhuanping Qin, Xiaoqing Zhou, Tianjin Univ. (China)[7566-14]

Coffee Break3:20 to 3:50 pm

SESSION 4

Room: 234 (Mezzanine) Sun. 3:50 to 5:50 pm

OCT for Tissue Engineering

Session Chair: **Ruikang K. Wang**, Oregon Health & Science Univ.

3:50 pm: **Doppler optical micro-angiography improves the quantification of local fluid flow and shear stress within 3D porous constructs**, Yali Jia, Ruikang K. Wang, Oregon Health & Science Univ. (USA)[7566-15]

4:10 pm: **Optical coherence tomography investigation of growth cycles of engineered skin tissue**, Robert Schmitt, Ulrich Marx, Fraunhofer-Institut für Produktionstechnologie (Germany); Heike Mertsching, Andrea Heymer, Fraunhofer-Institut für Grenzflächen- und Bioverfahrenstechnik (Germany)[7566-16]

4:30 pm: **Using swept source optical coherence tomography to monitor wound healing in tissue engineered skin**, Louise E. Smith, The Univ. of Sheffield (United Kingdom); Marco Bonesi, The Medical Univ. of Vienna (Austria); Rod Smallwood, Steven J. Matcher, Sheila MacNeil, The Univ. of Sheffield (United Kingdom)[7566-17]

4:50 pm: **The study of effects of pore architecture in chitosan scaffolds on the fluid flow pattern by Doppler OCT**, Ying Yang, Andreea Iftimia, Keele Univ. (United Kingdom); Yali Jia, Oregon Health & Science Univ. (USA); Alicia El Haj, Toby Gould, Keele Univ. (United Kingdom); Ruikang Wang, Oregon Health & Science Univ. (USA)[7566-18]

5:10 pm: **Understanding the nature of optical coherence tomography images using Monte Carlo modeling**, Peter H. Tomlins, National Physical Lab. (United Kingdom) and Univ. of Birmingham (United Kingdom); Andrew Beaumont, National Physical Lab. (United Kingdom)[7566-19]

5:30 pm: **Common-path endoscopic Fourier domain OCT with a reference Michelson interferometer**, Rui Wang, Joseph Zinkovich, Xiaocong Yuan, Clemson Univ. (USA); Richard Goodwin, Univ. of South Carolina (USA); Roger R. Markwald, Medical Univ. of South Carolina (USA); Hai Yao, Bruce Z. Gao, Clemson Univ. (USA)[7566-20]

Design and Performance Validation of Phantoms used in Conjunction with Optical Measurement of Tissue

Conference Chair: **Robert J. Nordstrom**, National Institutes of Health

Program Committee: **Anant Agrawal**, U.S. Food and Drug Administration; **Gerald T. Fraser**, National Institute of Standards and Technology; **William W. Mantulin**, Univ. of California, Irvine; **Brian W. Pogue**, Dartmouth College; **Scott Prah**, Providence St. Vincent Medical Ctr.; **Lihong V. Wang**, Washington Univ. in St. Louis

Saturday 23 January

SESSION 1

Room: 234 (Mezzanine) Sat. 8:30 to 9:50 am

Phantoms Standards in Validation

Session Chairs: **Lihong V. Wang**, Washington Univ. in St. Louis; **Gerald T. Fraser**, National Institute of Standards and Technology

8:30 am: **The need for validation standards in medical imaging**, Robert J. Nordstrom, Laurence Clarke, National Institutes of Health (USA)[7567-01]

8:50 am: **Quality control and assurance for validation of DOS/I measurements (Invited Paper)**, William W. Mantulin, Bruce J. Tromberg, Amanda Durkin, Timothy Quang, Richard Kwong, Univ. of California, Irvine (USA); Nick MacKinnon, OneLight Corp. (Canada); Albert Cerussi, Univ. of California, Irvine (USA)[7567-02]

9:10 am: **Contrast phantoms for optical coherence tomography**, Peter H. Tomlins, Peter D. Woolliams, Robert Ferguson, Christian Hart, National Physical Lab. (United Kingdom)[7567-03]

9:30 am: **Characterizing deep optical-sectioning microscopy performance with scattering phantoms and numerical simulations**, Jonathan T. C. Liu, Michael J. Mandella, Gordon S. Kino, Christopher H. Contag, Stanford Univ. (USA)[7567-04]

Coffee Break9:50 to 10:20 am

SESSION 2

Room: 234 (Mezzanine) Sat. 10:20 am to 12:00 pm

Phantom Construction and Uses I

Session Chairs: **Brian W. Pogue**, Dartmouth College; **Robert J. Nordstrom**, National Institutes of Health

10:20 am: **Multilayer silicone phantoms for the evaluation of quantitative optical techniques in skin imaging**, Rolf B. Saager, Clement Kondru, Kendrew Au, Kelly Sry, Frederick Ayers, Anthony J. Durkin, Univ. of California, Irvine (USA)[7567-05]

10:40 am: **Development of an autofluorescent probe designed to help brain tumour removal: preliminary phantom and simulation studies**, Barbara Leh, Univ. Paris-Sud 11 (France); Rainer Siebert, CNRS, Univ. Paris-Sud 11 (France); Yves Charon, Univ. Paris 7 (France); Marie-Alix Duval, Univ. Evry P6 (France); Françoise Lefebvre, CNRS, Univ. Paris-Sud 11 (France); Laurent Menard, Univ. Paris 7 (France)[7567-06]

11:00 am: **Correlation between collagen phantoms and skin containing methylene blue**, Elisa Morandé Sales, Univ. de São Paulo (Brazil); Nasser A. Daghestanli, Univ. Federal do ABC (Brazil); Daniela F. Teixeira da Silva, Univ. Nove de Julho (Brazil); Maurício d. S. Baptista, Rosângela Itri, Univ. de São Paulo (Brazil)[7567-07]

11:20 am: **Monte Carlo simulations combined with experimental measures: a new possibility of study of the light distribution in fat emulsions**, André Luiz Ramos, Marcelo Souza, Ana Carolina Magalhães, Marcia Saito, Maria Cristina Chavantes, Elisabeth Yoshimura, Univ. de São Paulo (Brazil)[7567-08]

11:40 am: **Uncertainty analysis of time resolved transmittance characterization of solid tissue phantom**, Jean-Pierre Bouchard, Isabelle Noiseux, Sébastien Leclair, Michel Fortin, Ozzy Mermut, INO (Canada) [7567-09]

Lunch/Exhibition Break12:00 to 1:00 pm

SESSION 3

Room: 234 (Mezzanine) Sat. 1:00 to 2:40 pm

Phantom Construction and Uses II

Session Chairs: **Gerald T. Fraser**, National Institute of Standards and Technology; **Robert J. Nordstrom**, National Institutes of Health

1:00 pm: **Development of optical phantoms for use in fluorescence-based imaging**, Isabelle Noiseux, Michel Fortin, Sébastien Leclair, Jocelyne Osouf, Ozzy Mermut, INO (Canada)[7567-10]

1:20 pm: **Lateral scattered light used to study laser light propagation in turbid media phantoms**, Claudia Valdes, Efrain Solarte, Univ. del Valle (Colombia)[7567-11]

1:40 pm: **Polyurethane phantoms with homogeneous and nearly homogeneous optical properties**, Ville T. Keränen, Oregon Health and Science Univ. (USA) and Univ. of Oulu (Finland); Anssi J. Mäkynen, Univ. of Oulu (Finland); Amanda L. Dayton, Scott A. Prah, Oregon Health and Science Univ. (USA)[7567-12]

2:00 pm: **Development and validation of multilayered scattering and absorbing polyurethane phantoms**, Sarah Ruderman, Valentina Stoyneva, Jeremy D. Rogers, Andrew J. Gomes, Vadim Backman, Northwestern Univ. (USA)[7567-13]

2:20 pm: **Tissue-mimicking optical phantoms for validation and multi-center standardization of spectroscopic devices: the Ramanujam lab experience**, J. Quincy Brown, Nimmi Ramanujam, Duke Univ. (USA)[7567-14]

Coffee Break3:00 to 3:30 pm

SESSION 4

Room: 234 (Mezzanine) Sat. 3:20 to 5:20 pm

Dynamic and Multimodal Phantoms

Session Chairs: **William W. Mantulin**, Univ. of California, Irvine; **Anant Agrawal**, U.S. Food and Drug Administration

3:20 pm: **Spectral imaging of a simple tissue phantom for re-projection in the NIST hyperspectral image projector**, Maritoni Litorja, Eric L. Shirley, David W. Allen, National Institute of Standards and Technology (USA)[7567-15]

3:40 pm: **Design of a multimodality breast-like phantom for combined optical tomography and ultrasound measured in transmission geometry**, Michael T. Ghijsen, Burcin Unlu, Orhan Nalcioglu, Gultekin Gulsen, Univ. of California, Irvine (USA)[7567-16]

4:00 pm: **Multilayer tubular phantoms for optical coherence tomography**, Charles-Etienne Bisailon, Gordon Campbell, Christian deGrandpré, Marc L. Dufour, Guy Lamouche, National Research Council Canada (Canada) .[7567-17]

4:20 pm: **Design of a dynamic optical tissue phantom to model extravasation pharmacokinetics**, Jane Y. Zhang, Aysegul Ergin, Kerry Lee Andken, Boston Univ. (USA); Chao Sheng, East Carolina Univ. (USA) and Brody School of Medicine (USA); Irving J. Bigio, Boston Univ. (USA)[7567-18]

4:40 pm: **Developing multifunctional tissue simulating phantoms for quantitative biomedical optical imaging**, Ronald X. Xu, Jeff S. Xu, Jiwei Huang, Ruogu Qin, Joseph Ewing, The Ohio State Univ. (USA)[7567-19]

5:00 pm: **Fabricating multifunctional microbubbles and nanobubbles for concurrent ultrasound and photoacoustic imaging**, Ruogu Qin, Jeff S. Xu, Ronald X. Xu, The Ohio State Univ. (USA); Chulhong Kim, Lihong V. Wang, Washington Univ. in St. Louis (USA)[7567-20]

Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues VIII

Conference Chairs: Daniel L. Farkas, Cedars-Sinai Medical Ctr.; Dan V. Nicolau, The Univ. of Liverpool (United Kingdom); Robert C. Leif, Newport Instruments

Conference Co-Chairs: James F. Leary, Purdue Univ.; Ramesh Raghavachari, U.S. Food and Drug Administration; J. Paul Robinson, Purdue Univ.; Attila Tarnok, Univ. Leipzig (Germany)

Program Committee: Vincenza Andrisano, Univ. degli Studi di Bologna (Italy); Christopher H. Contag, Stanford Univ. School of Medicine; Ewa M. Goldys, Macquarie Univ. (Australia); Charles P. Lin, Massachusetts General Hospital; Andreas G. Nowatzky, Cedars-Sinai Medical Ctr.; Markus Sauer, Univ. Bielefeld (Germany); Takahisa Taguchi, National Institute of Advanced Industrial Science and Technology (Japan)

Saturday 23 January

SESSION 1

Room: 200 (Mezzanine) Sat. 8:30 am to 12:00 pm

Cell Imaging

- 8:30 am: **Nanoprocessing and targeted transfection of stem cells** (*Invited Paper*), Karsten König, JenLab GmbH (Germany); Zeno Földes-Papp, ISS, Inc. (USA); Hauke Studier, Rainer Bückle, Hans Georg Breunig, JenLab GmbH (Germany); Aisada Uchugonova, Saarland Univ. (Germany); Gerhard M. Kostner, Medical Univ. of Graz (Austria) [7568-48]
- 8:50 am: **Total internal reflection holographic microscopy for quantitative phase characterization of cellular adhesion**, William M. Ash III, David Clark, Leo Krzewina, Myung K. Kim, Univ. of South Florida (USA) [7568-58]
- 9:10 am: **The fluorescence lifetime of BR11-GFP as probe for the noninvasive determination of the membrane potential in living cells**, Kirstin Elgass, Katharina Casear, Eberhard Karls Univ. Tübingen (Germany); Zhonghua Chen, Univ. of Glasgow (United Kingdom); Frank Schleifenbaum, Alfred J. Meixner, Eberhard Karls Univ. Tübingen (Germany); Mike R. Blatt, Univ. of Glasgow (United Kingdom); Klaus Harter, Eberhard Karls Univ. Tübingen (Germany) [7568-38]
- 9:30 am: **Quantification of optical disorder due to nanoscale density fluctuations in biological tissue: inverse participation ratio (IPR) analysis of transmission electron microscopy images for early-stage cancer detection**, Prabhakar Pradhan, Dhwanil Damania, Northwestern Univ. (USA); Hemant Roy, Univ. of Chicago (USA); Vadim Backman, Northwestern Univ. (USA) [7568-62]
- 9:50 am: **Two-photon microscopy of living cells by simultaneously exciting multiple endogenous fluorophores and fluorescent proteins**, Wei Zheng, Dong Li, Jianan Y. Qu, Hong Kong Univ. of Science and Technology (Hong Kong, China) [7568-33]
- Coffee Break 10:10 to 10:40 am
- 10:40 am: **Three-dimensional morphologies of human breast cancer cell lines obtained using FF-OCT and confocal microscopy**, Sang-Mo Shin, In H. Shin, Hye M. Park, Byung Ha Lee, Woo June Choi, Chang-Duk Jun, Gwangju Institute of Science and Technology (Korea, Republic of) [7568-76]
- 11:00 am: **Dynamic phase imaging of host cells attacked by vibrio vulnificus using quantitative phase microscopy**, Seung Rag Lee, Wenzhong Yang, Ji Yong Lee, Gwangju Institute of Science and Technology (Korea, Republic of); Mi Hye Cha, Dongshin Univ. (Korea, Republic of); Young Ran Kim, Clinical Vaccine R&D Center (Korea, Republic of); Dug Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7568-79]
- 11:20 am: **Effects of oxytocin on the cytoskeletal changes of human umbilical cord blood derived mesenchymal stem cells revealed by phase retardation imaging techniques**, Sang-Mo Shin, In H. Shin, Hye M. Park, Gwangju Institute of Science and Technology (Korea, Republic of); Yong S. Kim, Youngkeun Ahn, Chonnam National Univ. Hospital (Korea, Republic of) [7568-72]
- 11:40 am: **Gold nanorods for cell imaging with confocal reflectance microscopy and two-photon fluorescence microscopy**, Ji Yao Chen, Pei-Nan Wang, Fudan Univ. (China) [7568-04]
- Lunch/Exhibition Break 12:00 to 1:20 pm

SESSION 2

Room: 200 (Mezzanine) Sat. 1:20 to 5:30 pm

Tissue Imaging

- 1:20 pm: **Resources from the National Cancer Institute to support your innovative analytical technologies for cancer** (*Invited Paper*), Mark D. Lim, National Cancer Institute, NIH (USA) [7568-03]
- 1:40 pm: **Optical coherence tomography imaging of engineered skin tissue**, Robert Schmitt, Ulrich Marx, Fraunhofer-Institut für Produktionstechnologie (Germany); Heike Mertsching, Andrea Heymer, Fraunhofer-Institut für Grenzflächen- und Bioverfahrenstechnik (Germany) [7568-23]
- 2:00 pm: **A comparative study of different instrumental concepts for spectrally and lifetime-resolved multiphoton intravital tomography (5D-IVT) in dermatological applications**, Martin Schwarz, Iris Riemann, Frank Stracke, Fraunhofer-Institut für Biomedizinische Technik (Germany); Volker Huck, Univ. of Muenster (Germany); Christian Gorzelanny, Stefan W. Schneider, Heidelberg Univ. (Germany); Stefan Puschmann, Vivien Lutz, Nadine Sommer, Christian Rahn, Stefan Gallinat, Horst Wenck, Klaus-Peter Wittern, Frank Fischer, Beiersdorf AG (Germany) [7568-15]
- 2:20 pm: **Use of optical micro-angiography to compare pharmacological effects of tPA on reperfusion in a mouse model of ischemic injury**, Sawan Hurst, Yali Jia, An Lin, Erik Tucker, Andras Gruber, Ruikang K. Wang, Oregon Health & Science Univ. (USA) [7568-11]
- 2:40 pm: **Selective excitation light fluorescence (SELF) imaging**, Mehrnosh Khojasteh, Calum E. MacAulay, British Columbia Cancer Agency (Canada) [7568-88]
- 3:00 pm: **Plant abiotic stress diagnostic by laser induced chlorophyll fluorescence spectral analysis of in vivo leaf tissue of biofuel species**, Artur S. Gouveia-Neto, Elias A. Silva, Ernande Barbosa Costa, Luciano A. Bueno, Luciana M. H. Silva, Manuela M. C. Granja, Maria Jaislanny Medeiros, Terezinha J. R. Câmara, Lilia G. Willadino, Univ. Federal Rural de Pernambuco (Brazil) [7568-06]
- Coffee Break 3:20 to 3:50 pm
- 3:50 pm: **Specific binding of molecularly targeted agents to pancreas tumors and impact on observed optical contrast**, Kimberley S. Samkoe, Omar Pardesi, Julia A. O'Hara, Brian Pogue, Dartmouth College (USA) [7568-74]
- 4:10 pm: **Spectral ophthalmoscopy based on supercontinuum**, Yueh-Hung Cheng, Graduate Institute of Applied Physics, National Taiwan Univ. (Taiwan); Jiun-Yann Yu, Han-Hsuan Wu, National Taiwan Univ. (Taiwan); Bo-Jyun Huang, Graduate Institute of Applied Physics, National Taiwan Univ. (Taiwan); James M. Stone, Jonathan C. Knight, Univ. of Bath (United Kingdom); Shi-Wei Chu, National Taiwan Univ. (Taiwan) [7568-75]
- 4:30 pm: **Estrogen receptor-targeted optical imaging of breast cancer cells with near-infrared fluorescent dye**, Iven Jose, Biral Institute of Technology and Sciences, Pilani (India); Kodand D. Deodhar, Indian Institute of Technology (India); Shuba Chiplunkar, Meena Patkar, Advanced Ctr. for Treatment, Research & Education in Cancer (India) [7568-83]
- 4:50 pm: **Confocal microscopy for automatic measurement of the density and distance between elastin fibers of histologic preparations of normotensive and hypertensive patients**, Gislaine Vieira, Daniela P. Ferro, Adam L. Randall, André A. Thomaz, Carlos L. Cesar, Konradin Metzke, Univ. Estadual de Campinas (Brazil) [7568-57]
- 5:10 pm: **Fluorescence tomography based on dispersion of biotissue absorption for small animal imaging**, Mikhail S. Kleshnin, Ilya V. Turchin, Institute of Applied Physics (Russian Federation); Marina V. Shirmanova, Nizhny Novgorod State Medical Academy (Russian Federation); Irina V. Balalaeva, N.I. Lobachevsky State Univ. of Nizhniy Novgorod (Russian Federation); Vladislav A. Kamensky, Institute of Applied Physics (Russian Federation) [7568-46]

BiOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 3

Room: 200 (Mezzanine) Sun. 8:30 am to 12:40 pm

Micro Imaging, Manipulation, Probing

8:30 am: **High-throughput in vivo on-chip subcellular imaging and femtosecond-laser nanosurgery screen for neuro-regenerative compounds** (*Invited Paper*), Mehmet F. Yanik, Massachusetts Institute of Technology (USA) [7568-42]

8:50 am: **Fast optical protein patterning**, Jonathan M. Belisle, Dario Kunik, Santiago Costantino, Maisonneuve-Rosemont Hospital (Canada) and Univ. de Montréal (Canada) [7568-68]

9:10 am: **High-throughput magnetic sorting of human stem cell subsets for autologous transplantation in regenerative medicine**, Lisa M. Reece, Purdue Univ. (USA); Lehanna Sanders, Purdue Univ. (USA) and IKOTECH, LLC (USA); Byron K. Guernsey, David J. Kennedy, IKOTECH, LLC (USA); James F. Leary, Purdue Univ. (USA) [7568-73]

9:30 am: **Mechanical anisotropy and adaptation of metastatic cells probed by magnetic microbeads**, Zhipeng Zhang, Yanhui Shi, Sissy M. Jhiang, Chia-Hsiang Menq, The Ohio State Univ. (USA) [7568-50]

9:50 am: **Nonresonant femtosecond laser vaporization and mass analysis of solid state biomolecules at atmospheric pressure**, John Brady, Elizabeth Judge, Robert J. Levis, Temple Univ. (USA) [7568-52]

10:10 am: **Studying chemotaxis in real time using optical tweezers: applications for interactions study in rhodnius prolixus-trypanosoma cruzi/trypanosoma rangeli**, André A. de Thomaz, Univ. Estadual de Campinas (Brazil); Cecilia V. Stahl, Fundacao Oswaldo Cruz (Brazil); Diogo Burigo Almeida, Univ. Estadual de Campinas (Brazil); Adriana Fontes, Univ. Federal de Pernambuco (Brazil); Jacenir Santos-Mallet, Fundacao Oswaldo Cruz (Brazil); Carlos L. Cesar, Univ. Estadual de Campinas (Brazil); Denise Feder, Univ. Federal Fluminense (Brazil); Suzete A. O. Gomes, Fundacao Oswaldo Cruz (Brazil) [7568-59]

Coffee Break 10:30 to 11:00 am

11:00 am: **Decoding gene regulatory networks using microfluidics: NF- κ B signaling and dynamic range** (*Invited Paper*), Savas Tay, Stanford Univ. (USA) and Howard Hughes Medical Institute (USA); Rafael Gomez-Sjoberg, Stanford Univ. (USA) and Lawrence Berkeley National Lab. (USA); Anne Leyrat, Jake Hughey, Tim K. Lee, Markus Covert, Stephen R. Quake, Stanford Univ. (USA) [7568-02]

11:20 am: **MICAO: first universal all-in-the-box adaptive optics plug in accessory for standard high-resolution microscopes**, Jordi Andilla, Xavier Levecq, Imagine Optic SA (France) [7568-09]

11:40 am: **Temporal and spatial in vivo optical analysis of microtubules in neurospora crassa**, Marie Held, Clive Edwards, Dan V. Nicolau, Univ. of Liverpool (United Kingdom) [7568-29]

12:00 pm: **Incoherent on-chip cell holography for subcellular imaging and point-of-care diagnostics**, Serhan O. Isikman, Sungkyu Seo, Ikbal Sencan, Derek Tseng, Onur Mudanyali, Ting-Wei Su, Anthony F. Erlinger, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [7568-86]

12:20 pm: **Confocal fluorescence detection for 3D cultured mammalian cells in a microfluidic cell culture system**, Jong-ryul Choi, Yonsei Univ. (Korea, Republic of); Jong Hwan Sung, Michael L. Shuler, Cornell Univ. (USA); Donghyun Kim, Yonsei Univ. (Korea, Republic of) [7568-41]

Lunch/Exhibition Break 12:40 to 1:50 pm

SESSION 4

Room: 200 (Mezzanine) Sun. 1:50 to 5:40 pm

Biomolecular Imaging

1:50 pm: **High-throughput vibrational cytometry based on nonlinear Raman microspectroscopy** (*Invited Paper*), Vladislav V. Yakovlev, Univ. of Wisconsin-Milwaukee (USA) [7568-51]

2:10 pm: **Label-free quantitative detection of biomarkers**, Digant Dave, Sajal Chirvi, The Univ. of Texas at Arlington (USA) [7568-70]

2:30 pm: **Ultrasensitive detection and quantitation of DNA hybridization via terahertz spectrometry**, Anis Rahman, Applied Research & Photonics, Inc. (USA); Bruce Stanley, The Pennsylvania State Univ. College of Medicine (USA); Aunik K. Rahman, Applied Research & Photonics, Inc. (USA) [7568-08]

2:50 pm: **The use of time-resolved fluorescence in gel-based proteomics for improved biomarker discovery**, AnnSofi Sandberg, Karolinska Institutet (Sweden); Volker Buschmann, Peter Kapusta, Rainer Erdmann, PicoQuant GmbH (Germany); Asa M. Wheelock, Karolinska Institutet (Sweden) . . . [7568-61]

3:10 pm: **Spectroscopic phase microscopy for quantifying hemoglobin concentrations in intact red blood cells**, YongKeun Park, Toyohiko Yamauchi, Wonshik Choi, Ramachandra Dasari, Kamran Badizadegan, Michael S. Feld, Massachusetts Institute of Technology (USA) [7568-66]

3:30 pm: **Evaluation of interventional lipid nanoparticle-carried drug delivery for cancer therapy using fluorescence imaging**, Xing Jin, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Weiqiang Yan, The Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Marcela Saenz, Beth A. Goins, Ande Bao, The Univ. of Texas Health Science Ctr. at San Antonio (USA) [7568-63]

Coffee Break 3:50 to 4:20 pm

4:20 pm: **Spectroscopic microscopy using a stretched supercontinuum source**, Hoseong Song, Dug Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7568-64]

4:40 pm: **Intravital real-time study of tissue response to controlled laser-induced cavitation using 500-ps UV laser pulses focused in murine gut mucosa under online dosimetry and spectrally resolved 2-photon microscopy**, Regina B. Orzekowsky-Schroeder, Antje Klinger, Anna Schüth, Sebastian Freidank, Gereon Hüttmann, Andreas Gebert, Alfred Vogel, Univ. zu Lübeck (Germany) [7568-82]

5:00 pm: **High-speed fluorescence lifetime imaging microscope by analog mean-delay (AMD) method**, Young Jae Won, Donguk Kim, Wenzhong Yang, Dug Y. Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7568-10]

5:20 pm: **Denosing of single scan Raman spectroscopy signals**, Shawn D. Hunt, Luis Quintero, Univ. de Puerto Rico Mayagüez (USA) . [7568-67]

Monday 25 January

SESSION 5

Room: 200 (Mezzanine) Mon. 8:15 am to 12:25 pm

Cytomics

8:15 am: **Practical way to develop 10-color flow cytometry protocols for the clinical laboratory** (*Invited Paper*), Attila Tarnok, Jozsef Bocsi, Univ. Leipzig (Germany) [7568-17]

8:35 am: **Time-gated real-time bioimaging system using multicolor microsecond-lifetime silica nanoparticles** (*Invited Paper*), Dayong Jin, James Piper, Macquarie Univ. (Australia); Jingli Yuan, Dalian Univ. of Technology (China); Robert C. Leif, Newport Instruments (USA) [7568-36]

8:55 am: **An analog method to produce time-gated images**, Robert C. Leif, Newport Instruments (USA); Sean Yang, Newport Instruments (USA) and Phoenix Flow Systems (USA) [7568-91]

9:15 am: **Label-free single cell analysis with a chip-based impedance flow cytometer**, Arkadiusz Pierzchalski, Univ. Leipzig (Germany); Monika Hebeisen, Leister Process Technologies (Switzerland); Anja Mittag, Univ. Leipzig (Germany); Marco Di Berardino, Leister Process Technologies (Switzerland); Attila Tarnok, Univ. Leipzig (Germany) [7568-16]

9:35 am: **Fiber-based microflow cytometer**, Michel Fortin, Paul Grenier, Pascal Gallant, Ozy Mermut, Frédéric Emond, Isabelle Noiseux, INO (Canada) [7568-44]

Coffee Break 9:55 to 10:25 am

10:25 am: **CytoIQ: an adaptive cytometer for extracting the noisy dynamics of molecular interactions in live cells**, David A. Ball, Virginia Polytechnic Institute and State Univ. (USA); Stephen E. Moody, Orca Photonic Systems, Inc. (USA); Jean Peccoud, Virginia Polytechnic Institute and State Univ. (USA)[7568-55]

10:45 am: **Image processing techniques in computer-assisted patch clamping**, Mahdi Azizian, Rajni V. Patel, Univ. of Western Ontario (Canada) and Canadian Surgical Technologies and Advanced Robotics (Canada); Michael Poulter, Univ. of Western Ontario (Canada) and Robarts Research Institute (Canada)[7568-13]

11:05 am: **An integrated approach to human carcinogenicity testing based on image analysis and automatic classification of foci**, Chiara Urani, Giovanni F. Crosta, Claudio Procaccianti, Pasquale Melchiorro, Univ. degli Studi di Milano-Bicocca (Italy); Federico M. Stefanini, Univ. degli Studi di Firenze (Italy)[7568-20]

11:25 am: **Automatic image analysis system for networks formed by endothelial cells in vitro**, De Chen, Prabhakar Gudla, Jack Collins, SAIC-Frederick, Inc. (USA); Enrique Zudaire Ubani, Changge Fang, Frank Cuttitta, National Cancer Institute (USA); Stephen Lockett, SAIC-Frederick, Inc. (USA)[7568-27]

11:45 am: **Fluorescence diffuse tomography setup with a single source-detector pair for small-animal imaging**, Ilya V. Turchin, Anna Orlova, Mikhail Kleshnin, Ilya Fiks, Institute of Applied Physics (Russian Federation); Irina Balalaeva, Marina Shirmanova, Nizhny Novgorod State Univ. (Russian Federation); Alexander Savitsky, A.N. Bach Institute of Biochemistry (Russian Federation)[7568-21]

12:05 pm: **Impulsive noise reduction in Raman spectroscopy images**, Shawn D. Hunt, Luis Quintero, Univ. de Puerto Rico Mayagüez (USA)[7568-69]

Lunch Break 12:25 to 1:55 pm

SESSION 6

Room: 200 (Mezzanine) Mon. 1:55 to 5:05 pm

New Imaging Techniques

1:55 pm: **Angular domain spectroscopic imaging of turbid media using silicon micromachined microchannel arrays**, Fartash Vasefi, Simon Fraser Univ. (Canada) and Lawson Health Research Institute (Canada); Eldon Ng, Univ. of Western Ontario (Canada); Mohamadreza Najiminaini, Simon Fraser Univ. (Canada); Genevieve Albert, Lawson Health Research Institute (Canada); Bozena Kaminska, Glenn H. Chapman, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada)[7568-34]

2:15 pm: **Real-time megapixel multispectral bioimaging**, Jason M. Eichenholz, Nick Barnett, Ocean Optics, Inc. (USA)[7568-60]

2:35 pm: **Difference Raman for enhancing image resolution by modulating tip of atomic force probe that enhances or shadows Raman signal**, Rimma Dekhter, Hesham Taha, Avraham Israel, David Lewis, Nanonics Imaging Ltd. (Israel); Aaron Lewis, Hebrew Univ. of Jerusalem (Israel)[7568-43]

Coffee Break 2:55 to 3:25 pm

3:25 pm: **Fluorescence intensity decay shape analysis microscopy (FIDSAM) for quantitative and sensitive live-cell imaging**, Frank Schleifenbaum, Kirstin Elgass, Marcus Sackrow, Sébastien Peter, Katharina Caesar, Klaus Harter, Alfred J. Meixner, Eberhard Karls Univ. Tübingen (Germany)[7568-12]

3:45 pm: **Speckle-field digital holographic microscopy**, YongKeun Park, Wonshik Choi, Zahid Yaqoob, Ramachandra Dasari, Kamran Badizadegan, Michael S. Feld, Massachusetts Institute of Technology (USA)[7568-65]

4:05 pm: **Multi-color digital holographic microscope (DHM) for biological, bio-medical purposes**, Szabolcs Tokes, Computer and Automation Institute (Hungary) and PPKE The Faculty of Information Technology (Hungary). [7568-47]

4:25 pm: **Enhanced transverse resolution through polarization switching**, Omid Masihzadeh, David Kupka, Philip Schlup, Randy A. Bartels, Colorado State Univ. (USA)[7568-54]

4:45 pm: **Macroscopic rasterscanning as a tool for fluorescence lifetime based proteomics or μ -well plate based assays**, Volker Buschmann, Felix Koberling, Matthias Patting, PicoQuant GmbH (Germany); AnnSofi Sandberg, Karolinska Institutet (Sweden); Michael Wahl, PicoQuant GmbH (Germany); Åsa Wheelock, Karolinska Institutet (Sweden); Rainer Erdmann, PicoQuant GmbH (Germany)[7568-87]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Novel and facile design of photo-caged bioluminescent probes for noninvasive imaging of firefly luciferase expression, Tingting Jiang, Nanyang Technological Univ. (Singapore)[7568-89]

Topography, biomechanics, and chemical components of cancer cell membranes exploited by combined atomic force microscopy and Raman microspectroscopy, Yangzhe Wu, Gerald D. McEwen, Sherry Baker, Tian Yu, Timothy A. Gilbertson, Daryl B. DeWald, Anhong Zhou, Utah State Univ. (USA)[7568-81]

Detecting biomarkers of disease using carbone-fluorine spectroscopy, Farid Menaa, Fluorotronics, Inc. (USA); Ahmed Boucharaba, Ecole Polytechnique Fédérale de Lausanne (France); Bouzid Menaa, Carla A. Guimaraes, Fluorotronics, Inc. (USA); Leo Avakyants, Lomonosov Moscow State Univ. (Russian Federation); Olga N. Sharts, Fluorotronics, Inc. (USA)[7568-77]

Quantitative measurement of cerebral perfusion using time-series analysis of indocyanine green molecular dynamics imaging, Taeyun Ku, Hyeonjoo Jeong, Chulhee Choi, Korea Advanced Institute of Science and Technology (Korea, Republic of)[7568-53]

Development of bioluminescent probe for in vivo imaging of reactive oxygen species, Hideo Takakura, Yasuteru Urano, Tetsuo Nagano, The Univ. of Tokyo (Japan)[7568-49]

Optical modulation of smooth muscle cell contraction, Jonghee Yoon, Chulhee Choi, Hyosook Choi, Korea Advanced Institute of Science and Technology (Korea, Republic of)[7568-45]

Programmed cell death-involved cadmium toxicity in arabidopsis thaliana is associated with the production of reactive oxygen species, Wen Li Chen, Weina Zhang, South China Normal Univ. (China)[7568-30]

The effects of salicylic acid and methyl salicylate on the early growth of arabidopsis, Wen Li Chen, Lijuan Yun, South China Normal Univ. (China)[7568-31]

Combined optical coherence tomography based on the extended Huygens-Fresnel principle and histology of mouse skin, Shulian Wu, Hui Li, Fujian Normal Univ. (China)[7568-32]

Development of in vivo confocal microscope for reflection and fluorescence imaging simultaneously, MyoungKi Ahn, Cheol Song, ByungSeon Chun, DaeGab Gweon, Korea Advanced Institute of Science and Technology (Korea, Republic of)[7568-25]

Effects of NaCl on photosynthesis in arabidopsis and thellungiella leaves based on the fluorescence spectra, the fast chlorophyll fluorescence induction dynamics analysis, and the delayed fluorescence technique, Wen Li Chen, Zhiqiang Chen, South China Normal Univ. (China)[7568-26]

Evaluation of human serum of severe rheumatoid arthritis by confocal Raman spectroscopy, Carolina S. Carvalho, Leandro J. Raniero, Ana Maria Espirito Santo, Univ. do Vale do Paraíba (Brazil); Marcelo M. Pinheiro, Luis Eduardo C. Andrade, Univ. Federal de São Paulo (Brazil); Maria Angelica G. Cardoso, Univ. do Vale do Paraíba (Brazil); Jonatas S. Junior, Biomed Lab. (Brazil); Airton A. Martin, Univ. do Vale do Paraíba (Brazil)[7568-14]

Tomographic imaging system using digital holographic technique based on integrating four buckets phase shifting interferometry, Gihyeon Min, Ju W. Kim, Woo J. Choi, Gwangju Institute of Science of Technology (Korea, Republic of); Eun S. Choi, Chosun Univ. (Korea, Republic of); Byeong H. Lee, Gwangju Institute of Science of Technology (Korea, Republic of)[7568-40]

Immersion Mirau Interferometry for label-free live cell imaging in an epi-illumination geometry, Oleksandra V. Lyulko, Gerhard Randers-Pehrson, David J. Brenner, Columbia Univ. (USA)[7568-93]

Multiphoton Microscopy in the Biomedical Sciences X

Conference Chairs: **Ammasi Periasamy**, Univ. of Virginia; **Peter T. C. So**, Massachusetts Institute of Technology; **Karsten König**, Saarland Univ. (Germany)

Program Committee: **Wolfgang Becker**, Becker & Hickl GmbH (Germany); **Keith M. Berland**, Emory Univ.; **Guy C. Cox**, The Univ. of Sydney (Australia); **Alberto Diaspro**, Univ. degli Studi di Genova (Italy); **Chen-Yuan Dong**, National Taiwan Univ. (Taiwan); **Dennis Donley**, Olympus America; **Kevin W. Eliceiri**, Univ. of Wisconsin-Madison; **Scott E. Fraser**, California Institute of Technology; **Paul M. French**, Imperial College London (United Kingdom); **Hans C. Gerritsen**, Utrecht Univ. (Netherlands); **Min Gu**, Swinburne Univ. of Technology (Australia); **Stefan W. Hell**, Max-Planck-Institut für biophysikalische Chemie (Germany); **Brian A. Herman**, The Univ. of Texas Health Science Ctr. at San Antonio; **Satoshi Kawata**, Osaka Univ. (Japan); **Arnd K. Krueger**, Newport Spectra-Physics; **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine; **Stephen M. McDonald**, Coherent, Inc.; **Simon C. Watkins**, Univ. of Pittsburgh; **Paul W. Wiseman**, McGill Univ. (Canada); **Sunney X. Xie**, Harvard Univ.; **Bernhard Zimmermann**, Carl Zeiss Jena GmbH (Germany); **Warren R. Zipfel**, Cornell Univ.

Support for this Conference is provided by:

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Sunday 24 January

Welcome Remarks

Room: 308 (Esplanade) Sun. 8:10 am

Session Chair: **Ammasi Periasamy**, Univ. of Virginia

Keynote Session

Room: 308 (Esplanade) Sun. 8:20 to 9:50 am

Session Chair: **Ammasi Periasamy**, Univ. of Virginia

8:20 am: **Plasmon-controlled fluorescence: applications to sensing and single molecule detection** (*Invited Paper*), Joseph R. Lakowicz, Krishanu Ray, Mustafa H. Chowdhury, Yi Fu, Jian Zhang, Henryk Szmajcinski, Kazimierz Nowaczyk, Univ. of Maryland School of Medicine (USA) [7569-01]

8:50 am: **Nanoscapy with focused light** (*Invited Paper*), Stefan W. Hell, Max-Planck-Institut für biophysikalische Chemie (Germany) [7569-02]

9:20 am: **Label-free nonlinear optical imaging for biology and medicine** (*Invited Paper*), Sunney Xiaoliang Xie, Harvard Univ. (USA) [7569-03]

SESSION 1

Room: 308 (Esplanade). Sun. 9:50 to 11:55 am

Raman/CARS Microscopy I

Session Chair: **Sunney X. Xie**, Harvard Univ.

9:50 am: **Coherent Raman scattering microscopy: current status and new advances** (*Invited Paper*), Ji-Xin Cheng, Purdue Univ. (USA) [7569-04]

Coffee Break 10:10 to 10:30 am

10:30 am: **CARS and SHG microscopy of artificial bioengineered tissues** (*Invited Paper*), Annika M. Enejder, Christian Brackmann, Jan-Olof Dahlberg, Paul Gatenholm, Chalmers Univ. of Technology (Sweden) [7569-05]

10:50 am: **Stimulated Raman scattering (SRS) microscopy: label-free imaging with improved sensitivity and specificity**, Christian W. Freudiger, Wei Min, Brian G. Saar, Sunney X. Xie, Harvard Univ. (USA) [7569-06]

11:05 am: **Multimodal CARS microscopy using femtosecond lasers**, Adrian F. Pegoraro, National Research Council Canada (Canada) and Queen's Univ. (Canada); Andrew Ridsdale, Douglas J. Moffatt, National Research Council Canada (Canada); Brian K. Thomas, Libin Fu, Liang Dong, Martin E. Ferrmann, IMRA America, Inc. (USA); Albert Stolow, National Research Council Canada (Canada) and Queen's Univ. (Canada) [7569-07]

11:20 am: **Frequency modulation coherent anti-Stokes Raman scattering (FM-CARS) microscopy based on spectral focusing of chirped laser pulses**, Sang-Hyun Lim, Jiha Sung, Bi-Chang Chen, The Univ. of Texas at Austin (USA) [7569-08]

11:35 am: **Hyperspectral CARS imaging: label-free and quantitative mapping of cholesterol in lipid mixtures** (*Invited Paper*), Andreas Volkmer, Gregor Hehl, Univ. Stuttgart (Germany) [7569-09]

Lunch/Exhibition Break 11:55 am to 1:05 pm

SESSION 2

Room: 308 (Esplanade). Sun. 1:05 to 3:00 pm

Raman/CARS Microscopy II

Session Chair: **Ji-Xin Cheng**, Purdue Univ.

1:05 pm: **Femtosecond pulse shaping for the enhancement of nonlinear microscopy in tissue** (*Invited Paper*), Warren S. Warren, Martin C. Fischer, Duke Univ. (USA) [7569-10]

1:25 pm: **Background-free CARS microscopy at interfaces** (*Invited Paper*), Hervé Rigneault, Gachet David, Institut Fresnel (France); Franck Billard, Institut Carnot de Bourgogne (France); Sophie Brustlein, Institut Fresnel (France) [7569-11]

1:45 pm: **CARS endoscopy**, Brian G. Saar, Harvard Univ. (USA); Richard S. Johnston, Univ. of Washington (USA); Maarten B. J. Roeffaers, ; Eric J. Seibel, Univ. of Washington (USA); Xiaoliang Sunney Xie, Harvard Univ. (USA) [7569-12]

2:00 pm: **Chemistry in confinement: using CARS for quantitative monitoring of chemical processes**, Mischa Bonn, Katrin Domke, Gianluca Rago, James Day, FOM Institute for Atomic and Molecular Physics (Netherlands); Marianne Kox, Bert Weckhuysen, Utrecht Univ. (Netherlands) [7569-13]

2:15 pm: **Vibrational phase contrast CARS microscopy for quantitative analysis**, Martin Jurna, Erik T. Garbacik, Jeroen P. Korterik, Cees Otto, Jennifer L. Herek, Herman L. Offerhaus, Univ. Twente (Netherlands) [7569-14]

2:30 pm: **Broadband CARS microscopy: noninvasive chemical imaging for biology**, Marcus T. Cicerone, Young Jong Lee, Sapun Parekh, National Institute of Standards and Technology (USA) [7569-21]

2:45 pm: **A novel hands-free and compact picosecond CARS light source based on OPO technology**, Ingo Rimke, Dirk Neumeyer, Ralf Bressel, Edlef Büttner, APE GmbH (Germany) [7569-16]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Room: 308 (Esplanade). Sun. 3:30 to 5:55 pm

Raman/CARS Microscopy III

Session Chair: **Hervé Rigneault**, Institut Fresnel (France)

3:30 pm: **Short-pulse fiber lasers for coherent Raman microscopies** (*Invited Paper*), Frank W. Wise, Cornell Univ. (USA) [7569-17]

3:50 pm: **Leica TCS CARS: a CARS commercial solution with high temporal resolution**, Vanessa Lurquin, William C. Hay, Vishnu Krishnamachari, Leica Microsystems CMS GmbH (Germany) [7569-18]

4:05 pm: **Coherent Raman imaging of chemical compounds in human hair** (*Invited Paper*), Eric Olaf Potma, Maxwell Zimmerley, Univ. of California, Irvine (USA) [7569-19]

4:25 pm: **Minimally invasive coherent Raman clinical diagnostic microscopy**, Geoffrey S. Young, Brigham and Women's Hospital (USA); Sunny Xie, Christian Freudiger, Brian Saar, Harvard Univ. (USA); Santosh Kesari, Xiaoyin Xu, Qing Zeng, Brigham and Women's Hospital (USA) [7569-20]

4:40 pm: **Nonlinear Raman microscopy: improving detection through nonlinear optical interaction**, Vladislav V. Yakovlev, Univ. of Wisconsin-Milwaukee (USA) [7569-15]

4:55 pm: **Stain-free histopathology using nonlinear interferometric vibrational imaging and spectroscopy**, Praveen D. Chowdary, Zhi Jiang, Wladimir Benalcazar, Adeel Ahmad, Eric Chaney, Martin Gruebele, Stephen Boppart, Univ. of Illinois at Urbana-Champaign (USA) [7569-22]

5:10 pm: **Comparing coherent and spontaneous Raman scattering signals for biological imaging and biosensing applications**, Jennifer P. Ogilvie, Brandon R. Bachler, Sarah R. Nichols, Meng Cui, Univ. of Michigan (USA) [7569-23]

5:25 pm: **Polarization-resolved coherent anti-Stokes Raman scattering microscopy**, Fabiana Munhoz, Sophie Brustlein, Institut Fresnel (France); Pradyot A. Agaskar, Spherosils LLC (USA); Sophie Brasselet, Hervé Rigneault, Institut Fresnel (France) [7569-96]

5:40 pm: **High-speed CARS spectral imaging using acousto optic tunable filter**, Mamoru Hashimoto, Takeo Minamikawa, Tsutomu Araki, Osaka Univ. (Japan) [7569-21]

11:15 am: **Pulsed excitation is not just TPE and FLIM: lifetime weighted FCS (FLCS) and laser cutting with confocal laser scanning microscopes**, Volker Buschmann, Benedikt Kraemer, PicoQuant GmbH (Germany); Samantha Fore, PicoQuant Photonics North America, Inc. (USA); Isabel Raabe, Jan Peychl, Max-Planck-Institut für molekulare Zellbiologie und Genetik (Germany); Uwe Ortmann, Felix Koberling, Peter Kapusta, PicoQuant GmbH (Germany); Iva M. Tolic-Nørrelykke, Max-Planck-Institut für molekulare Zellbiologie und Genetik (Germany); Rainer Erdmann, PicoQuant GmbH (Germany) [7569-32]

11:30 am: **Total internal reflection fluorescence lifetime imaging microscope to probe FRET in neurobiology**, Viviane Devauges, LPPM-CNRS, Univ. Paris-Sud 11 (France); Pierre Blandin, LPPM-CNRS, Ecole Supérieure de Physique et de Chimie Industrielles (France); Jack Cossec, CRICM, Ecole Supérieure de Physique et de Chimie Industrielles (France); Sandrine Lécart, CPBM, Univ. Paris-Sud 11 (France); Catherine Marquer, Marie-Claude Potier, CRICM, Ecole Supérieure de Physique et de Chimie Industrielles (France); Frederic Druon, Patrick Georges, Institut d'Optique Graduate School (France); Sandrine Leveque-Fort, LPPM-CNRS, Univ. Paris-Sud 11 (France) . . . [7569-33]

11:45 am: **In vivo stoichiometry monitoring of G protein coupled receptor oligomers using spectrally resolved two-photon microscopy**, Michael R. Stoneman, Deo Raj Singh, Valerica Raicu, Univ. of Wisconsin-Milwaukee (USA) [7569-34]

12:00 pm: **New strategies to measure sodium concentrations in living cells**, Sascha Dietrich, Birgit Hoffmann, Sarmiza E. Stanca, Charles Cranfield, Klaus Benndorf, Christoph U. Biskup, Univ. Hospital Jena (Germany) [7569-35]

Lunch Break 12:15 to 1:35 pm

Monday 25 January

SESSION 4

Room: 308 (Esplanade) Mon. 8:00 to 10:00 am

FLIM/FRET/FCS I

Session Chair: Angelika C. Rueck, Univ. Ulm (Germany)

8:00 am: **Time-resolved anisotropy imaging enables quantification of protein cluster sizes with sub-cellular resolution** (*Invited Paper*), Hans C. Gerritsen, Arjen Bader, Erik Hofman, Paul van Bergen en Henegouwen, Gerrit van Meer, Utrecht Univ. (Netherlands) [7569-24]

8:25 am: **Better FLIM and FCS data by GaAsP hybrid detectors** (*Invited Paper*), Wolfgang Becker, Becker & Hickl GmbH (Germany) [7569-25]

8:45 am: **Seamless integration of FLIM and FCS for confocal laser scanning microscopy**, Lioba Kuschel, Leica Microsystems CMS GmbH (Germany); Benedikt Krämer, Uwe Ortmann, Felix Koberling, Michael Wahl, Matthias Patting, Rainer Erdmann, PicoQuant GmbH (Germany); Constantin Kappel, Leica Microsystems CMS GmbH (Germany) [7569-26]

9:00 am: **Comparison of FRET microscopy imaging techniques for studying protein-protein interactions in living cells using FRET standards**, Yuansheng Sun, Soo-Ah Seo, Ammasi Periasamy, Univ. of Virginia (USA) [7569-27]

9:15 am: **Time-resolved fluorescence microscopy using TCSPC and multifrequency techniques**, Lin Chandler, HORIBA Jobin Yvon Inc. (USA) [7569-28]

9:30 am: **Regulatory assembly of the vacuolar proton pump VoV1-ATPase in yeast by FLIM-FRET**, Stefan Ernst, Univ. Stuttgart (Germany); Claire Batisse, EMBL Heidelberg (Germany); Nawid Zarrabi, Univ. Stuttgart (Germany); Bettina Böttcher, EMBL Heidelberg (Germany); Michael Börsch, Univ. Stuttgart (Germany) [7569-29]

9:45 am: **Molecular order imaging in lipid membranes by polarimetric two-photon fluorescence microscopy**, Alicja Gasecka, Tsai-Jung Han, Cyril Favard, Herve Rigneault, Sophie Brasselet, Institut Fresnel (France) . . [7569-105]

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 308 (Esplanade) Mon. 10:30 am to 12:15 pm

FLIM/FRET/FCS II

Session Chair: Hans C. Gerritsen, Utrecht Univ. (Netherlands)

10:30 am: **Spectral resolved fluorescence lifetime imaging: new developments and applications** (*Invited Paper*), Angelika C. Rueck, Univ. Ulm (Germany) [7569-30]

10:55 am: **Dynamics of cellular energy metabolism during cell culture growth measured with fluorescence lifetime and anisotropy imaging** (*Invited Paper*), Vladimir Ghukasyan, Tatyana Buryakina, Chih-Chun Hsu, Fu-Jen Kao, National Yang-Ming Univ. (Taiwan) [7569-31]

SESSION 6

Room: 308 (Esplanade) Mon. 1:35 to 5:20 pm

Technology Development and Applications I

Session Chair: Peter T. C. So, Massachusetts Institute of Technology

1:35 pm: **Current developments in clinical multiphoton tomography** (*Invited Paper*), Karsten König, Univ. Saarbrücken (Germany) and JenLab GmbH (Germany) [7569-36]

2:00 pm: **Long-term marker-free multiphoton imaging, targeted transfection, optical cleaning of stem cell clusters, and optical transport of microRNA with extreme ultrashort laser pulses**, Aisada Uchugonova, Univ. Saarland (Germany); Karsten König, Hauke Studier, JenLab GmbH (Germany); Gerhard M. Kostner, Medizinische Univ. Graz (Austria); Zeno Földes-Papp, ISS, Inc. (USA) [7569-37]

2:15 pm: **Arbitrary-scan imaging for two-photon microscopy**, Edward J. Botcherby, Christopher W. Smith, Martin J. Booth, Rimas Juskaitis, Tony Wilson, Univ. of Oxford (United Kingdom) [7569-38]

2:30 pm: **Multiphoton microscopy as a diagnostic imaging modality for lung cancer**, Ina P. Pavlova, Kelly R. Hume, Stephanie A. Yazinski, Rachel M. Peters, Robert S. Weiss, Watt W. Webb, Cornell Univ. (USA) [7569-39]

2:45 pm: **Controllable infrared continuum source for multiphoton imaging**, Claudio de Mauro, Domenico Alfieri, Light4Tech Firenze S.r.l. (Italy); Marco Arrigoni, David Armstrong, Coherent, Inc. (USA); Francesco Saverio Pavone, Univ. of Florence (Italy) [7569-40]

Coffee Break 3:00 to 3:25 pm

3:25 pm: **What can jumping optical tweezers offer in probing the cell mechanics of red blood cells?** (*Invited Paper, Presentation Only*), Yu-Tsung Wu, Chi-Han Ho, Ming-Tzo Wei, Arthur E. T. Chiou, National Yang-Ming Univ. (Taiwan) [7569-41]

3:50 pm: **Latest advances in ultrafast laser sources for multiphoton microscopy**, Philip G. Smith, Newport Spectra-Physics (USA) [7569-42]

4:05 pm: **Advances in lasers for biological imaging**, David P. Armstrong, Coherent, Inc. (USA) [7569-103]

4:20 pm: **Nonlinear fs-laser scanning microscopy with broadband and ultrabroadband pulses**, Hauke Studier, Hans Georg Breunig, Karsten König, JenLab GmbH (Germany) [7569-43]

4:35 pm: **Wavefront correction in two-photon microscopy using a nematic liquid crystal modulator**, Gunnsteinn Hall, John G. White, Kevin Eliceiri, Univ. of Wisconsin-Madison (USA) [7569-44]

4:50 pm: **Two-photon excited photothermal lens microscopy for label free imaging of heme proteins**, Sijia Lu, Wei Min, Shasha Chong, Gary R. Holtom, X. Sunney Xie, Harvard Univ. (USA) [7569-45]

5:05 pm: **Imaging skin mast cells in vivo with two-photon autofluorescence microscopy**, Chunqiang Li, Massachusetts General Hospital (USA); Riikka K. Pastila, Radiation and Nuclear Safety Authority (Finland) and Massachusetts General Hospital (USA); Charles P. Lin, Massachusetts General Hospital (USA) [7569-46]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Session Chairs: **Holly L. Aaron**, Univ. of California, Berkeley;
Vladimir Ghukasyan, National Yang-Ming Univ. (Taiwan);
Christoph U. Biskup, Friedrich-Schiller-Univ. Jena (Germany);
Eric Olaf Potma, Univ. of California, Irvine

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Real-time molecular imaging of organelles in living cell by multifocus excitation CARS microscope, Takeo Minamikawa, Tsutomu Araki, Mamoru Hashimoto, Osaka Univ. (Japan) [7569-70]

In situ observation of collagen thermal denaturation by second harmonic generation, Chien Sheng Liao, Zong Yan Zhuo, Jiun Yann Yu, Pen Hsiu Chao, Shi Wei Chu, National Taiwan Univ. (Taiwan) [7569-71]

Spatio-temporal control in multiphoton fluorescence laser-scanning microscopy, Arijit Kumar De, Debjit Roy, Debabrata Goswami, Indian Institute of Technology Kanpur (India) [7569-72]

Discrimination the collagen in normal and pathological dermis through polarization second harmonic generation, Ping-Jung Su, Wei-Liang Chen, National Taiwan Univ. (Taiwan); Jin-Bon Hong, National Taiwan Univ. Hospital (Taiwan); Tsung-Hsien Li, Ruei-Jr Wu, Chen-Kuan Chou, National Taiwan Univ. (Taiwan); Sung-Jan Lin, National Taiwan Univ. Hospital (Taiwan) and Biomedical Engineering Institute, National Taiwan Univ. (Taiwan); Chen-Yuan Dong, National Taiwan Univ. (Taiwan) [7569-73]

Multispectral autofluorescence lifetime imaging of RPE cells using two-photon excitation, Junle Qu, Lingling Zhao, Danni Chen, Hanben Niu, Shenzhen Univ. (China) [7569-74]

In vivo multiphoton imaging of metabolic dynamics of obstructive cholestasis in mice, Feng-Chieh Li, Chen-Yuan Dong, National Taiwan Univ. (Taiwan) [7569-75]

Versatile photonic crystal fiber-enabled source for multi-modality biophotonic imaging beyond conventional multiphoton microscopy, Haohua Tu, Stephen Boppart, Univ. of Illinois at Urbana-Champaign (USA) [7569-77]

Ultrasensitive Raman imaging in living monocytes using doubly-resonant four-wave mixing, Tyler J. Weeks, Lawrence Livermore National Labs. (USA) and Univ. of California, Davis (USA); Thomas R. Huser, Sebastian Wachsmann-Hogiu, Univ. of California, Davis (USA) [7569-78]

Multiplex coherent anti-Stokes Raman scattering flow cytometry for real-time classification of particles in a microfluidic channel, Charles H. Camp, Jr., Siva Yegnanarayanan, Ali A. Eftekhar, Georgia Institute of Technology (USA); Hamsa Sridhar, Harvard Univ. (USA); Ali Adibi, Georgia Institute of Technology (USA) [7569-79]

Quantitative analysis of biological tissues using Fourier transform-second-harmonic generation imaging, Raghu Ambekar Ramachandra Rao, Univ. of Illinois, Urbana-Champaign (USA); Monal R. Mehta, Scott M. Leithem, Kimani C. Toussaint, Jr., Univ. of Illinois at Urbana-Champaign (USA) [7569-80]

NIR Luminescence Microscopy for Nano- and PV-Material Characterization, Lin Chandler, HORIBA Jobin Yvon Inc. (USA) [7569-81]

Fluorescence standards for confocal microscopy, Steffen Ruettinger, Physikalisch-Technische Bundesanstalt (Germany); Peter Kapusta, Volker Voellkopf, Felix Koberling, Rainer Erdmann, PicoQuant GmbH (Germany); Rainer Macdonald, Physikalisch-Technische Bundesanstalt (Germany) [7569-82]

Fiber-based multiphoton system, Gangjun Liu, Beckman Laser Institute and Medical Ctr. (USA); Khanh Kieu, Cornell Univ. (USA); Lingfeng Yu, Beckman Laser Institute and Medical Ctr. (USA); Frank W. Wise, Cornell Univ. (USA); Zhongping Chen, Beckman Laser Institute and Medical Ctr. (USA) [7569-83]

Biological chromophore imaging with stimulated emission microscopy, Wei Min, Sijia Lu, Shasha Chong, Rahul Roy, Gary Holtom, Sunney X. Xie, Harvard Univ. (USA) [7569-84]

Advances in complex monolithic optics for optical tagging in multi-wavelength fluorescence microscopy, Alan Graham, George P. Tsai, John Dow, Agilent Technologies, Inc. (USA) [7569-85]

Fiber optic two-photon fluorescence endomicroscope with dynamic focus tracking, Yicong Wu, Li Huo, Jiefeng Xi, Xingde Li, The Johns Hopkins Univ. (USA) [7569-86]

Nonlinear phase contrast imaging in tissue, Prathyush Samineni, Henry C. Liu, Duke Univ. (USA); Ryohei Yasuda, Duke Univ. Medical Ctr. (USA); Warren S. Warren, Martin C. Fischer, Duke Univ. (USA) [7569-87]

Nonlinear microscopy with wavelength swept pulsed laser delivered by single-mode fiber, Jeon Woong Kang, Pilhan Kim, Seok-Hyun Yun, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [7569-88]

Line scanning multiphoton modulation microscopy with a single element detector, Scott S. Howard, Adam Straub, Chris Xu, Cornell Univ. (USA) [7569-89]

Microprisms for in vivo multiphoton microscopy of mouse cortex, Thomas Chia, Michael J. Levene, Yale Univ. (USA) [7569-90]

Two-photon imaging of partial pressure of oxygen in small animal brain tissue and vasculature, Sava Sakadzic, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Mohammad A. Yaseen, Massachusetts General Hospital (USA); Vivek J. Srinivasan, Emiri T. Mandeville, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Anna Devor, Massachusetts General Hospital (USA) and Harvard Medical School (USA) and Univ. of California, San Diego (USA); Emmanuel Roussakis, Univ. of Pennsylvania (USA); Eng H. Lo, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Sergei A. Vinogradov, Univ. of Pennsylvania (USA); David A. Boas, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [7569-91]

In vivo deep tissue imaging with long wavelength two-photon excitation, Demirhan Kobat, Michael E. Durst, Nozomi Nishimura, Angela W. Wong, Chris B. Schaffer, Chris Xu, Cornell Univ. (USA) [7569-92]

Coherent anti-Stokes Raman scattering microscopy using photonic crystal fiber, Maji Naji, Sangeeta Murugkar, Kaiser Khan, Hanan Anis, Univ. of Ottawa (Canada) [7569-93]

Ex vivo second and third harmonic generation imaging of cornea by epi-detection on a whole eye, Louis Jay, Carolynne Dion, Arnaud Brocas, Kanwarpal Singh, Jean-Claude Kieffer, Institut National de la Recherche Scientifique (Canada); Isabelle Brunette, Univ. de Montréal (Canada); Tsuneyuki Ozaki, Institut National de la Recherche Scientifique (Canada) [7569-94]

CARS microscopy in a microcavity, Hervé Rigneault, David Gachet, Institut Fresnel (France); Franck Billard, Institut Carnot de Bourgogne (France) [7569-97]

Polarized broadband multiplex CARS in the picosecond regime, Sebastien Michel, Fabiana Munhoz, Institut Fresnel (France); Antoine Courjaud, Eric Mottay, Amplitude-Systèmes (France); John Dudley, Femto-ST (France); Herve Rigneault, Institut Fresnel (France) [7569-98]

Polarization second harmonic generation (PSHG) imaging of neurons: estimating the effective orientation of the SHG source in axons, Sotiris Psilodimitrakopoulos, Instituto de Ciencias Fotónicas (Spain); Valerie Petegnief, Guadalupe Soria, Consejo Superior de Investigaciones Científicas (Spain); Ivan Amat-Roldan, Instituto de Ciencias Fotónicas (Spain); David Artigas, Univ. Politècnica de Catalunya (Spain) and Instituto de Ciencias Fotónicas (Spain); Anna M. Planas, Consejo Superior de Investigaciones Científicas (Spain); Pablo Loza-Alvarez, Instituto de Ciencias Fotónicas (Spain) [7569-99]

Multiphoton microscopy for in situ investigations of cryopreserved samples, Daniel Dörr, Axel Beier, Martin Schwarz, Heiko Zimmermann, Iris Riemann, Julia Schulz, Frank Stracke, Fraunhofer-Institut für Biomedizinische Technik (Germany) [7569-100]

Complementary equipment for controlling multiple laser beams on single scanner MPLSM systems, P. Johannes Helm, Gabriele Nase, CMBN & LRC, Univ. of Oslo (Norway); Paul Heggelund, Trond Reppen, Univ. of Oslo (Norway) [7569-101]

Investigating the protective effects of milk phospholipids against ultraviolet exposure in a skin equivalent model using multiphoton microscopy, Ashley Russell, Andrea Laubscher, Rafael Jimenez-Flores, Lily H. Laiho, California Polytechnic State Univ., San Luis Obispo (USA) [7569-102]

In vivo tissue imaging using a compact mobile nonlinear microscope, Riccardo Cicchi, Dimitrios Kapsokalyvas, Despoina Stampouli, Vincenzo De Giorgi, Serena Sestini, Daniela Massi, Torello Lotti, Francesco Saverio Pavone, Univ. degli Studi di Firenze (Italy) [7569-104]

Fast rasterscanning enables FLIM in macroscopic samples up to several centimeter, Felix Koberling, Volker Buschmann, PicoQuant GmbH (Germany); Carsten Hille, Univ. Potsdam (Germany); Matthias Patting, Michael Wahl, PicoQuant GmbH (Germany); Carsten Dosche, Univ. Potsdam (Germany); Rainer Erdmann, PicoQuant GmbH (Germany); Samantha Fore, PicoQuant Photonics North America, Inc. (USA) [7569-106]

pH and chloride recordings in living cells using two-photon fluorescence lifetime imaging microscopy, Mattes Lahn, Carsten Hille, Univ. of Potsdam (Germany); Felix Koberling, Peter Kapusta, PicoQuant GmbH (Germany); Carsten Dosche, Univ. of Potsdam (Germany) [7569-107]

Extracellular oxygen concentration mapping with a confocal multiphoton laser scanning microscope and TCSPC card, Neveen A. Hosny, Martin M. Knight, David A. Lee, Queen Mary Univ. of London (United Kingdom) [7569-108]

A multimodal multiphoton microscope for biological imaging, Rabah Mouras, Andrew Downes, Grigore Rischitor, Meropi Mari, Alistair Effick, Univ. of Edinburgh (United Kingdom) [7569-109]

Chitin SHG and its organization in the squid pen, André Alexandre de Thomaz, Carlos Lenz Cesar, Hernandes F. Carvalho, Univ. Estadual de Campinas (Brazil) [7569-110]

Patterns of second harmonic generation in human ovarian tissues, Luciana Pietro, Carlos Lenz Cesar, Leveson Lamonier, L. A. Andrade, André Alexandre de Thomaz, C. L. Machado, Fatima Bottcher-Luiz, Univ. Estadual de Campinas (Brazil) [7569-111]

Wavefront optimized multiphoton microscopy of ex vivo ocular tissues, Emilio Gualda, Juan M. Bueno, Pablo Artal, Univ. de Murcia (Spain) . . [7569-112]

Nonlinear 3D microscopy of ex vivo corneas, Juan M. Bueno, Emilio J. Gualda, Pablo Artal, Univ. de Murcia (Spain) [7569-113]

Comparison of double- and single-pass adaptive optics configuration in an optical sectioning microscope, Marie Caroline Muellenbroich, Simon P. Poland, Univ. of Strathclyde (United Kingdom); Kim-Kristin Buttenschoen, John M. Girkin, Durham Univ. (United Kingdom); Amanda J. Wright, Univ. of Strathclyde (United Kingdom) [7569-114]

Annular-aperture detection scheme in radially polarized coherent anti-Stokes Raman scattering (RP-CARS) microscopy for vibrational contrast enhancement, Jian Lin, Fake Lu, Haifeng Wang, Wei Zheng, Zhiwei Huang, National Univ. of Singapore (Singapore) [7569-126]

Fiber delivered probe for efficient CARS imaging of tissues, Mihaela Balu, Gangjun Liu, Beckman Laser Institute and Medical Ctr. (USA); Eric O. Potma, Univ. of California, Irvine (USA); Bruce J. Tromberg, Beckman Laser Institute and Medical Ctr. (USA) [7569-130]

Tuesday 26 January

SESSION 7

Room: 308 (Esplanade) Tues. 8:00 to 10:10 am

Second Harmonic Generation I

Session Chair: Chen-Yuan Dong, National Taiwan Univ. (Taiwan)

8:00 am: **Alterations of the extracellular matrix in ovarian cancer studied by second harmonic generation imaging microscopy** (*Invited Paper*), Paul J. Campagnola, Oleg Nadiarnykh, Ronald B. LaComb, Molly A. Brewer, Univ. of Connecticut Health Ctr. (USA) [7569-47]

8:25 am: **Adaptive multiphoton and harmonic generation microscopy for developmental biology**, Martin J. Booth, Anisha Thayil, Alexander Jesacher, Tony Wilson, Univ. of Oxford (United Kingdom) [7569-48]

8:40 am: **Longitudinal study of multiphoton autofluorescence microscopy and second harmonic generation microscopy during oral carcinogenesis**, Tuya Shilagard, Sri Rajya L. Rudrabhatla, Natalya Patrikeeva, Vicente Resto, Susan McCammon, Suimin Qiu, Gracie Vargas, The Univ. of Texas Medical Branch (USA) [7569-49]

8:55 am: **Digital holography for second harmonic microscopy**, Etienne Shaffer, Christian Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7569-50]

9:10 am: **Video-rate higher-harmonic-generation fiber-endoscope with a submicron spatial resolution**, Che-Hang Yu, Shih-Hsuan Chia, Tzu-Ming Liu, Nai-Chia Cheng, Ming-Che Chan, I-Hsiu Chen, National Taiwan Univ. (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) and Research Ctr. for Applied Sciences, Academia Sinica (Taiwan) [7569-51]

9:25 am: **Two-photon and second harmonic generation microscopy for dynamic investigation of skin morphogenesis**, Chun-Chin Wang, Yi-Ju Chen, Ping-Jung Su, Chen-Yuan Dong, Sung-Jan Lin, National Taiwan Univ. (Taiwan) [7569-52]

9:40 am: **Second harmonic generation microscopy detection of individual hybrid nanopores**, Sophie Brasselet, Institut Fresnel (France); Nicolas Sandeau, Univ. Pierre et Marie Curie Paris VI (France); Emilie Delahaye, René Clément, Institut de Chimie Moléculaire et des Matériaux d'Orsay, Univ. Paris-Sud 11 (France) [7569-53]

9:55 am: **Differential nonlinear microscopy for biomedical imaging**, Virginijus Barzda, Daaf Sandkuijl, Adam Tuer, Richard Cisek, Sergey Musikhin, Univ. of Toronto Mississauga (Canada) [7569-95]

Coffee Break 10:10 to 10:30 am

SESSION 8

Room: 308 (Esplanade) Tues. 10:30 am to 12:00 pm

Second Harmonic Generation II

Session Chair: Paul J. Campagnola, Univ. of Connecticut Health Ctr.

10:30 am: **Second-order susceptibility imaging with polarization-resolved second harmonic generation microscopy**, Wei-Liang Chen, Tsung-Hsian Li, Ping-Jung Su, Chen-Kuan Chou, Peter Tramyon Fwu, National Taiwan Univ. (Taiwan); Sung-Jan Lin, National Taiwan Univ. Hospital (Taiwan) and National Taiwan Univ. (Taiwan); Daekeun Kim, Peter T.C. So, Massachusetts Institute of Technology (USA); Chen-Yuan Dong, National Taiwan Univ. (Taiwan) . [7569-54]

10:45 am: **In vivo optical virtual biopsy of human oral cavity with harmonic generation microscopy**, Ming-Rung Tsai, Szu-Yu Chen, National Taiwan Univ. (Taiwan); Dar-Bin Shieh, National Cheng-Kung Univ. (Taiwan); Pei-Jen Lou, National Taiwan Univ. Hospital (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) [7569-55]

11:00 am: **Polarization and phase pulse shaping applied to structural contrast in nonlinear microscopy imaging**, Peter Schön, Martin Behrnt, Dora Ait-Belkacem, Hervé Rigneault, Sophie Brasselet, Institut Fresnel (France) [7569-56]

11:15 am: **Nonlinear optical response of the collagen triple helix and second harmonic microscopy of collagen liquid crystals**, Ariane Deniset-Besseau, Paulo De Sa Peixoto, Ecole Polytechnique (France); Julien Duboisset, Claire Loison, Emmanuel Benichou, Univ. Lyon I (France); François Hache, Ecole Polytechnique (France); Pierre-François Brevet, Univ. Lyon I (France); Gervaise Mosser, Marie-Claire Schanne-Klein, Ecole Polytechnique (France) [7569-57]

11:30 am: **MMP-2 silencing by siRNA inhibits morphogenesis of the rat ventral prostate in vitro studied by SHG microscopy**, Alexandre Cardoso, André Alexandre de Thomaz, Carlos Lenz Cesar, Hernandes F. Carvalho, Univ. Estadual de Campinas (Brazil) [7569-58]

11:45 am: **Second harmonic generation in human ovarian neoplasias**, Leveson Lamonier, André Alexandre de Thomaz, Fatima Bottcher-Luiz, Luciana Pietro, L. A. Andrade, C. L. Machado, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) [7569-59]

Lunch Break 12:05 to 1:35 pm

SESSION 9

Room: 308 (Esplanade) Tues. 1:35 to 5:00 pm

Technology Development and Applications II

Session Chair: Karsten König, JenLab GmbH (Germany)

1:35 pm: **High-throughput three-dimensional (3D) lithographic microfabrication in biomedical applications**, Daekeun Kim, Peter T. C. So, Massachusetts Institute of Technology (USA) [7569-60]

1:50 pm: **Assessment of fibrotic liver disease with multimodal nonlinear optical microscopy**, Fake Lu, Wei Zheng, National Univ. of Singapore (Singapore); Dean C. S. Tai, Institute of Bioengineering and Nanotechnology (Singapore); Jian Lin, Hanry Yu, Zhiwei Huang, National Univ. of Singapore (Singapore) [7569-61]

2:05 pm: **Two-photon autofluorescence imaging deep in human epithelial tissue down to the out-of-focus background limit**, Nicholas J. Durr, Christian T. Weisspennig, Benjamin A. Holfeld, The Univ. of Texas at Austin (USA); Leslie Zachariah, Ann M. Gillenwater, The Univ. of Texas M. D. Anderson Cancer Ctr. (USA); Adela Ben-Yakar, The Univ. of Texas at Austin (USA) [7569-62]

2:20 pm: **Multiphoton microscopy of entire intact mouse organs**, Michael J. Levene, Sonia Parra, Yale Univ. (USA) [7569-63]

2:35 pm: **Multimodal multiphoton microscopy at 1.5 μm**, Chun Zhan, Chulmin Joo, Siavash Yazdanfar, GE Global Research (USA); Mikhail Berezin, Walter Akers, Yunpeng Ye, Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA) [7569-64]

2:50 pm: **Multicolor excitation two-photon microscopy: in vivo imaging of cells and tissues**, Dong Li, Wei Zheng, Jianan Y. Qu, Hong Kong Univ. of Science and Technology (Hong Kong, China) [7569-76]

Coffee Break 3:05 to 3:30 pm

3:30 pm: **Microscope lens for multiphoton endoscopy** (*Presentation Only*), Hyungsik Lim, Cornell Univ. (USA) and City Univ. of New York (USA); Chris Xu, Watt W. Webb, Cornell Univ. (USA)[7569-65]

3:45 pm: **The analysis of fluorophore orientation by multiphoton fluorescence microscopy**, Jamie Leeder, David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)[7569-66]

4:00 pm: **3D resolved two-photon microscopy with liquid lens**, Kye-Sung Lee, Philip Vanderwall, The Institute of Optics, Univ. of Rochester (USA); Supraja Murali, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Kevin P. Thompson, Optical Research Associates (USA); Jianan Y. Qu, Hong Kong Univ. of Science and Technology (Hong Kong, China); Jannick P. Rolland, The Institute of Optics, Univ. of Rochester (USA)[7569-67]

4:15 pm: **Maximizing signals from in vivo multiphoton microscopy: noncontact total emission detection (TEDII)**, Aleksandr V. Smirnov, Jay Knutson, National Institutes of Health (USA)[7569-68]

4:30 pm: **Fiber optic endomicroscopy for intrinsic nonlinear optical imaging of biological tissues**, Yicong Wu, Jiefeng Xi, Li Huo, The Johns Hopkins Univ. (USA); Ming-Jun Li, Corning Inc. (USA); Xingde Li, The Johns Hopkins Univ. (USA)[7569-69]

4:45 pm: **Pulse shaping for reducing photodamage in multiphoton microscopy**, Dmitry Pestov, Yair Andegeko, Vadim V. Lozovoy, Marcos M. Dantus, Michigan State Univ. (USA)[7569-125]



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See p. 10

Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVII

Conference Chairs: **Jose-Angel Conchello**, Harvard Univ. Ctr. for Brain Science; **Carol J. Cogswell**, Univ. of Colorado at Boulder; **Tony Wilson**, Univ. of Oxford (United Kingdom); **Thomas G. Brown**, Univ. of Rochester Medical Ctr.

Program Committee: **G. J. Brakenhoff**, Univ. van Amsterdam (Netherlands); **Charles A. DiMarzio**, Northeastern Univ.; **Mats G. L. Gustafsson**, Howard Hughes Medical Institute, Jenelia Farm Research Ctr.; **Raimund J. Ober**, The Univ. of Texas at Dallas; **Chrysanthe Preza**, The Univ. of Memphis

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Two and three-dimensional refractive index measurements of biological samples, Gavin R. Erry, Matthew Tedaldi, Pete Tomlins, National Physical Lab. (United Kingdom) [7570-40]

Fully automated data acquisition and fast interpretation in a customized multimodal multiphoton microscope, Christian-Dennis Rahn, Beiersdorf AG (Germany); Hans Meine, Univ. Hamburg (Germany); Stefan Gallinat, Horst Wenck, Klaus-Peter Wittern, Frank Fischer, Beiersdorf AG (Germany) . [7570-41]

Low-cost two-photon microscope with fully customized trajectories, Stefano Lodo, Alessandra Tomaselli, Carla Vacchi, Elena Ugolotti, Univ. degli Studi di Pavia (Italy) [7570-42]

The photobleaching property of confocal laser scanning microscopy with masked illumination, Dong-Uk Kim, Suhei Moon, Hoseong Song, Wenzhong Yang, Dug Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7570-43]

Self-reference extended depth-of-field quantitative phase microscopy, Jaeduck Jang, Jong-Chul Ye, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7570-44]

An improvement based on FDK reconstruction algorithm for cone-beam CT, Hui Miao, Tingting Wang, Huijuan Zhao, Feng Gao, Tianjin Univ. (China) [7570-45]

Wednesday 27 January

SESSION 1

Room: 308 (Esplanade) Wed. 8:00 to 10:00 am

Progress in Computational Microscopy

Session Chair: **G. J. Brakenhoff**, Univ. van Amsterdam (Netherlands)

8:00 am: **Fluorescence fluctuation analysis of mixed chromophores from a line-scanning hyperspectral imager**, Ryan W. Davis, Jesse S. Aaron, Michael B. Sinclair, Jerilyn A. Timlin, Sandia National Labs. (USA) [7570-01]

8:20 am: **Quantitative depth-variant imaging for fluorescence microscopy using the COSMOS software package**, Chrysanthe Preza, Vimeetha Myneni, The Univ. of Memphis (USA) [7570-02]

8:40 am: **Comparison of estimation algorithms in single-molecule localization**, Anish V. Abraham, Sripad Ram, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Jerry Chao, The Univ. of Texas at Dallas (USA); E. Sally Ward, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Raimund J. Ober, The Univ. of Texas at Dallas (USA) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) [7570-03]

9:00 am: **Reconstructing features of thick objects from phase images**, Heidi Sierra, Charles A. DiMarzio, Dana H. Brooks, Northeastern Univ. (USA) [7570-04]

9:20 am: **Closed-loop adaptive optics for microscopy without a wavefront sensor**, Peter A. Kner, The Univ. of Georgia (USA); Lukman Winoto, Univ. of California, San Francisco (USA); David A. Agard, Univ. of California, San Francisco (USA) and Howard Hughes Medical Institute (USA); John W. Sedat, Univ. of California, San Francisco (USA) [7570-05]

9:40 am: **Increasing precision of lifetime determination in fluorescence lifetime imaging**, Ching-Wei Chang, Mary-Ann Mycek, Univ. of Michigan (USA) [7570-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 308 (Esplanade) Wed. 10:30 to 11:30 am

Holographic Methods in Microscopy

Session Chair: **Mats G. L. Gustafsson**, Howard Hughes Medical Institute

10:30 am: **Gabor wavelet transform for dynamic analysis in digital holographic microscopy**, Jingang Zhong, Jiawen Weng, Cuiying Hu, Jinan Univ. (China) [7570-07]

10:50 am: **A wide field-of-view microscope based on holographic focus grid**, Jigang Wu, Xiquan Cui, Guoan Zheng, Changhui Yang, California Institute of Technology (USA) [7570-08]

11:10 am: **Dual-mode digital holographic and fluorescence microscopy for the study of morphological changes in cells under simulated microgravity**, Muhammed Fatih Toy, Jérôme Parent, Jonas Kühn, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Marcel Egli, ETH Zürich (Switzerland); Christian Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7570-09]

Lunch Break 11:30 am to 1:40 pm

SESSION 3

Room: 308 (Esplanade) Wed. 1:40 to 3:00 pm

Visualization of Transparent Specimens

Session Chair: **Chrysanthe Preza**, The Univ. of Memphis

1:40 pm: **Full-field quantitative differential interference contrast microscopy based on 2D structured-aperture wavefront sensor**, Xiquan Cui, Changhui Yang, California Institute of Technology (USA) [7570-10]

2:00 pm: **Differential interference contrast microscopy for the quantitative assessment of tissue organization**, Donald D. Duncan, Oregon Health & Science Univ. (USA); David G. Fischer, NASA Glenn Research Ctr. (USA); Mehran Daneshbod, The Univ. of New Mexico (USA); Scott Prahl, Oregon Health and Science Univ. (USA) [7570-11]

2:20 pm: **Differential interference contrast with spatial light modulator**, Christian Maurer, Stephanie Fassel, Ruth Steiger, Innsbruck Medical Univ. (Austria); Tim McIntyre, The Univ. of Queensland (Australia); Stefan Bernet, Monika Ritsch-Marte, Innsbruck Medical Univ. (Austria) [7570-12]

2:40 pm: **Quantitative phase microscopy by QWLSI wavefront sensing: applications to long-duration imaging**, Pierre Bon, PHASICS S.A. (France) and Institut Fresnel (France); Benoit F. Wattelier, PHASICS S.A. (France); Serge Monneret, Institut Fresnel (France) [7570-14]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 308 (Esplanade). Wed. 3:30 to 5:50 pm

Recent Advances in Microtomography

Session Chair: Raimund J. Ober, The Univ. of Texas at Dallas

- 3:30 pm: **Applying optical Fourier filtering to standard optical projection tomography**, Raoul-Amadeus Lorbeer, Heiko Meyer, Marco Heidrich, Holger Lubatschowski, Alexander Heisterklamp, Laser Zentrum Hannover e.V. (Germany) [7570-15]
- 3:50 pm: **tomoFLIM: fluorescence lifetime projection tomography**, James A. McGinty, Imperial College London (United Kingdom); Daniel W. Stuckey, Imperial College Healthcare NHS Trust (United Kingdom); Khadija B. Tahir, Romain Laine, Imperial College London (United Kingdom); Joseph V. Hajnal, Alessandro Sardini, Imperial College Healthcare NHS Trust (United Kingdom); Paul M. W. French, Imperial College London (United Kingdom) [7570-16]
- 4:10 pm: **Dual-modal optical projection tomography microscopy for cancer diagnosis**, Qin Miao, Univ. of Washington (USA); Julia Yu, Michael G. Meyer, John R. Rahn, Thomas Neumann, Alan C. Nelson, VisionGate Inc. (USA); Eric J. Seibel, Univ. of Washington (USA) [7570-17]
- 4:30 pm: **Computational model of OCT in lung tissue**, David C. Reed, Charles A. DiMarzio, Northeastern Univ. (USA) [7570-18]
- 4:50 pm: **Integrated optical coherence tomography (OCT)/optical coherence microscopy imaging of pathology**, Hsiang-Chieh Lee, Chao Zhou, Massachusetts Institute of Technology (USA); Yihong Wang, Beth Israel Deaconess Medical Ctr. (USA); Aaron D. Aquirre, Massachusetts Institute of Technology (USA) and Harvard-MIT Div. of Health Sciences and Technology (USA); Tsung-Han Tsai, Massachusetts Institute of Technology (USA); David W. Cohen, James L. Connolly, Beth Israel Deaconess Medical Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [7570-19]
- 5:10 pm: **Snapshot spectral imaging system**, Thomas Arnold, Martin De Biasio, Raimund Leitner, Carinthian Tech Research AG (Austria) [7570-20]
- 5:30 pm: **Compressed sensing in optical coherence tomography**, Nishant Mohan, Ivana Stojanovic, William C. Karl, Boston Univ. (USA); Bahaa Saleh, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Malvin C. Teich, Boston Univ. (USA) [7570-21]

Thursday 28 January

SESSION 5

Room: 308 (Esplanade). Thurs. 8:00 to 10:00 am

Developments in Confocal and Multiphoton Microscopy

Session Chair: Charles A. DiMarzio, Northeastern Univ.

- 8:00 am: **Multifocal imaging of retinal activation**, Jinyu Wang, Xin-Cheng Yao, The Univ. of Alabama at Birmingham (USA) [7570-22]
- 8:20 am: **Confocal microscope with enhanced lateral resolution using engineered illumination pupil**, Bosanta R. Boruah, Indian Institute of Technology Guwahati (India) [7570-23]
- 8:40 am: **Coherent pupil engineered scanning reflectance confocal microscope (SRCM) for turbid imaging**, Christopher Glazowski, James Zavislan, Univ. of Rochester (USA) [7570-24]
- 9:00 am: **Optimal pupil design for confocal microscopy**, Yogesh G. Patel, Charles A. DiMarzio, Northeastern Univ. (USA); Milind Rajadhyakshay, Memorial Sloan-Kettering Cancer Ctr. (USA) [7570-25]
- 9:20 am: **Real-time focal modulation microscopy**, Nanguang Chen, Chee-Howe Wong, Shau-Poh Chong, Colin J. R. Sheppard, National Univ. of Singapore (Singapore) [7570-26]
- 9:40 am: **Parametric spatio-temporal control of focusing laser pulses**, Matthew A. Coughlan, Mateusz Plewicki, Robert J. Levis, Temple Univ. (USA) [7570-27]
- Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 308 (Esplanade). Thurs. 10:30 to 11:50 am

Advanced Visualization and Detection

Session Chair: Thomas G. Brown, Univ. of Rochester Medical Ctr.

- 10:30 am: **Extended depth-of-field microscopy**, Edward J. Botcherby, Christopher W. Smith, Martin J. Booth, Rimas Juskaitis, Tony Wilson, Univ. of Oxford (United Kingdom) [7570-28]
- 10:50 am: **Image-based adaptive optics and acousto-optic depth-of-field switching for nonlinear microscopy**, Nicolas Olivier, Delphine Débarre, Ecole Polytechnique (France); Alexandre Mermillod-Blondin, Craig B. Arnold, Princeton Univ. (USA); Emmanuel Beaufrepaire, Ecole Polytechnique (France) [7570-29]
- 11:10 am: **Highly parallel CMOS lock-in optical sensor array for hyperspectral recording in scanned imaging systems**, Roger A. Light, Nicholas S. Johnston, Richard J. Smith, Steve D. Sharples, Michael G. Somekh, Mark C. Pitter, The Univ. of Nottingham (United Kingdom) [7570-30]
- 11:30 am: **Scientific CMOS (sCMOS) technology for ultralow-light quantitative calcium flux microscopy**, Colin G. Coates, Donal Denvir, Marcin Barszczewski, Andor Technology plc (Ireland); Noel McHale, Keith Thornbury, Gerard Sergeant, Mark Hollywood, Dundalk Institute of Technology (Ireland) [7570-31]
- Lunch Break 11:50 am to 1:20 pm

SESSION 7

Room: 308 (Esplanade). Thurs. 1:20 to 4:30 pm

New Developments in Microscopy

Session Chair: Carol J. Cogswell, Univ. of Colorado at Boulder

- 1:20 pm: **Practical optical quality assessment and correction of a nonlinear microscope**, Rodrigo Aviles-Espinosa, ICFO-The Institute of Photonic Sciences (Spain); Jordi Andilla, Imagine Optic (France); Rafael Porcar-Guezenc, Imagine Optic (France) and ICFO-The Institute of Photonic Sciences (Spain); Omar Olarte, Susana I. Santos, ICFO-The Institute of Photonic Sciences (Spain); Xavier Levecq, Imagine Optic (France); David Artigas, Univ. Politècnica de Catalunya (Spain) and ICFO-The Institute of Photonic Sciences (Spain); Pablo Loza-Alvarez, ICFO-The Institute of Photonic Sciences (Spain) [7570-32]
- 1:40 pm: **Label-free classification of cell types by imaging of cell membrane fluctuations using low-coherent full-field quantitative phase microscopy**, Toyohiko Yamauchi, Hamamatsu Photonics K.K. (Japan) and Massachusetts Institute of Technology (USA); Norikazu Sugiyama, Hamamatsu Photonics K.K. (Japan); Takashi Sakurai, Hamamatsu Univ. School of Medicine (Japan); Hidenao Iwai, Yutaka Yamashita, Hamamatsu Photonics K.K. (Japan) [7570-33]
- 2:00 pm: **Image correlation spectroscopy for the assessment of fiber networks**, Urs Utzinger, Sadiq M. Mir, Brenda K. Baggett, The Univ. of Arizona (USA) [7570-34]
- 2:20 pm: **High-resolution image slicing spectrometer (ISS) for hyperspectral microscopy**, Liang Gao, Robert Kester, Tomasz Tkaczyk, Rice Univ. (USA) [7570-35]
- 2:40 pm: **Wide-field supercritical fluorescence microscopy: real-time live cell membrane imaging**, Karla Balaa, Ecole Supérieure de Physique et de Chimie Industrielles (France); Sandrine Lévesque-Fort, Univ. Paris-Sud 11 (France); Julie Delahaye, Emmanuel Fort, Ecole Supérieure de Physique et de Chimie Industrielles (France) [7570-36]
- Coffee Break 3:00 to 3:30 pm
- 3:30 pm: **Pupil polarimetry using stress-engineered optical elements**, Thomas G. Brown, Amber M. Beckley, Univ. of Rochester Medical Ctr. (USA) [7570-37]
- 3:50 pm: **Hyper-NA imaging with solid-immersion optics and induced polarization imaging**, Jun Zhang, Tom D. Milster, College of Optical Sciences, The Univ. of Arizona (USA); Seungjoon Yang, Samsung Electronics Co., Ltd. (Korea, Republic of); Warren L. Bletscher, Delbert Hansen, College of Optical Sciences, The Univ. of Arizona (USA) [7570-38]
- 4:10 pm: **Real-time, extended depth DIC microscopy**, Ingeborg E. Beckers, Technische Fachhochschule Berlin (Germany); Robert H. Cormack, Carol J. Cogswell, Univ. of Colorado at Boulder (USA) [7570-39]

Single Molecule Spectroscopy and Imaging III

Conference Chairs: **Jörg Enderlein**, Georg-August-Univ. Göttingen (Germany); **Zygmunt Karol Gryczynski**, The Univ. of North Texas Health Science Ctr.; **Rainer Erdmann**, PicoQuant GmbH (Germany)

Program Committee: **Michael Börsch**, Univ. Stuttgart (Germany); **Christian Eggeling**, Max-Planck-Institut für biophysikalische Chemie (Germany); **Paul M. French**, Imperial College London (United Kingdom); **Ewa M. Goldys**, Macquarie Univ. (Australia); **Johan Hofkens**, Katholieke Univ. Leuven (Belgium); **Thomas R. Huser**, Univ. of California, Davis; **Gabor Laczko**, Univ. of Szeged (Hungary); **Joseph A. Miragliotta**, The Johns Hopkins Univ.; **Maria Teresa Neves-Petersen**, Aalborg Univ. (Denmark); **Markus Sauer**, Univ. Bielefeld (Germany); **Shimon Weiss**, Univ. of California, Los Angeles; **Andong Xia**, Institute of Chemistry, Chinese Academy of Science Peking (China)

Saturday 23 January

Welcome and Introduction

Room: 307 (Esplanade) Sat. 8:30 to 8:35 am

Session Chairs: **Rainer Erdmann**, PicoQuant GmbH (Germany); **Zygmunt Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth

SESSION 1

Room: 307 (Esplanade) Sat. 8:35 to 10:20 am

Single Molecule Spectroscopy in Biology

Session Chair: **Rainer Erdmann**, PicoQuant GmbH (Germany)

8:35 am: Photon statistics and hydrodynamic properties of fluorescently labeled DNA helices (Invited Paper), Sandeep Pallikkuth, Andreas Volkmer, Univ. Stuttgart (Germany) [7571-01]

9:00 am: Understanding enzyme activity using single molecule spectroscopy, Yu-San Liu, Yining Zeng, Yonghua Luo, Qi Xu, Michael Himmel, National Renewable Energy Lab. (USA); Steve Smith, South Dakota School of Mines and Technology (USA); Hui Wei, Shi-You Ding, National Renewable Energy Lab. (USA) [7571-02]

9:20 am: Solvent relaxation studies applied to stimuli-responsive core-shell nanoparticles, Karel Prochazka, Pavel Matejcek, Miroslav Stepanek, Charles Univ. in Prague (Czech Republic); Martin Hof, Jana Humpolickova, Radek Sachl, Czech Academy of Sciences (Czech Republic); Joerg Schroeder, Georg-August Univ. of Göttingen (Germany) [7571-03]

9:40 am: Near-field scanning optical microscopy as a new tool to study the kinetics of single proteins at a biological membrane, Andreas Naber, Nicole Neuberth, Michael Herrmann, Jörg Wissler, José Pérez, Dietmar Gradl, Univ. Karlsruhe (Germany) [7571-04]

10:00 am: Single molecule study on cardiac muscle, Julian Borejdo, Prasad Mettikolla, Priya Muthu, Rafal Luchowski, Ignacy Gryczynski, Zygmunt Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA) [7571-05]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 307 (Esplanade) Sat. 10:50 am to 12:55 pm

New Developments in Methods and Systems I

Session Chair: **Zygmunt Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth

10:50 am: Design and application of single fluorophore dual-view imaging system (Invited Paper), Hui Zhang, Dan Shu, Univ. of Cincinnati (USA); Mark Browne, Andor Technology (USA); Wenjuan Wang, Roman Petrenko, Taejin Lee, Jarek Meller, Peixuan Guo, Univ. of Cincinnati (USA) [7571-06]

11:15 am: The electrostatic corral: a new approach for nanoscale trapping of single molecules, Jorg C. Woehl, Christine A. Carlson, Univ. of Wisconsin-Milwaukee (USA) [7571-07]

11:35 am: Simultaneous single molecule atomic force and fluorescence lifetime imaging, Olaf Schulz, Arizona State Univ. (USA); Felix Koberling, Marcelle Koenig, PicoQuant GmbH (Germany); Deron Walters, Jacob Viani, Asylum Research (USA); Robert Ros, Arizona State Univ. (USA) [7571-08]

11:55 am: Dielectric microspheres to enhance single molecule fluorescence detection, Heykel Aouani, Jérôme Wenger, Institut Fresnel, Aix-Marseille Univ. (France); Davy Gérard, Institut Charles Delaunay, Univ. de Technologie Troyes (France); Hervé Rigneault, Alexis Devilez, Nicolas Bonod, Institut Fresnel, Aix-Marseille Univ. (France) [7571-09]

12:15 pm: Nonlinear optical techniques for improved data capture in fluorescence microscopy and imaging, David S. Bradshaw, Jamie Leeder, David L. Andrews, Univ. of East Anglia Norwich (United Kingdom) [7571-10]

12:35 pm: Bimodal single molecule microscopy: multiparameter spectroscopy gives insight into photodegradation processes, Frank Schleifenbaum, Sébastien Peter, Alfred J. Meixner, Eberhard Karls Univ. Tübingen (Germany) [7571-11]

Lunch/Exhibition Break 12:55 to 2:15 pm

SESSION 3

Room: 307 (Esplanade) Sat. 2:15 to 3:00 pm

Keynote Session

Session Chair: **Rainer Erdmann**, PicoQuant GmbH (Germany)

2:15 pm: Single-molecule studies of gene expression in living cells, Xiaoliang S. Xie, Harvard Univ. (USA) [7571-12]

SESSION 4

Room: 307 (Esplanade) Sat. 3:00 to 3:45 pm

Fluorescence Correlation Spectroscopy I

Session Chair: **Rainer Erdmann**, PicoQuant GmbH (Germany)

3:00 pm: Concepts and components for time-resolved single molecule microscopy (Invited Paper), Felix Koberling, Benedikt Kraemer, Peter Kapusta, PicoQuant GmbH (Germany); Steffen Ruettinger, Physikalisch Technische Bundesanstalt (Germany); Volker Buschmann, Marcelle Koenig, Sebastian Tannert, Michael Wahl, Rainer Erdmann, PicoQuant GmbH (Germany); Deron A. Walters, Jacob A. Viani, Asylum Research (USA); Samantha Fore, PicoQuant Photonics North America Inc. (USA) [7571-13]

3:25 pm: Binding studies of G-protein coupled receptor associated nanolipoproteins using fluorescence correlation spectroscopy, Tingjuan Gao, Matthew Coleman, Thomas Huser, John Voss, Wei He, Univ. of California, Davis (USA); Feliza Bourguet, Craig Blanchette, Lawrence Livermore National Lab. (USA); Sonny Ly, Univ. of California, Davis (USA); Federico Katzen, Wieslaw A. Kudlick, Life Technologies Corp. (USA) [7571-14]

Coffee Break 3:45 to 4:15 pm

SESSION 5

Room: 307 (Esplanade) Sat. 4:15 to 5:50 pm

Fluorescence Correlation Spectroscopy II

Session Chair: **Felix Koberling**, PicoQuant GmbH (Germany)

4:15 pm: High-throughput multipot single-molecule spectroscopy (Invited Paper), Ryan A. Colyer, Giuseppe Scalia, Univ. of California, Los Angeles (USA); Taiho Kim, Neshor Technologies (USA); Ivan Rech, Daniele Resnati, Stefano Marangoni, Massimo Ghioni, Sergio Cova, Politecnico di Milano (Italy); Shimon Weiss, Xavier Michalet, Univ. of California, Los Angeles (USA) [7571-15]

4:40 pm: Fluorescence lifetime correlation spectroscopy resolves EGFR interaction in live cells (Invited Paper), Joseph M. Irudayaraj, Jiji Chen, Purdue Univ. (USA) [7571-16]

5:05 pm: Measuring rotational diffusion of proteins with pulsed interleaved excitation fluorescence correlation spectroscopy (PIE-FCS), Anastasia Loman, Ingo Gregor, Jörg Enderlein, Georg-August-Univ. Göttingen (Germany) [7571-17]

5:25 pm: Extending coincidence analysis to count fluorescent molecules (Invited Paper), Haisen Ta, Alexander Kiel, Ruprecht-Karls-Univ. Heidelberg (Germany); Michael Wahl, PicoQuant GmbH (Germany); Dirk-Peter Herten, Ruprecht-Karls-Univ. Heidelberg (Germany) [7571-18]

BiOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 6

Room: 307 (Esplanade) Sun. 8:15 to 9:45 am

New Developments in Methods and Systems II

Session Chair: Zygmunt Karol Gryczynski,

Univ. of North Texas Health Science Ctr. at Fort Worth

8:15 am: **Single molecule detection of biomolecules in the ultraviolet region** (*Invited Paper*), Joseph R. Lakowicz, Krishanu Ray, Mustafa H. Chowdhury, Univ. of Maryland School of Medicine (USA)[7571-20]

8:40 am: **Enhanced single molecule detection on plasmonic nanostructures** (*Invited Paper*), Rafal Luchowski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Tanya Shtoyko, The Univ. of Texas at Tyler (USA); Pabak Sarkar, Eva G. Matveeva, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Thomas Sorensen, Univ. of Copenhagen (Denmark); Nils Calander, Ignacy Gryczynski, Zygmunt Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA)[7571-21]

9:05 am: **Multiparametric single molecule fluorescence spectroscopy studies of photo-induced charge transfer between CdSe/ZnS quantum dots and fullerene**, Zhihua Xu, Mircea Cotlet, Brookhaven National Lab. (USA)[7571-22]

9:25 am: **Metal nanoparticle fluorophore: a powerful fluorescence probe in single cell imaging**, Jian Zhang, Univ. of Maryland School of Medicine (USA)[7571-23]

Coffee Break9:45 to 10:15 am

SESSION 7

Room: 307 (Esplanade) Sun. 10:15 am to 12:00 pm

FRET

Session Chair: Felix Koberling, PicoQuant GmbH (Germany)

10:15 am: **Monitoring the catalytic mechanism of P-glycoprotein by single-molecule fluorescence resonance energy transfer** (*Invited Paper*), Stefan Ernst, Univ. Stuttgart (Germany); Brandy Verhalen, Upstate Medical Univ. (USA); Nawid Zarrabi, Univ. Stuttgart (Germany); Stephan Wilkens, Upstate Medical Univ. (USA); Michael Börsch, Univ. Stuttgart (Germany)[7571-24]

10:40 am: **Super-resolved position and orientation estimation of fluorescent dipoles using 3D steerable filters** (*Invited Paper*), Stefan Geissbuehler, François Aguet, Iwan Märki, Theo Lasser, École Polytechnique Fédérale de Lausanne (Switzerland)[7571-25]

11:00 am: **Quantitative FRET measurement by high-speed fluorescence excitation and emission spectrometer**, Jing Yuan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Huazhong Univ. of Science & Technology (China); Leilei Peng, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Brett E. Bouma, Guillermo J. Tearney, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA)[7571-26]

11:20 am: **Diffusion spFRET reveals nanoscopic cardiac reserve**, Mathivanan Chinnaraj, Herbert C. Cheung, John M. Robinson M.D., The Univ. of Alabama at Birmingham (USA)[7571-27]

11:40 am: **Quantitative analysis using imaging mode single particle detection**, Danny Brouard, Mathieu Lessard-Viger, Guillermo Bracamonte, François Magnan, Hugo Poirier-Richard, Denis Boudreau, Univ. Laval (Canada)[7571-28]

Lunch/Exhibition Break12:00 to 1:15 pm

SESSION 8

Room: 307 (Esplanade) Sun. 1:15 to 2:00 pm

Keynote Session

Session Chair: Rainer Erdmann, PicoQuant GmbH (Germany)

1:15 pm: **Far-field optical nanoscopy**, Stefan W. Hell, Max-Planck-Institut für biophysikalische Chemie (Germany)[7571-29]

SESSION 9

Room: 307 (Esplanade) Sun. 2:00 to 3:25 pm

Superresolution Microscopy I

Session Chair: Rainer Erdmann, PicoQuant GmbH (Germany)

2:00 pm: **dSTORM: real-time subdiffraction-resolution fluorescence imaging with organic fluorophores** (*Invited Paper*), Mark Schüttelz, Steve Wolter, Sebastian van de Linde, Mike Heilemann, Markus Sauer, Univ. Bielefeld (Germany)[7571-30]

2:25 pm: **Dual excitation image-scanning microscopy**, Claus-Bernhard Mueller, Jörg Enderlein, Georg-August-Univ. Göttingen (Germany)[7571-31]

2:45 pm: **Fast, background-free, 3D superresolution optical fluctuation imaging (SOFI)**, Thomas Dertinger, Ryan A. Colyer, Robert Vogel, Gopal Iyer, Shimon Weiss, Univ. of California, Los Angeles (USA); Jörg Enderlein, Georg-August Univ. Göttingen (Germany)[7571-44]

3:05 pm: **Superresolution microscopy of viral infection pathways**, Deanna L. Thompson, Gregory P. McNERney, Thomas Huser, Univ. of California, Davis (USA) and NSF Ctr. for Biophotonics Science and Technology (USA)[7571-32]

Coffee Break3:25 to 3:50 pm

SESSION 10

Room: 307 (Esplanade) Sun. 3:50 to 6:00 pm

Superresolution Microscopy II

Session Chair: Zygmunt Karol Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth

3:50 pm: **In vivo three-dimensional superresolution fluorescence tracking using a double-helix point spread function** (*Invited Paper*), Matthew D. Lew, Michael A. Thompson, Majid Badieirostami, W. E. Moerner, Stanford Univ. (USA)[7571-33]

4:15 pm: **STED nanoscopy and single molecule tracking map the nanoscale dynamics of plasma membrane lipids**, Steffen J. Sahl, Marcel Leutenegger, Christian Ringemann, Veronika Müller, Stefan Hell, Christian Eggeling, Max Planck Institute for Biophysical Chemistry (Germany)[7571-34]

4:35 pm: **Three-dimensional localization of single particles at the nanoscale** (*Invited Paper*), Iwan Märki, Noelia Bocchio, Stefan Geissbuehler, François Aguet, Alberto Bilenca, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7571-35]

5:00 pm: **Four-focus single-particle position determination and fluorescence cross-correlation spectroscopy**, Lloyd M. Davis, Brian K. Canfield, James A. Germann, Jason K. King, William N. Robinson, The Univ. of Tennessee Space Institute (USA); Albert D. Dukes III, Sandra J. Rosenthal, Philip C. Samson, John P. Wikswo, Vanderbilt Univ. (USA)[7571-36]

5:20 pm: **The mathematical nanoscope: obtaining sub-diffraction-limited resolution by multiple hypothesis testing**, Fang Ma, Alberto Bilenca, Leigh Univ. (USA)[7571-37]

5:40 pm: **Fluorescence correlation spectroscopy on nanofabrik surfaces**, Julie Delahaye, Samuel Gresillon, Ecole Supérieure de Physique et de Chimie Industrielles (France); Sandrine Lévêque-Fort, Univ. Paris-Sud 11 (France); Neso Sojic, Univ. Bordeaux 1 (France); Emmanuel Fort, Ecole Supérieure de Physique et de Chimie Industrielles (France)[7571-38]

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Single-molecule photoswitching microscopy using only a single excitation wavelength. Volker Buschmann, PicoQuant GmbH (Germany); Sebastian van de Linde, Markus Sauer, Steve Wolter, Univ. of Bielefeld (Germany); Rainer Erdmann, Felix Koberling, PicoQuant GmbH (Germany) [7571-39]

High-speed multipoint patch clamp fluorometry system for the real-time monitoring of calcium-activated potassium (BKca) channels in a cell. Woosub Song, Byoung-Cheol Lee, Chul-Seung Park, Dug Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7571-41]

Near-field optical fluorescence correlation spectroscopy. José Pérez, Michael Herrmann, Dietmar Gradl, Andreas Naber, Univ. Karlsruhe (Germany) [7571-42]

PicoQuant Young Investigator Award

Room: 307 (Esplanade) Sun. 6:00 to 6:10 pm

Session Chair: Zygmunt Karol Gryczynski,
Univ. of North Texas Health Science Ctr. at Fort Worth

See page 17 for details.

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Optical Diagnostics and Sensing X: Toward Point-of-Care Diagnostics

Conference Chair: **Gerard L. Coté**, Texas A&M Univ.

Program Committee: **Rafat R. Ansari**, NASA Glenn Research Ctr.; **Werner Gellermann**, The Univ. of Utah; **Yuri I. Gurfinkel**, Central Clinical Hospital (Russian Federation); **Jürgen M. Lademann**, Charité Universitätsmedizin Berlin (Germany); **Michael J. McShane**, Texas A&M Univ.; **Kenith E. Meissner**, Texas A&M Univ.; **Risto A. Myllylä**, Univ. of Oulu (Finland); **Gert E. Nilsson**, Univ. Hospital Linköping (Sweden); **Jeffery S. Reynolds**, Bayer Healthcare; **Wiendelt Steenbergen**, Univ. Twente (Netherlands); **Kexin Xu**, Tianjin Univ. (China); **Shaoqun Zeng**, Britton Chance Ctr. for Biomedical Photonics (China); **Dmitry A. Zimnyakov**, Saratov State Univ. (Russian Federation)

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

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Evaluation of the cell depleted layer of blood flow in vitro using confocal microscopic PIV method, Cheol-Woo Park, Soo Hee Lim, Ho Lee, Choon-Young Lee, Gyu-Man Kim, Kyungpook National Univ. (Korea, Republic of) [7572-15]

Monte Carlo simulation of ZPP fluorescence in the retina, Xiaoyan Chen, Stephen Lane, Univ. of California, Davis (USA) [7572-16]

Research on the NIR spectroscopy of turbid media with optical-length resolved detection, Zhenhui Du, Chenxi Li, Feng Chen, Kexin Xu, Tianjin Univ. (China) [7572-17]

Feasibility of analyte prediction in phantoms using a theoretical model of near-infrared spectra, Fengmei Zou, Boyan Peshlov, Univ. of Massachusetts Medical School (USA); Randy Ross, College of the Holy Cross (USA); Gwenn Ellerby, Peter Scott, Ye Yang, Babs Soller, Univ. of Massachusetts Medical School (USA) [7572-18]

An integrated CMOS dual lock-in amplifier for optoelectronic antigens detection, Nampyo Hong, Do-Gyun Kim, In-Il Jung, Ho-Hyun Son, Hoseong Kim, Tae-Kyung Chung, Young-Ki Choi, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [7572-19]

A fast imaging system and algorithm for monitoring microlymphatics, Tony J. Akl, Elaheh Rahbar, Texas A&M Univ. (USA); David Zawieja, Anatoliy Gashev, Texas A&M Univ. Health Science Ctr. (USA); James Moore, Jr., Gerard Cote, Texas A&M Univ. (USA) [7572-20]

Oblique-incidence spatially resolved diffuse reflectance spectroscopic diagnosis of skin cancer, Alejandro Garcia-Urbe, Washington Univ. in St. Louis (USA); Jun Zou, Texas A&M Univ. (USA); Madeleine Duvic, Victor Prieto, The Univ. of Texas M. D. Anderson Cancer Ctr. (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [7572-21]

Comparison of different kinds of skin using Raman spectroscopy, Adrian Villanueva-Luna, Jorge Castro-Ramos, Sergio Vazquez-Montiel, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7572-22]

Calcium wave in the astrocyte network induced by femtosecond laser, Zeng Shaoqun, Wuhan National Lab. for Optoelectronics (China) [7572-23]

The velocity profile measurement of the blood flow in the micro-channel using the confocal laser scanning microscope based on particle image velocimetry, Wi Han Kim, H. Lee, H. C. Choi, C. W. Park, S. H. Lim, Kyungpook National Univ. (Korea, Republic of) [7572-24]

A minimally invasive human glucose detection instrument by surface plasmon resonance, Dachao Li, Jingxin Zhang, Peng Wu, Kexin Xu, Tianjin Univ. (China) [7572-25]

Adulteration detection in milk using near-infrared spectroscopy combined with two-dimensional correlation analysis, Bin He, Rong Liu, Renjie Yang, Kexin Xu, Tianjin Univ. (China) [7572-26]

Tuesday 26 January

SESSION 1

Room: 208/210 (Mezzanine) Tues. 8:30 to 10:30 am

Optical Glucose Monitoring Approaches

Session Chair: **Michael J. McShane**, Texas A&M Univ.

8:30 am: **Development of a real-time closed-loop dual-wavelength optical polarimeter for glucose monitoring**, Bilal H. Malik, Gerard L. Coté, Texas A&M Univ. (USA) [7572-01]

8:50 am: **Multivariate image processing technique for noninvasive glucose sensing**, Anthony J. Webb, Brent D. Cameron, The Univ. of Toledo (USA) [7572-02]

9:10 am: **New scheme for polarimetric glucose sensing without polarization optics**, Amy M. Winkler, The Univ. of Arizona (USA); Garret T. Bonnema, D4D Technologies, LLC (USA); Jennifer K. Barton, The Univ. of Arizona (USA) [7572-03]

9:30 am: **Dynamic testing and in-vivo evaluation of dermally implantable luminescent microparticle glucose sensors**, Ruiqi Long, Bradley Collier, Michael J. McShane, Texas A&M Univ. (USA) [7572-04]

9:50 am: **Accurate glucose detection in a small etalon**, Joerg Martini, Sebastian Kuebler, Michael I. Recht, Francisco E. Torres, Jeffrey Roe, Peter Kiesel, Richard H. Bruce, Palo Alto Research Center, Inc. (USA) [7572-05]

10:10 am: **Challenge for spectroscopic tomography of biomembrane using imaging type two-dimensional Fourier spectroscopy**, Ichiro Ishimaru, Kagawa Univ. (Japan) [7572-06]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: 208/210 (Mezzanine) Tues. 11:00 am to 12:00 pm

Optical Blood Perfusion and Oxygenation Monitoring

11:00 am: **Wireless near-infrared spectroscopy of skeletal muscle oxygenation and hemodynamics during exercise and ischemia**, Babak Shadgan, Darlene Reid, Univ. of British Columbia (Canada); Mehran Taghavi, IRI National Olympic & Paralympic Academy (Iran, Islamic Republic of); Andrew J. Macnab, Univ. of British Columbia (Canada) [7572-07]

11:20 am: **Optical sensor technology for a noninvasive continuous monitoring of blood components**, Jens Kraithl, Sergi Andruschenko, Hagen Koroll, Hartmut Ewald, Univ. Rostock (Germany) [7572-08]

11:40 am: **Measurement of blood flow rate in hemodialysis shunts using self-mixing laser diode**, Stefano Cattini, Univ. degli Studi di Modena (Italy); Michele Norgia, Alessandro Pesatori, Politecnico di Milano (Italy); Luigi Rovati, Univ. degli Studi di Modena (Italy) [7572-09]

Lunch Break 12:00 to 1:50 pm

SESSION 3

Room: 208/210 (Mezzanine). Tues. 1:50 to 3:10 pm

Optical Point-of-Care Systems

Session Chair: Gerard L. Coté, Texas A&M Univ.

1:50 pm: **Low-cost fluorescence microscopy for point-of-care cell imaging**, Michael J. Lochhead, Jeffrey Ives, Monique Givens, Marie Delaney, Kevin Moll, Chris Myatt, Precision Photonics Corp. (USA) [7572-11]

2:10 pm: **Tumor specific lung cancer diagnostics with multiplexed FRET immunoassays**, Daniel Geißler, Diana Hill, Hans-Gerd Löhmansröben, Univ. Potsdam (Germany); Eddy Thomas, Arnaud Lavigne, Bruno Darbouret, Emmanuel Bois, Cezanne (France); Loic Charbonnière, Raymond Ziessel, CNRS, Univ. Louis Pasteur (France); Nathaniel Butlin, Lumiphore Inc. (USA); Niko Hildebrandt, Fraunhofer-Institut für Angewandte Polymerforschung (Germany) [7572-12]

2:30 pm: **Guided-mode resonance biochip system for early detection of ovarian cancer**, Debra D. Wawro, Resonant Sensors (USA); Peter Koulen, Univ. of Missouri, Kansas City (USA); Yiwu Ding, Robert Magnusson, Resonant Sensors (USA) [7572-13]

2:50 pm: **Multi-wavelength spectroscopy of oriented erythrocytes**, Yulia Serebrennikova, Univ. of South Florida, College of Public Health (USA); Luis Garcia-Rubio, Debra Huffman, Jennifer Smith, Claro Scientific (USA) . . [7572-14]



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Biomedical Applications of Light Scattering IV

Conference Chairs: **Adam P. Wax**, Duke Univ.; **Vadim Backman**, Northwestern Univ.

Program Committee: **Irving J. Bigio**, Boston Univ.; **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign; **Bernard Choi**, Beckman Laser Institute, Univ. of California, Irvine; **Steven L. Jacques**, Oregon Health & Science Univ.; **Lev T. Perelman**, Harvard Medical School; **Brian W. Pogue**, Dartmouth College; **Bruce Jason Tromberg**, Beckman Laser Institute and Medical Ctr., Univ. of California, Irvine

Saturday 23 January

SESSION 1

Room: 301 (Esplanade). Sat. 10:40 am to 12:00 pm

Theory I

Session Chair: **Bernard Choi**, Beckman Laser Institute, Univ. of California, Irvine

10:40 am: **Simulating the optical phase conjugation phenomenon of light multiply scattered through a macroscopic random medium**, Snow H. Tseng, National Taiwan Univ. (Taiwan) [7573-01]

11:00 am: **Origin of partial wave spectroscopic signals in a weak refractive index medium**, Hariharan Subramanian, Dhwanil Damania, Prabhakar Pradhan, Lusik Cherkazyan, Ilker R. Capoglu, Allen Taflove, Vadim Backman, Northwestern Univ. (USA) [7573-02]

11:20 am: **The limits of multimode fibers and dispersion in the frequency domain**, Amanda L. Dayton, Niloy Chourdhury, Scott A. Prah, Oregon Health & Science Univ. (USA) [7573-03]

11:40 am: **A new approach to SVM model selection for pre-cancerous and cancerous tissue diagnosis using elastic scattering spectroscopy**, Yan Jiao, Univ. College London (United Kingdom); Waseem K. Jerjes, Univ. College Hospital (United Kingdom); Martin R. Austwick, Univ. College London (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom); Laurence B. Lovat, Stephen G. Bown, John Shawe-Taylor, David R. Hardoon, Univ. College London (United Kingdom) [7573-04]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 2

Room: 301 (Esplanade). Sat. 1:30 to 3:20 pm

Dynamic Light Scattering and Speckle Imaging

Session Chair: **Bernard Choi**, Beckman Laser Institute, Univ. of California, Irvine

1:30 pm: **Quantitative blood flow imaging using multi-exposure laser speckle contrast imaging (Invited Paper)**, Andrew K. Dunn, The Univ. of Texas at Austin (USA) [7573-05]

2:00 pm: **Real-time laser speckle imaging**, Owen Yang, Beckman Laser Institute and Medical Ctr., Univ. of California, Irvine (USA); Bernard Choi, Beckman Laser Institute, Univ. of California, Irvine (USA); David J. Cuccia, Modulated Imaging, Inc. (USA) [7573-06]

2:20 pm: **Probing light fluctuations with wide-field interferometry: application to blood flow imaging in vivo**, Michael Atlan, Ecole Supérieure de Physique et de Chimie Industrielles (France); Michel Gross, Ecole Normale Supérieure (France); Isabelle Ferezou, Ecole Supérieure de Physique et de Chimie Industrielles (France) [7573-07]

2:40 pm: **Application of a novel wide-field functional imaging (WiFi) instrument to a mammary window chamber preclinical model of breast cancer**, Austin J. Moy, Jae Gwan Kim, Beckman Laser Institute and Medical Ctr., Univ. of California, Irvine (USA); Eva Y. H. P. Lee, Univ. of California, Irvine (USA); Bernard Choi, Beckman Laser Institute, Univ. of California, Irvine (USA) [7573-08]

3:00 pm: **Fluctuation spectroscopy in low-coherence dynamic light scattering of tissue responding to pharmacologicals**, David D. Nolte, Purdue Univ. (USA); Kwan Jeong, Korea Military Academy (Korea, Republic of); John J. Turek, Purdue Univ. (USA) [7573-09]

Coffee Break 3:20 to 3:50 am

SESSION 3

Room: 301 (Esplanade). Sat. 3:50 to 5:40 pm

Theory II

Session Chair: **Lev T. Perelman**, Harvard Medical School

3:50 pm: **A statistical model of light scattering in biological continuous random media based on the Born approximation (Invited Paper)**, Ilker R. Capoglu, Jeremy D. Rogers, Allen Taflove, Vadim Backman, Northwestern Univ. (USA) [7573-10]

4:20 pm: **Extracting intrinsic optical properties using the 400/200 elastic scattering spectroscopy geometry**, Martin R. Austwick, Joanna Brunker, Charles A. Mosse, Yan Jiao, Laurence B. Lovat, Stephen G. Bown, Jeremy C. Hebden, Univ. College London (United Kingdom) [7573-11]

4:40 pm: **Stochastic Huygens and partial coherence propagation through thin tissues**, Scott Prah, Providence St. Vincent Medical Ctr. (USA); David G. Fischer, NASA Glenn Research Ctr. (USA); Donald D. Duncan, Oregon Health & Science Univ. (USA) [7573-12]

5:00 pm: **Investigating the spectral characteristics of backscattering from heterogeneous spheroidal nuclei using broadband finite-difference time-domain simulations**, Guo-Shan Chao, Kung-Bin Sung, National Taiwan Univ. (Taiwan) [7573-13]

5:20 pm: **Bayesian variable selection for pre-cancerous versus cancerous tissue diagnosis using elastic scattering spectra**, Yan Jiao, Tom Diethel, Martin R. Austwick, Univ. College London (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom); Laurence B. Lovat, Stephen G. Bown, David Barber, Univ. College London (United Kingdom) [7573-14]

BiOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 4

Room: 301 (Esplanade). Sun. 8:50 to 10:20 am

Novel Approaches

Session Chair: **Adam P. Wax**, Duke Univ.

8:50 am: **Tomographic imaging of Förster resonance energy transfer in highly light scattering media**, Vadim Y. Soloviev, Univ. College London (United Kingdom); James A. McGinty, Khadija B. Tahir, Romain Laine, Daniel W. Stuckey, Joseph V. Hajnal, Alessandro Sardini, Paul M. W. French, Imperial College London (United Kingdom); Simon R. Arridge, Univ. College London (United Kingdom) [7573-15]

9:10 am: **Optical narrow-band frequency analysis of polystyrene bead mixtures**, Kaloyan A. Popov, Timothy P. Kurzweg, Drexel Univ. (USA) . [7573-16]

9:30 am: **Spatially modulated quantitative spectroscopy (SMoQS): determination of optical properties of turbid media spanning visible and near-infrared regimes**, Rolf B. Saager, David J. Cuccia, Anthony J. Durkin, Univ. of California, Irvine (USA) [7573-17]

9:50 am: **Scanning fiber angle-resolved low-coherence interferometry for light-scattering measurement of cell morphology (Invited Paper)**, Yizheng Zhu, Neil G. Terry, Michael G. Giacomelli, Adam P. Wax, Duke Univ. (USA) [7573-18]

Coffee Break 10:20 to 10:50 am

SESSION 5

Room: 301 (Esplanade)..... Sun. 10:50 to 11:50 am

Nanoscale Measurements

Session Chair: Vadim Backman, Northwestern Univ.

10:50 am: **A fiber-coupled microfluidic cytometer for the obtaining of nanostructural mitochondria information in single cells**, Xuantao Su, Wojciech Rozmus, Ying Y. Tsui, Univ. of Alberta (Canada)[7573-19]

11:10 am: **Quantification of colloidal and intracellular gold nanomarkers down to the single particle level using confocal microscopy**, Sabine Klein, Friedrich-Loeffler-Institut (Germany); Svea Petersen, Laser Zentrum Hannover e.V. (Germany); Ulrike Taylor, Detlef Rath, Friedrich-Loeffler-Institut (Germany); Stephan Barcikowski, Laser Zentrum Hannover e.V. (Germany) and Excellence Cluster Rebirth (Germany).....[7573-20]

11:30 am: **Detecting the role of cytoskeleton in nanoscale alterations of biological cells using partial wave spectroscopic microscopy**, Dhwanil Damania, Hariharan Subramanian, Northwestern Univ. (USA); Ashish K. Tiwari, NorthShore Univ. HealthSystem (USA); Yolanda Stypula, Prabhakar Pradhan, Northwestern Univ. (USA); Hemant K. Roy, Evanston Hospital (USA); Vadim Backman, Northwestern Univ. (USA)[7573-21]

Lunch/Exhibition Break11:50 am to 1:30 pm

SESSION 6

Room: 301 (Esplanade)..... Sun. 1:30 to 3:20 pm

Clinical Studies

Session Chair: Adam P. Wax, Duke Univ.

1:30 pm: **Spectral scatter imaging of breast cancer tumors (Invited Paper)**, Brian W. Pogue, Dartmouth College (USA).....[7573-22]

2:00 pm: **Assessment of breast tumor margins via quantitative spectral reflectance imaging (Invited Paper)**, J. Quincy Brown, Torre M. Bydlon, Stephanie A. Kennedy, Lisa M. Richards, Marlee Junker, Lee Wilke, Joseph Geradts, Nirmala Ramanujam, Duke Univ. (USA)[7573-23]

2:30 pm: **In-vivo clinical Fourier-domain angle resolved low-coherence interferometry for dysplasia detection**, Neil G. Terry, Yizheng Zhu, Matthew T. Rinehart, Duke Univ. (USA); Steven C. Gebhart, William J. Brown, OncoScope, Inc. (USA) and Duke Univ. (USA); Stephanie Bright, Elizabeth Carretta, Ryan Madanick, The Univ. of North Carolina School of Medicine (USA); John T. Woosley, The Univ. of North Carolina at Chapel Hill (USA); Nicholas J. Shaheen, The Univ. of North Carolina School of Medicine (USA); Adam P. Wax, Duke Univ. (USA)[7573-24]

2:50 pm: **Detection of dysplasia in Barrett's esophagus with endoscopic polarized spectroscopic scanning (EPSS) instrument (Invited Paper)**, Le Qiu, Douglas Pleskow, Ram Chuttani, Edward Vitkin, Jan Leyden, Nuri Ozden, Sara Itani, Alana Sacks, Jeffrey Goldsmith, Mark D. Modell, Eugene B. Hanlon, Irving Itzkan, Lev T. Perelman, Harvard Medical School (USA)[7573-25]

Coffee Break3:20 to 3:50 pm

SESSION 7

Room: 301 (Esplanade)..... Sun. 3:50 to 5:30 pm

Pre-clinical and Animal Studies

Session Chair: Irving J. Bigio, Boston Univ.

3:50 pm: **Measurements of clinically relevant in-vivo concentration of a photosensitizer using optical pharmacokinetics and correlations with PDT necrosis**, Martin R. Austwick, Josephine H. Woodhams, Charles A. Mosse, Univ. College London (United Kingdom); Vadzim Chalau, Univ. College London (United Kingdom) and Research Institute of Oncology and Medical Rad (Belarus); Yan Jiao, Laurence B. Lovat, Alexander J. MacRobert, Univ. College London (United Kingdom); Irving J. Bigio, Boston Univ. (USA); Stephen G. Bown, Univ. College London (United Kingdom)[7573-26]

4:10 pm: **In-vivo time course studies of site specific inflammation using microneedle array fiduciary markings**, Kevin G. Phillips, Niloy Choudhury, Oregon Health & Science Univ. (USA); Harvinder Singh, Texas Tech Univ. (USA); Philippe Thuillier, Steve L. Jacques, Oregon Health & Science Univ. (USA).....[7573-27]

4:30 pm: **Dependence of the hemoglobin spectrum on lateral scattering in reflectance oximetry**, Tyson Ririe, Katarzyna Sieluzycza, College of Optical Sciences, The Univ. of Arizona (USA); Kurt Denninghoff, The Univ. of Arizona (USA); Lloyd W. Hillman, The Univ. of Alabama in Huntsville (Deceased) (USA); Russell A. Chipman, College of Optical Sciences, The Univ. of Arizona (USA)[7573-28]

4:50 pm: **Correlation between light scattering signal and tissue reversibility in rat brain exposed to hypoxia**, Satoko Kawauchi, Shunichi Sato, Yoichi Uozumi, Hiroshi Nawashiro, Miya Ishihara, Makoto Kikuchi, National Defense Medical College (Japan)[7573-29]

5:10 pm: **Ex-vivo elastic light single-scattering measurements to differentiate precancerous tissue from normal cervical tissue**, Murat Canpolat, Tuba Denkceken, Şeyda Karavelli, Elif Peşterelli, Gülgün Erdoğan, Deniz Özel, Uşur Bilge, Tayup Şimşek, Akdeniz Üniv. (Turkey)[7573-31]

Monday 25 January

SESSION 8

Room: 301 (Esplanade)..... Mon. 8:50 to 10:10 am

Enhanced Backscattering

Session Chair: Vadim Backman, Northwestern Univ.

8:50 am: **High anisotropy utilized diffuse light suppression for large area spectroscopic imaging**, Zhengbin Xu, Jingjing Liu, Young L. Kim, Purdue Univ. (USA)[7573-32]

9:10 am: **Probing turbid medium structure using ultra-low coherence enhanced backscattering spectroscopy**, Bianca DeAngelo, Grant Arzumanov, Charles Matovu, Patrick Shanley, Min Xu, Fairfield Univ. (USA)[7573-33]

9:30 am: **Measurement of optical and physical properties with low-coherence enhanced backscattering spectroscopy**, Vladimir M. Turzhitsky, Jeremy D. Rogers, Nikhil N. Mutyal, Vadim Backman, Northwestern Univ. (USA)[7573-34]

9:50 am: **Helicity flip of backscattered circularly polarized light**, Igor Meglinski, Univ. of Otago (New Zealand); Vladimir L. Kuzmin, St. Petersburg Institute of Commerce and Economics (Russian Federation)[7573-35]

Coffee Break10:10 to 10:40 am

SESSION 9

Room: 301 (Esplanade)..... Mon. 10:40 to 11:20 am

Low-Coherence Interferometry

Session Chair: Stephen Allen Boppart, Univ. of Illinois at Urbana-Champaign

10:40 am: **Measuring structural features using a dual window method for light scattering spectroscopy and Fourier-domain low coherence interferometry**, Francisco E. Robles, Adam P. Wax, Duke Univ. (USA) [7573-36]

11:00 am: **Detection of biofilms in middle ear by low coherence interference data**, Cac T. Nguyen, Haohua Tu, Eric J. Chaney, Univ. of Illinois at Urbana-Champaign (USA); Charles N. Stewart, Blue Highway, LLC (USA); Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA)[7573-37]

POSTER SESSION

Room: 103/104 (Exhibit Level)..... Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Anisotropic optical property of a bio-medium with highly photon-scattering anisotropic biomolecules, Tsu-Wei Nee, Soe-Mie F. Nee, National Yang-Ming Univ. (Taiwan)[7573-40]

Spatially resolved 2-D attenuation image of a semi-infinite non-homogeneous tissue from diffuse reflectance, Jordan Tse, Lian-Kuan Chen, The Chinese Univ. of Hong Kong (Hong Kong, China)[7573-41]

Non-negative matrix factorization: a blind sources separation method applied to optical fluorescence spectroscopy and multiplexing, Anne-Sophie Montcuquet, Lab. d'Electronique de Technologie de l'Information (France) and GIPSA-Lab, (France); Lionel Hervé, Laurent Guyon, Jean-Marc Dinten, Lab. d'Electronique de Technologie de l'Information (France); Jerome I. Mars, Univ. Joseph Fourier (France) and GIPSA-Lab. (France)[7573-42]

Angular dependence of blood spectrum using scattering spectroscopy in reflection, Katarzyna Sieluzycza, Tyson Ririe, College of Optical Sciences, The Univ. of Arizona (USA); Kurt Denninghoff, The Univ. of Arizona (USA); Russell Chipman, College of Optical Sciences, The Univ. of Arizona (USA)[7573-43]

- Photon-cell interactive Monte Carlo simulation for quantification of MCV and MCHC of RBCs**, Daisuke Sakota, Setsuo Takatani, Tokyo Medical and Dental Univ. (Japan)[7573-44]
- Comparison of the performance of two depth-resolved optical imaging systems: laminar optical tomography and spatially modulated imaging**, Edgar Guevara, Maxime Abran, Samuel Bélanger, Nicolas Ouakli, Frederic Lesage, Ecole Polytechnique de Montréal (Canada)[7573-45]
- Surface effect measurement of a small scattering object in highly scattering medium by use of diffuse photon-pairs density wave**, Chien Chou, Chang Gung Univ. (Taiwan); Li-Ping Yu, National Yang Ming Univ. (Taiwan); Jheng-Syong Wu, National Central Univ. (Taiwan)[7573-46]
- Study on dynamics of photon migration in human breast based on three-dimensional Monte Carlo modeling**, Ching-Cheng Chuang, Chung-Ming Chen, Jui-Che Tsai, National Taiwan Univ. (Taiwan); Chih-Wei Lu, Industrial Technology Research Institute (Taiwan); Chia-Wei Sun, National Yang-Ming Univ. (Taiwan)[7573-47]
- Exploration of the influence of the spectrometer sensitivity on optical cancer diagnosis using elastic scattering spectroscopy**, Yan Jiao, Jason M. Dunn, Martin R. Austwick, Charles A. Mosse, Univ. College London (United Kingdom); Marco R. Novelli, Univ. College Hospital (United Kingdom); Matthew R. Banks, Stephen G. Bown, Laurence B. Lovat, Univ. College London (United Kingdom)[7573-48]
- Combining finite element and propagation methods for scattering simulations of biological nanoparticles**, Michael Kuhn, LightTrans GmbH (Germany); Joachim Schoeberl, RWTH Aachen Univ. (Germany); Tino Untermann, LightTrans GmbH (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany)[7573-49]
- Edge preserving regularization for near infrared diffuse optical tomography**, Liang-Yu Chen, National Central Univ. (Taiwan); Min-Cheng Pan, Tung Nan Institute of Technology (Taiwan); Min-Chun Pan, National Central Univ. (Taiwan)[7573-50]



Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VII

Conference Chairs: **Alexander N. Cartwright**, Univ. at Buffalo; **Dan V. Nicolau**, The Univ. of Liverpool (United Kingdom)

Program Committee: **Igal Brener**, Sandia National Labs.; **Philippe M. Fauchet**, Univ. of Rochester; **Paul Lee Gourley**, Sandia National Labs.; **Piotr Grodzinski**, National Cancer Institute; **Brian McGraith**, Dublin City Univ. (Ireland); **Igor L. Medintz**, Naval Research Lab.; **Ammasi Periasamy**, Univ. of Virginia; **Paras N. Prasad**, Univ. at Buffalo; **Weihong Tan**, Univ. of Florida

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Biofilms of chitosan-gold nanorods as a novel composite for the laser welding of biological tissue. Paolo Matteini, Fulvio Ratto, Francesca Rossi, Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) [7574-30]

Depolarized scattering of silver nanostructures in dye-less sensing. Pabak Sarkar, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Tanya Shtoyko, The Univ. of Texas at Tyler (USA); Rafal Luchowski, Nils Calander, Zygmunt K. Gryczynski, Ignacy Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA) [7574-31]

Limit of detection for a bead-based diffraction biosensor. Youbong Lim, David D. Nolte, Khalid M. Arif, Cagri A. Savran, Purdue Univ. (USA) . . . [7574-32]

Wednesday 27 January

SESSION 1

Room: 305 (Esplanade) Wed. 8:00 am to 12:00 pm

Nano-Imaging of Nano-Objects I

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

8:00 am: **In-vitro and in-vivo detection of p53 by fluorescence lifetime on a hybrid FITC-gold nanosensor** (*Invited Paper*). Giuseppe Chirico, Univ. degli Studi di Milano-Bicocca (Italy); Laura Sironi, Stefano Freddi, Laura D'Alfonso, Univ. degli Studi di Milano Bicocca (Italy); Maddalena Collini, Univ. degli Studi di Milano-Bicocca (Italy); Tatiana Gorletta, Univ. degli Studi di Milano Bicocca (Italy); Silvia Soddu, Regina Elena Cancer Institute (Italy) [7574-02]

8:30 am: **SPR tuning by pH-controlled reversible assembly of polyelectrolyte-coated gold nanorods.** Desheng Zheng, Yong-Ping Chen, Xingde Li, The Johns Hopkins Univ. (USA) [7574-03]

8:50 am: **Combined photothermal therapy and magneto-motive ultrasound imaging using multifunctional nanoparticles.** Mohammad Mehrmohammadi, Min Qu, Kimberly A. Homan, The Univ. of Texas at Austin (USA); Pratixa Joshi, The Univ. of Texas Health Science Ctr. at Houston (USA); Yun-Sheng Chen, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [7574-04]

9:10 am: **From circulation to tumor cells in living subjects: the sub-microscale journey of targeted carbon nanotubes in living subjects imaged using intravital microscopy.** Bryan R. Smith, Cristina L. Zavaleta, Zhuang Liu, Hongjie Dai, Sanjiv S. Gambhir, Stanford Univ. (USA) [7574-05]

9:30 am: **Single molecule tracking by spatially resolved single photon counting as a tool for far-field optical nanoscopy.** Steffen J. Sahl, Marcel Leutenegger, Michael Hilbert, Christian Eggeling, Stefan Hell, Max Planck Institute for Biophysical Chemistry (Germany) [7574-06]

9:50 am: **Tracking of optically trapped particle in three dimensions using off-axis digital holographic microscopy.** Yoonsung Bae, Seungrag Lee, Gwangju Institute of Science and Technology (Korea, Republic of); Wenzhong Yang, Gwangju Institute of Science and Technology (Korea, Republic of); Dug Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7574-07]

Coffee Break 10:10 to 10:40 am

10:40 am: **Nanoplatforms for biomedical imaging** (*Invited Paper*), Srinivas Sridhar, Northeastern Univ. (USA) [7574-08]

11:10 am: **A nonlinear theory for the optical property of gold nanorods** (*Invited Paper*), Jui-teng Lin, Jr., New Vision Inc. (Taiwan) and National Taiwan Univ. (Taiwan); Yu-lin Hong, Chun-Lin Chang, National Taiwan Univ. (Taiwan) [7574-09]

11:40 am: **Dependence of numerical aperture on sizes of subwavelength circular apertures.** Ying Min Wang, Guoan Zheng, Changhui Yang, California Institute of Technology (USA) [7574-10]

Lunch Break 12:00 to 1:30 pm

Keynote Presentation

Room: 305 (Esplanade) Wed. 1:30 to 2:15 pm

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

1:30 pm: **Acoustic cavity transducers for the manipulation of cells and biomolecules** (*Invited Paper*), Abraham P. Lee, Univ. of California, Irvine (USA) [7574-01]

SESSION 2

Room: 305 (Esplanade) Wed. 2:15 to 4:15 pm

Nano-Imaging of Nano-Objects II

Session Chair: **Alexander N. Cartwright**, Univ. at Buffalo

2:15 pm: **Modified multi-walled carbon nanotubes potentially suitable for intracellular pH measurements** (*Invited Paper*), Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy); Giuliano Giambastiani, Consiglio Nazionale delle Ricerche (Italy); Ambra Giannetti, Giacomo Ghini, Istituto di Fisica Applicata Nello Carrara (Italy); Gian Luigi Puleo, Consiglio Nazionale delle Ricerche (Italy); Cosimo Trono, Istituto di Fisica Applicata Nello Carrara (Italy) [7574-11]

2:45 pm: **AFM imaging and manipulation of cytoskeleton proteins on surfaces.** Serban Dobroiu, Univ. of Liverpool (United Kingdom); Marina Naldi, Vincenza Andrisano, Univ. of Bologna (Italy); Dan V. Nicolau, Univ. of Liverpool (United Kingdom) [7574-12]

Coffee Break 3:05 to 3:35 pm

3:35 pm: **Plasmon-enhanced near-field detection and imaging with metal nanostructures.** Kyujung Kim, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [7574-13]

3:55 pm: **Modeling of biological nanostructured surfaces.** Paul Dan A. Cristea, Rodica A. Tuduce, Octavian Arsene, Alina Dinca, Dumitru I. Nastac, Polytechnical Univ. of Bucharest (Romania); Dan V. Nicolau, Florin Fulga, Univ. of Liverpool (United Kingdom) [7574-14]

SESSION 3

Room: 305 (Esplanade).Wed. 4:15 to 5:35 pm

Nano-Imaging on Surfaces I

Session Chair: Alexander N. Cartwright, Univ. at Buffalo

- 4:15 pm: **Optofluidic biochemical sensor based on antiresonant optical waveguides**, Roshni Biswas, Univ. at Buffalo (USA); Edward P. Furlani, Univ. at Buffalo (USA) and Eastman Kodak Inc. (USA); Natalia M. Litchinitser, Univ. at Buffalo (USA)[7574-15]
- 4:35 pm: **Detecting protein on a diffractive optical balance**, Xuefeng Wang, Ming Zhao, David D. Nolte, Purdue Univ. (USA)[7574-16]
- 4:55 pm: **Label-free detection of biomolecules using LED technology**, Nan Wu, Wenhui Wang, Yunfeng Ling, Leslie Farris, Byungki Kim, Melisenda J. McDonald, Xingwei Wang, Univ. of Massachusetts Lowell (USA)[7574-17]
- 5:15 pm: **Fluorine surface modification of organosilica nanoporous sol-gel glasses host matrices enhance the protein folding process**, Farid Mena, Bouzid Mena, Carla A. Guimaraes, Fluorotronics, Inc. (USA); Leo Avakyants, Lomonosov Moscow State Univ. (Russian Federation); Olga N. Sharts, Fluorotronics, Inc. (USA)[7574-18]

Thursday 28 January

SESSION 4

Room: 305 (Esplanade).Thurs. 8:00 am to 12:00 pm

Nano-Imaging on Surfaces II

Session Chairs: Vamsy P. Chodavarapu, McGill Univ. (Canada); Sharon M. Weiss, Vanderbilt Univ.

- 8:00 am: **Tuning the feature size of nanostructured materials for improved infiltration and detection of small molecules (Invited Paper)**, Sharon M. Weiss, Yang Jiao, Jennifer L. Lawrie, Girija Gaur, Judson D. Ryckman, Dmitry S. Koktysh, Vanderbilt Univ. (USA)[7574-19]
- 8:30 am: **Electrophoretic entrapment of nano particles into a size-dependent-nanoarray for optical immunosensing**, Jin-Hee Han, Sudheendra Lakshmana, Hee-Joo Kim, Shirley J. Gee, Bruce D. Hammock, Ian M. Kennedy, Univ. of California, Davis (USA)[7574-20]
- 8:50 am: **Optimum time and space resolution for tracking motile nano-objects**, Florin Fulga, Univ. of Liverpool (United Kingdom)[7574-21]
- 9:10 am: **New directions in AFM bio-imaging in liquids**, David Lewis, Rima Dekhter, Galina Fish, Sofia Kokotov, Michael Kokotov, Hesham Taha, Nanonics Imaging Ltd. (Israel); Aaron Lewis, Hebrew Univ. of Jerusalem (Israel) and Nanonics Imaging Ltd. (Israel)[7574-22]
- 9:30 am: **Plasmonic optical antennas excited by guided mode resonance for SERS applications**, Jingjing Li, David A. Fattal, Zhiyong Li, Hewlett-Packard Labs. (USA)[7574-23]
- Coffee Break9:50 to 10:20 am
- 10:20 am: **Photo-driven nano-impellers and nanovalves for on-command drug release**, Jeffrey I. Zink, J. Fraser Stoddart, Eunshil Choi, Univ. of California, Los Angeles (USA)[7574-24]
- 10:40 am: **Dry etched nanoporous silicon substrates for optical biosensors**, Mohamad Hajj Hassan, Maurice Cheung, Timothy Gonzalez, Vamsy P. Chodavarapu, Mark P. Andrews, McGill Univ. (Canada)[7574-25]
- 11:00 am: **CMOS camera-on-a-chip for fluorescence life-time imaging**, Munir M. Eldesouki, M. Jamal Deen, Qiyin Fang, McMaster Univ. (Canada)[7574-26]
- 11:20 am: **Neuromorphic optical sensor chip with color change-intensity change disambiguation**, Albert H. Titus, Univ. at Buffalo (USA)[7574-27]
- 11:40 am: **Applications and developments of carbene-fluorine spectroscopy**, Farid Mena, Bouzid Mena, Carla A. Guimaraes, Fluorotronics, Inc. (USA); Leo Avakyants, Lomonosov Moscow State Univ. (Russian Federation); Olga N. Sharts, Fluorotronics, Inc. (USA)[7574-28]

Colloidal Quantum Dots for Biomedical Applications V

Conference Chairs: **Marek Osirski**, The Univ. of New Mexico; **Wolfgang J. Parak**, Philipps-Univ. Marburg (Germany); **Thomas M. Jovin**, Max-Planck-Institut für biophysikalische Chemie (Germany); **Kenji Yamamoto**, International Medical Ctr. of Japan (Japan)

Program Committee: **Antigoni Alexandrou**, Ecole Polytechnique (France); **Moungi G. Bawendi**, Massachusetts Institute of Technology; **Maxime Dahan**, Lab. Kastler Brossel (France); **Jesus M. de la Fuente**, Univ. de Zaragoza (Spain); **Alexander Eychmüller**, Technische Univ. Dresden (Germany); **Jennifer A. Hollingsworth**, Los Alamos National Lab.; **Hedi Mattoussi**, Florida State Univ.; **Paul Mulvaney**, The Univ. of Melbourne (Australia); **Jay L. Nadeau**, McGill Univ. (Canada); **Shuming Nie**, Emory Univ.; **Sandra J. Rosenthal**, Vanderbilt Univ.; **Tania Q. Vu**, Oregon Health & Science Univ.; **Michael S. Wong**, Rice Univ.

Saturday 23 January

Opening Remarks

Room: 212 (Mezzanine) Sat. 8:10 to 8:15 am

Marek Osirski, The Univ. of New Mexico

SESSION 1

Room: 212 (Mezzanine) Sat. 8:15 to 9:00 am

Opening Session

Session Chair: Wolfgang J. Parak, Philipps-Univ. Marburg (Germany)

8:15 am: **Plasmon rulers for measuring dynamical distance changes in biological macromolecular assemblies** (*Keynote Presentation*), A. Paul Alivisatos, Lawrence Berkeley National Lab. (USA) and Univ. of California, Berkeley (USA) [7575-01]

SESSION 2

Room: 212 (Mezzanine) Sat. 9:00 to 9:50 am

Synthesis and Characterization of Colloidal Nanocrystals for Biomedical Applications I

Session Chair: Wolfgang J. Parak, Philipps-Univ. Marburg (Germany)

9:00 am: **Rare earth doped oxide nanoparticles for biomedical imaging: development of particles with enhanced properties** (*Invited Paper*), Thierry Gacoin, Genevieve Mialon, Silvan C. Türkcan, Antigoni Alexandrou, Jean-Pierre Bilot, Ecole Polytechnique (France) [7575-02]

9:30 am: **Silica capped CdS/Cd(OH)₂ quantum dots for biological applications**, Claudilene R. Chaves, Univ. Federal de Pernambuco (Brazil); Diogo Almeida, Univ. Estadual de Campinas (Brazil); Adriana Fontes, Univ. Federal de Pernambuco (Brazil); Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil); Beate S. Santos, Patricia M. A. Farias, Univ. Federal de Pernambuco (Brazil) [7575-04]

Coffee Break 9:50 to 10:40 am

SESSION 3

Room: 212 (Mezzanine) Sat. 10:40 to 11:50 am

Synthesis and Characterization of Colloidal Nanocrystals for Biomedical Applications II

Session Chair: Hedi Mattoussi, Florida State Univ.

10:40 am: **One-sided growth of large plasmonic gold domains on CdS quantum rods observed on the single particle level** (*Invited Paper*), Carsten Sönnichsen, Luigi Carbone, Arpad Jakab, Yuriy Khalavka, Johannes Gutenberg Univ. Mainz (Germany) [7575-05]

11:10 am: **Synthesis and surface modification of highly fluorescent gold nanoclusters and their exploitation for cellular labeling**, Cheng-An J. Lin, Chih-Hsien Lee, Jiun-Tai Hsieh, Wan-Chun Yu, Chung Yuan Christian Univ. (Taiwan); Ralph Sperling, Philipps-Univ. Marburg (Germany); Hsueh-Hsiao Wang, Hung-I Yeh, Mackay Memorial Hospital (Taiwan); Wolfgang J. Parak, Philipps-Univ. Marburg (Germany); Walter H. Chang, Chung Yuan Christian Univ. (Taiwan) [7575-06]

11:30 am: **Biocompatible water soluble UV-blue-emitting ZnSe quantum dots for biomedical applications**, Juliana Andrade, Aluizio G. Brasil, Jr., Clayton Azevedo, Breno Barbosa, Patricia Farias, Adriana Fontes, Beate S. Santos, Univ. Federal de Pernambuco (Brazil) [7575-07]

Lunch/Exhibition Break 11:50 am to 1:50 pm

SESSION 4

Room: 212 (Mezzanine) Sat. 1:50 to 3:00 pm

Biofunctionalization of Colloidal Nanocrystals

Session Chair: Jay L. Nadeau, McGill Univ. (Canada)

1:50 pm: **Fabrication of biocompatible nanoparticles for molecular imaging and drug delivery** (*Invited Paper*), Horst Weller, Univ. Hamburg (Germany) [7575-08]

2:20 pm: **Taking advantage of unspecific interactions to orient antibodies on magnetic nanoparticles**, Jesus Martinez de la Fuente, Pablo del Pino, Sara Puertas, Univ. de Zaragoza (Spain); Pilar Batalla, Roberto Fernandez-Lafuente, Jose Manuel Guisan, Instituto de Catálisis y Petroleoquímica (CSIC) (Spain); Valeria Grazu, Univ. de Zaragoza (Spain) [7575-09]

2:40 pm: **Interactions between a colloidal CdTe quantum dot and distinct functionalizer compounds**, Elisa Leite, Univ. Federal de Pernambuco (Brazil); Jeanlex Sousa, Univ. Federal do Ceará (Brazil); Kilmara Carvalho, Aluizio G. Brasil, Jr., Adriana Fontes, Patricia Farias, Beate S. Santos, Univ. Federal de Pernambuco (Brazil) [7575-10]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Room: 212 (Mezzanine) Sat. 3:30 to 5:00 pm

Resonant-Energy-Transfer-based Nanosensing and Energy Conversion

Session Chair: Jesus Martinez de la Fuente, Univ. de Zaragoza (Spain)

3:30 pm: **Energy conversion within the hybrid materials engineered from the nanocrystals quantum dots and photochromic membrane proteins** (*Invited Paper*), Alyona Sukhanova M.D., CIC nanoGUNE Consolider Research Ctr. (Spain) and Univ. de Reims Champagne-Ardenne (France); Aliaksandra Rakovich, Trinity College Dublin (Ireland); Claudio Mendicute, CIC nanGUNE Consolider Research Ctr. (Spain); Nicolas Bouchonville, Univ. de Reims Champagne-Ardenne (France); Yury P. Rakovich, Trinity College Dublin (Ireland); Michael Molinary, Michel Troyon, Univ. de Reims Champagne-Ardenne (France); John F. Donegan, Trinity College Dublin (Ireland); Alexander O. Govorov, Ohio Univ. (USA); Igor Nabiev, CIC nanGUNE Consolider Research Ctr. (Spain) and Univ. de Reims Champagne-Ardenne (France) [7575-11]

4:00 pm: **A quantum dot-fluorescent protein FRET probe for imaging intracellular pH**, Allison M. Dennis, Won Jong Rhee, David Sotito, Gang Bao, Georgia Institute of Technology (USA) [7575-12]

4:20 pm: **Energy transfer from terbium complexes to quantum dots: the advantage of independent donor and acceptor decay time analysis for investigations on FRET distance dependence**, Niko Hildebrandt, Fraunhofer-Institut für Angewandte Polymerforschung (Germany) [7575-13]

4:40 pm: **Optical size determination of quantum dots using FRET with terbium complexes as donors**, Daniel Geißler, Hans-Gerd Löhmannsröben, Univ. Potsdam (Germany); Loïc J. Charbonnière, Raymond F. Ziesel, Univ. Louis Pasteur (France); Nathaniel G. Butlin, Lumiphore Inc. (USA); Igor L. Medintz, U.S. Naval Research Lab. (USA); Hedi Mattoussi, Florida State Univ. (USA); Niko Hildebrandt, Fraunhofer-Institut für Angewandte Polymerforschung (Germany) [7575-14]

BIOS Hot Topics

Come hear 10-minute presentations by some of the brightest people in biophotonics

Saturday, 7:00 to 9:00 pm · Room: 102 (Exhibit Level)

See details on page 16.

Sunday 24 January

SESSION 6

Room: 212 (Mezzanine) Sun. 8:50 to 10:00 am

Novel Quantum-Dot-based Sensors

Session Chair: Igor L. Medintz, U.S. Naval Research Lab.

- 8:50 am: **Immobilization of quantum dots in multiple responsive microgels for biomedical applications** (*Invited Paper*), Shuiqin Zhou, Weitai Wu, Ting Zhou, M. Aiello, College of Staten Island (USA) [7575-15]
- 9:20 am: **Ion and pH sensing with colloidal nanoparticles: the influence of surface charge on sensing and colloidal properties** (*Invited Paper*), Wolfgang J. Parak, Feng Zhang, Ali Ali Zulqurnain, Faheem Amin, Philipps-Univ. Marburg (Germany); Martin Oheim, Paris Descartes (France); Anne Feltz, Ecole Normale Supérieure de Cachan (France) [7575-16]
- 9:40 am: **Whispering-gallery mode based biosensing using quantum dot-embedded microspheres**, Hope T. Beier, Gerard L. Coté, Kenith E. Meissner, Texas A&M Univ. (USA) [7575-17]
- Coffee Break 10:00 to 10:30 am

SESSION 7

Room: 212 (Mezzanine) Sun. 10:30 am to 12:10 pm

Molecular-Level Sensing with Nanoparticles

Session Chair: Tania Q. Vu, Oregon Health & Science Univ.

- 10:30 am: **Superparamagnetic nanoparticles as platforms for studying protein-carbohydrate interactions** (*Invited Paper*), Jesus Martinez de la Fuente, Maria Moros, Beatriz Pelaz, Valeria Grazu, Univ. de Zaragoza (Spain) [7575-18]
- 11:00 am: **3D single molecule tracking of quantum-dot labeled antibody molecules using multifocal plane microscopy** (*Invited Paper*), Raimund J. Ober, The Univ. of Texas at Dallas (USA) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Sripad Ram, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Prashant Prabhat, Jerry Chao, The Univ. of Texas at Dallas (USA) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); E. Sally Ward, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) [7575-19]
- 11:30 am: **Synthesis and manipulation of multifunctional, fluorescent-magnetic nanoparticles for single molecule tracking**, Jessica O. Winter, Gang Ruan, Dhananjay Thakur, Sean Hawkins, The Ohio State Univ. (USA) [7575-20]
- 11:50 am: **Ultrasensitive western immunoblot detection using single quantum dot imaging**, Tania Q. Vu, Oregon Health & Science Univ. (USA) [7575-21]
- Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 8

Room: 212 (Mezzanine) Sun. 1:40 to 3:30 pm

Applications of Colloidal Nanoparticles in Flow Cytometry, Cell Labeling, and Neuroscience

Session Chair: Thomas Pons, Ecole Supérieure de Physique et de Chimie Industrielles (France)

- 1:40 pm: **Quantum-dot-based quantitative identification of pathogens in complex mixture** (*Invited Paper*), Sun Hee Lim, Felix Bestwater, Institut Pasteur Korea (Korea, Republic of); Philippe Buchy, Sek Mardy, Institut Pasteur Cambodia (Cambodia); Alexey Dan Chin Yu, Institut Pasteur Korea (Korea, Republic of) [7575-44]
- 2:10 pm: **Biomedical application of fluorescent gold nanoclusters** (*Invited Paper*), Walter H. Chang, Chung Yuan Christian Univ. (Taiwan); Hsueh-Hsiao Wang, Mackay Memorial Hospital (Taiwan); Cheng-An J. Lin, Chih-Hsien Lee, Chung Yuan Christian Univ. (Taiwan); Yi-Chun Lin, Chin-Ling Hsieh, Ya-Ming Tseng, Chi-Hau Chen, Cheng-Ho Tsai, Hung-I Yeh, Mackay Memorial Hospital (Taiwan) [7575-22]
- 2:40 pm: **Quantum dot, a versatile probe for exo-/endocytosis and beyond** (*Invited Paper*), Qi Zhang, Yulong Li, Richard W. Tsien, Stanford Univ. (USA) [7575-23]
- 3:10 pm: **Biocompatible water soluble quantum dots as new biophotonic tools for hematologic cells: applications for flow cell cytometry**, Antonio Sales Neto, Rafael Lira, Aluizio G. Brasil, Jr., Denise Azevedo, Kilmara Carvalho, Mariana Cavalcanti, Ademir Amaral, Patricia Farias, Beate Santos, Adriana Fontes, Univ. Federal de Pernambuco (Brazil) [7575-24]
- Coffee Break 3:30 to 4:00 pm

SESSION 9

Room: 212 (Mezzanine) Sun. 4:00 to 6:20 pm

Applications of Colloidal Nanocrystals in Cell Biology

Session Chair: Marek Osirński, The Univ. of New Mexico

- 4:00 pm: **Reactive oxygen species detection in living cells by nanoparticle imaging: application to PDGF signaling** (*Invited Paper*), C. Bouzigues, Thanh L. Nguyen, Didier Casanova, R. Ramodiharilafy, Thierry Gacoin, Jean-Pierre Bilot, Antigonis Alexandrou, Ecole Polytechnique (France) [7575-45]
- 4:30 pm: **In vitro imaging of cells using peptide-conjugated quantum dots** (*Invited Paper*), Mitsuru Ishikawa, Vasudevan P. Biju, National Institute of Advanced Industrial Science and Technology (Japan) [7575-46]
- 5:00 pm: **Delivery of quantum dot bioconjugates to the cellular cytosol: release from the endolysosomal system**, James B. Delehanty III, Christopher Bradburne, Kelly Boeneman, Igor Medintz, Dorothy Farrell, Thomas Pons, Bing Mei, Naval Research Lab. (USA); Juan Blanco-Canosa, Philip Dawson, Scripps Research Institute (USA); Hedi Mattoussi, Naval Research Lab. (USA) . [7575-26]
- 5:20 pm: **Cellular uptake of conjugated InP quantum dots**, Lina Carlini, K. Ntumba, Jay L. Nadeau, McGill Univ. (Canada) [7575-27]
- 5:40 pm: **Cell uptake of magnetic nanoparticles functionalized with penetratin**, Pablo del Pino, Jesus Martinez de la Fuente, Univ. de Zaragoza (Spain); Catherine Berry, Theo Dejardin, Univ. of Glasgow (United Kingdom) [7575-28]
- 6:00 pm: **Quantum dots and supermagnetic iron oxide nanocrystals for systemic investigation of lipoprotein metabolism by correlative in vivo imaging**, Oliver T. Bruns, Univ. Medical Ctr. Hamburg-Eppendorf (Germany); R. Reimer, Univ. Hamburg (Germany); C. Waurisch, Technische Univ. Dresden (Germany); U. I. Tromsdorf, Horst weller, Univ. Hamburg (Germany); Alexander Eychmüller, Technische Univ. Dresden (Germany); J. Heeren, Univ. Medical Ctr. Hamburg-Eppendorf (Germany); H. Hohenberg, Univ. Hamburg (Germany) [7575-47]

Monday 25 January

SESSION 10

Room: 212 (Mezzanine) Mon. 8:40 to 10:30 am

Applications of Colloidal Quantum Dots in Cancer Diagnostics and Therapy

Session Chair: Igor R. Nabiev, Univ. de Reims Champagne-Ardenne (France) and CIC nanoGUNE Consolider Research Ctr. (Spain)

- 8:40 am: **Targeting cell surface proteins in breast cancer cell lines and tumor mice models using ImmunoQDots** (*Invited Paper*), Gopal Iyer, J.-M. Xu, S. Sirk, Jianqing Li, A. Wu, Shimon Weiss, Univ. of California, Los Angeles (USA) [7575-48]
- 9:10 am: **Visualizing the influx of various nanoparticle types from blood vessels into tumor interstitium in multiple animal models and tumor varieties using intravital microscopy**, Bryan R. Smith, Zhen Cheng, Zhuang Liu, Hongjie Dai, Sanjiv S. Gambhir M.D., Stanford Univ. (USA) [7575-31]
- 9:30 am: **Semiconductor nanoparticles produced by femtosecond laser ablation as photosensitizer for photodynamic therapy**, David Rioux, Ecole Polytechnique de Montréal (Canada); Lothar Lilge, Ontario Cancer Institute (Canada); Michel Meunier, Ecole Polytechnique de Montréal (Canada) . [7575-32]
- 9:50 am: **Radiation sensitivity enhancement in cells using high-Z nanoparticles**, Nathan J. Withers, John B. Plumley, Brian A. Akins, Gloria Medina, G. Timmons, Gennady A. Smolyakov, Marek Osinski, The Univ. of New Mexico (USA) [7575-33]
- 10:10 am: **Whole-body imaging of HER2/neu-overexpressing tumors using scFv-antibody conjugated quantum dots**, Irina V. Balalaeva, Nizhny Novgorod State Univ. (Russian Federation) and Institute of Applied Physics RAS (Russian Federation); Tatiana A. Zdobnova, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry RAS (Russian Federation) and Institute of Applied Physics RAS (Russian Federation); Anna A. Briikina, Nizhny Novgorod State Univ. (Russian Federation) and Institute of Applied Physics RAS (Russian Federation); Irina M. Krutova, Marina V. Shirmanova, Nizhny Novgorod State Univ. (Russian Federation); Oleg A. Stremovskiy, Elena N. Lebedenko, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry RAS (Russian Federation); Vladimir V. Vodenev, Nizhny Novgorod State Univ. (Russian Federation); Ilya V. Turchin, Institute of Applied Physics RAS (Russian Federation); Sergey M. Deyev, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry RAS (Russian Federation) [7575-34]
- Coffee Break 10:30 to 10:50 am

SESSION 11

Room: 212 (Mezzanine) Mon. 10:50 to 11:50 am

Cytotoxicity and Applications of Colloidal Quantum Dots in Drug Delivery

Session Chair: Kenji Yamamoto,
International Medical Ctr. of Japan (Japan)

10:50 am: **Nanoparticle-modified polymer capsules as carrier systems for biosensing and drug delivery**, Loretta L. del Mercato, Abbasi A. Zahoor, Markus Ochs, Almudena Muñoz Javier, Pablo del Pino, Wolfgang J. Parak, Philipps-Univ. Marburg (Germany) [7575-35]

11:10 am: **Intracellular processing of proteins mediated by biodegradable polyelectrolyte capsules**, Pilar Rivera Gil, Philipps-Univ. Marburg (Germany); Stefaan De Koker, Bruno G. De Geest, Univ. Gent (Belgium); Wolfgang J. Parak, Philipps-Univ. Marburg (Germany) [7575-36]

11:30 am: **Studying nanotoxic effects of CdTe quantum dots in Trypanosoma cruzi**, Cecilia Vieira Stahl, Fundacao Oswaldo Cruz (Brazil); Diogo Burigo Almeida, André A. de Thomaz, Univ. Estadual de Campinas (Brazil); Adriana Fontes, Univ. Federal de Pernambuco (Brazil); Jacenir R. Santos-Mallet, Fundacao Oswaldo Cruz (Brazil); Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil); Suzete A. O. Gomes, Fundacao Oswaldo Cruz (Brazil); Denise Feder, Univ. Federal Fluminense (Brazil) [7575-37]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Re-dispersion of aggregated colloidal quantum dots using small needle valve with pinhole auto regulation, Noriyoshi Manabe, Sanshiro Hanada, Yasuhiro Futamura, Akiyoshi Hoshino, International Medical Ctr. of Japan (Japan); Tadafumi Adschiri, Tohoku Univ. (Japan); Kenji Yamamoto, International Medical Ctr. of Japan (Japan) [7575-38]

Silver nanoparticle-induced degranulation observed with quantitative phase microscopy, Wenzhong Yang, Seungrag Lee, Jiyong Lee, Yoonsung Bae, Dugyoung Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7575-40]

Photochemical nitric oxide delivery using semiconductor quantum dots, Alexis D. Ostrowski, Peter C. Ford, Univ. of California, Santa Barbara (USA) [7575-41]

BIOS

Ocean Optics Young Investigator Award Ceremony

Room: 212 (Mezzanine) Mon. 11:50 am to 12:00 pm

Session Chair: Marek Osinski, The Univ. of New Mexico

The Ocean Optics Young Investigator Award will be given for the best paper presented by a leading author who is either a graduate student or has graduated within less than five years of the paper submission date. The award consists of a \$1,000 cash prize to the Young Investigator and \$1,000 Ocean Optics equipment credit to the laboratory where the work was performed. To be eligible, manuscripts of self-nominating authors must be received by the due date. Nominations should be submitted by email to osinski@chtm.unm.edu.

Award Sponsor:



Photonics West maps:

- Moscone Maps pp. 2–5
- Hilton Hotel Map p. 3
- Area Map p. 322

Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Conference Chairs: **Samuel Achilefu**, Washington Univ. School of Medicine in St. Louis; **Ramesh Raghavachari**, U.S. Food and Drug Administration

Program Committee: **Mikhail Berezin**, Washington Univ. School of Medicine in St. Louis; **Richard B. Dorshow**, Covidien; **Paul M. French**, Imperial College London (United Kingdom); **Israel Gannot**, Tel Aviv Univ. (Israel); **Hisataka Kobayashi**, National Institutes of Health; **Lyle R. Middendorf**, LI-COR Biosciences; **Gabor Patonay**, Georgia State Univ.; **Yasuteru Urano**, The Univ. of Tokyo (Japan)

Monday 25 January

SESSION 1

Room: 300 (Esplanade). Mon. 8:30 to 10:20 am

Optical Probes in Molecular Imaging and Therapy

Session Chair: **Samuel Achilefu**, Washington Univ. School of Medicine in St. Louis

8:30 am: **Targeted theranostic nanoparticles for biomedical applications** (*Invited Paper*), Tayyaba Hasan, Prakash Rai, Lei Zak Zheng, Zhiming Mai, Ramtin Rahmanzadeh, Xiang Zheng, Wellman Ctr. for Photomedicine (USA) [7576-01]

8:55 am: **Two different approaches in skin cancer therapy in vivo using a photosensitizer/a natural product**, Annie Abraham, Gayathri Devi, T. R. Cibin, Univ. of Kerala (India); D. Ramaiah, National Institute of Interdisciplinary Science and Technology, CSIR (India) [7576-02]

9:15 am: **Microdistribution of fluorescently-labeled monoclonal antibody in a peritoneal dissemination model of ovarian cancer**, Nobuyuki Kosaka, Mikako Ogawa, David S. Paik, Chang H. Paik, Peter L. Choyke, Hisataka Kobayashi, National Institutes of Health (USA) [7576-03]

9:35 am: **Reporters to monitor cellular MMP12 activity**, Carsten Schultz, Amanda Cobos-Correa, European Molecular Biology Lab. Heidelberg (Germany); Marcus Mall, Children's Hospital, Univ. Clinic Heidelberg (Germany) [7576-04]

9:55 am: **Bio-luminescent imaging and characterization of organ-specific metastasis of human cancer in NOD/SCID mice** (*Invited Paper*), Takashi Murakami, Jichi Medical Univ. (Japan) [7576-05]

Coffee Break 10:20 to 10:40 am

SESSION 2

Room: 300 (Esplanade). Mon. 10:40 am to 12:30 pm

Near-Infrared Probes for Biological Imaging I

Session Chair: **Ramesh Raghavachari**, U.S. Food and Drug Administration

10:40 am: **Near-infrared fluorophores as biomolecular probes and tracers** (*Invited Paper*), Gabor Patonay, Garfield Beckford, Lucjan Strekowski, Maged Henary, Georgia State Univ. (USA) [7576-06]

11:05 am: **In vivo photoconversion for cell tracking in live animals**, Alicia L. Carlson, Massachusetts General Hospital (USA); Weian Zhao, Harvard Stem Cell Institute (USA); Joji Fujisaki, Massachusetts General Hospital (USA); Sebastian Schaefer, Jeffrey Karp, Harvard Stem Cell Institute (USA); Charles P. Lin, Massachusetts General Hospital (USA) [7576-07]

11:25 am: **Single dose intravenous toxicity study of IRDye 800CW in Sprague-Dawley rats** (*Invited Paper*), D. Michael Olive, LI-COR Biosciences (USA) [7576-71]

11:50 am: **In vivo investigation of pharmacokinetics of model drug: comparison of near infrared technique with high-performance liquid chromatography** (*Invited Paper*), Yueqing Gu, Fei Liu, China pharmaceutical Univ. (China); Zhiyu Qian, Nanjing Univ. of Aeronautics and Astronautics (China); Samuel Achilefu, Washington Univ. in St. Louis (USA) [7576-08]

12:10 pm: **Phosphorescent light-emitting iridium complexes serve as a hypoxia-sensing probe for tumor imaging in living animals**, Toshiyuki Takeuchi, Shaojuan Zhang, Kazuya Negishi, Toshitada Yoshihara, Masahiro Hosaka, Seiji Tobita, Gunma Univ. (Japan) [7576-75]

Lunch Break 12:30 to 1:30 pm

SESSION 3

Room: 300 (Esplanade). Mon. 1:30 to 3:00 pm

Near-Infrared Probes for Biological Imaging II

Session Chair: **Gabor Patonay**, Georgia State Univ.

1:30 pm: **Intraoperative detection of tiny tumors in living mice with novel, fast-responding, and highly activatable fluorescence probes** (*Invited Paper*), Yasuteru Urano, Masayo Sakabe, Daisuke Asanuma, Mako Kamiya, Tetsuo Nagano, The Univ. of Tokyo (Japan); Mikako Ogawa, Nobuyuki Kosaka, Peter L. Choyke, Hisataka Kobayashi, National Cancer Institute, National Institutes of Health (USA) [7576-09]

1:55 pm: **Hydrocyanines: a new family of leucodyes that can image reactive oxygen species in vitro, in cell culture, and in vivo**, Niren Murthy, Georgia Tech (USA) [7576-10]

2:15 pm: **Near-infrared molecular imaging probes based on chlorin-bacteriochlorin dyads**, Marcin Ptaszek, North Carolina State Univ. (USA); Hooi Ling Kee, Washington Univ. in St. Louis (USA); Chinnasamy Muthiah, North Carolina State Univ. (USA); Ralph Nothdurft, Walter Akers, Samuel Achilefu, Joseph P. Culver, Washington Univ. School of Medicine in St. Louis (USA); David F. Bocian, Univ. of California, Riverside (USA); Dewey Holten, Washington Univ. in St. Louis (USA) [7576-11]

2:35 pm: **Strategy for developing pH sensitive NIR probes** (*Invited Paper*), Mikhail Y. Berezin, Hyeran Lee, Washington Univ. School of Medicine in St. Louis (USA); Kevin Guo, Washington Univ. in St. Louis (USA); Walter J. Akers, Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA); Olga Vasalatiy, Amir H. Gandjbakhche, Gary Griffiths, National Institutes of Health (USA); Adah Almutairi, Jean M. J. Frechet, Univ. of California, Berkeley (USA) [7576-12]

Coffee Break 3:00 to 3:25 pm

SESSION 4

Room: 300 (Esplanade). Mon. 3:25 to 4:50 pm

Imaging Molecular Processes with Fluorescent Proteins

Session Chair: **Hisataka Kobayashi**, National Institutes of Health

3:25 pm: **Fluorescence lifetime imaging spectroscopy in living cells with particular regards to pH dependence and electric field effect** (*Invited Paper*), Nobuhiro Ohta, Takakazu Nakabayashi, Shugo Oshita, Masataka Kinjo, Hokkaido Univ. (Japan) [7576-13]

3:50 pm: **Modeling structure and spectra of red fluorescent proteins**, Jack Collins, Igor Topol, SAIC- Frederick Inc., NCI-Freder (USA); Alexander Savitsky, A.N. Bach Institute of Biochemistry (Russian Federation); Alexander V. Nemukhin, M.V. Lomonosov Moscow State Univ. (Russian Federation) [7576-14]

4:10 pm: **Strong local electric fields in red fluorescent proteins result in quadratic Stark shifts of their absorption peaks**, Mikhail A. Drobizhev, Shane E. Tillo, Nikolay S. Makarov, Thomas E. Hughes, Aleksander Rebane, Montana State Univ. (USA) [7576-15]

4:30 pm: **A quantitative nanoplatfrom for receptor-mediated amplification of gene silencing**, Michael A. McDonald, John T. Elliott, Michael Halter, Anne L. Plant, National Institute of Standards and Technology (USA) [7576-16]

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

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Aqueous synthesis of PbS quantum dots for noninvasive near-infrared fluorescence imaging in a mouse model, Dawei Deng, Xinyang Chen, Jian Zhang, Fei Liu, Jie Cao, Yueqing Gu, China Pharmaceutical Univ. (China) [7576-52]

Photodynamic/photocatalytic effects on microorganisms, processed by nanodyes, Elena Tuchina, Valery V. Tuchin, Saratov State Univ. (Russian Federation) [7576-53]

Development of highly sensitive novel fluorescence probes to detect activity of protease based on unique intramolecular spirocyclization, Masayo Sakabe, The Univ. of Tokyo (Japan); Hisataka Kobayashi, National Institutes of Health (USA); Tetsuo Nagano, Yasuteru Urano, The Univ. of Tokyo (Japan) [7576-54]

Fluorescence emission and polarization analyses for evaluating binding of ruthenium metalloglycocluster to lectin and tetanus toxin C-fragment, Tomoko Okada, Norihiko Minoura, Tokyo Univ. of Technology (Japan) . [7576-55]

Tissue distribution, toxicity assessment, and oxidative profile of squaraine-based photosensitizer, Gayathri Devi, D. Ramaiah, T. R. Cibir, Annie Abraham, Univ. of Kerala (India) [7576-56]

Squaraine PDT induces oxidative stress in skin tumor of swiss albino mice, T. R. Cibir, Gayathri Devi, D. Ramaiah, Annie Abraham, Univ. of Kerala (India) [7576-57]

Cellular uptake of polymeric nanocapsules loaded with ICG by human blood monocytes and endothelial cells, Baharak Bahmani, Bongsu Jung, Sharad Gupta, Bahman Anvari, Univ. of California, Riverside (USA) . . . [7576-58]

Organically modified silica nanoparticles entrapping hydrophobic two-photon absorbing squaraine dye as probes for two-photon optical imaging, Xuhua Wang, Ciceron O. Yanez, Sheng Yao, Sabrina A. Coombs, Curtesa L. Arnett, Kevin D. Belfield, Univ. of Central Florida (USA) [7576-59]

Fluorescence Imaging of Peritoneal Metastases of Ovarian tumors in Mouse Models with beta-Galactosidase Targeted Fluorescence Activatable Probes, Daisuke Asanuma, Mako Kamiya, The Univ. of Tokyo (Japan); Mikako Ogawa, Nobuyuki Kosaka, Yukihiro Hama, Yoshinori Koyama, Peter L. Choyke, Hisataka Kobayashi, National Cancer Institute, National Institutes of Health (USA); Tetsuo Nagano, Yasuteru Urano, The Univ. of Tokyo (Japan) . . [7576-60]

Characterization of surface enhanced Raman scattering (SERS) substrates fabricated from colloidal printing inks, Manuel A. Figueroa, William Stephenson, Drexel Univ. (USA); Samuel D. Park, Univ. of California, Berkeley (USA); Kambiz Pourrezaei, Somdev D. Tyagi, Drexel Univ. (USA) [7576-61]

Dual near-infrared optical/MRI organic probe sensitive to protein binding, Kevin Guo, Washington Univ. in St. Louis (USA); Mikhail Berezin, Washington Univ. School of Medicine in St. Louis (USA); Jie Zheng, Washington Univ. in St. Louis (USA); Walter J. Akers, Washington Univ. School of Medicine in St. Louis (USA); Franck Lin, Washington Univ. in St. Louis (USA); Olga Vasalatiy, Amir H. Gandjbakhche, Gary Griffiths, National Institutes of Health (USA); Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA) . . . [7576-72]

Tuesday 26 January

SESSION 5

Room: 300 (Esplanade) Tues. 8:40 to 10:05 am

Nanoparticles for Nanomedicine

Session Chair: Mikhail Berezin,
Washington Univ. School of Medicine in St. Louis

8:40 am: Multifunctional inorganic nanoparticles for imaging, targeting, and drug delivery (Invited Paper), Jeffrey I. Zink, Monty Liong, Andre Nel, Fuyou Tamanoi, Univ. of California, Los Angeles (USA) [7576-17]

9:05 am: Sustained and observable oxidation-triggered release of therapeutics using porous Si particles, Elizabeth Wu, Jennifer Andrew, Ji-Ho Park, Jennifer Park, Ester Segal, Lingyun Cheng, William Freeman, Michael Sailor, Univ. of California, San Diego (USA) [7576-18]

9:25 am: Novel remotely triggered nanocarrier for imaging and therapy applications, Katheryne E. Wilson, Kimberly Homan, Stanislav Emelianov, The Univ. of Texas at Austin (USA) [7576-19]

9:45 am: Photophysical characterization of fluorescent metal nanoclusters synthesized using oligonucleotides, proteins and small reagent molecules, Hsin-Chih Yeh, Jaswinder Sharma, Los Alamos National Lab. (USA); Yuping Bao, Univ. of Alabama (USA); James H. Werner, Jennifer S. Martinez, Los Alamos National Lab. (USA) [7576-20]

Coffee Break 10:05 to 10:25 am

SESSION 6

Room: 300 (Esplanade) Tues. 10:25 am to 12:25 pm

Fluorescent Bionanosensors

Session Chair: D. Michael Olive, LI-COR Biosciences

10:25 am: Multicolor lymphatic optical imaging using nanoparticles (Invited Paper), Hisataka Kobayashi M.D., National Institutes of Health (USA) [7576-74]

10:45 am: Enzymatic generation of quantum dots: activity assay for acetylcholine esterase with exponential evolution of fluorescence, Valeri Pavlov, CIC BiomaGUNE (Spain) [7576-21]

11:05 am: Design of PEGylated rare-earth doped ceramic nanophosphors for near-infrared bioimaging, Yukio Nagasaki, Univ. of Tsukuba (Japan) and International Ctr. for Materials Nanoarchitectonics, National Institute for Materials Science (Japan); Masao Kamimura, Univ. of Tsukuba (Japan); Kohei Soga, Tokyo Univ. of Science (Japan) and Ctr. for Tsukuba Advanced Research Alliance, Univ. of Tsukuba (Japan) [7576-22]

11:25 am: Nanocrystalline rare-Earth oxides for use as a novel multifunctional biological probe, Robert C. Dennis, Kelly L. Nash, John B. Gruber, Dhiraj K. Sardar, Mao Gen Zhang, Waldemar Gorski, The Univ. of Texas at San Antonio (USA) [7576-23]

11:45 am: Rapid conjugation of nucleic acids to gold nanoparticles for cancer cell targeting, Timothy A. Larson, Na Li, Andrew Ellington, Konstantin Sokolov, The Univ. of Texas at Austin (USA) [7576-24]

12:05 pm: Synthesis and characterization of upconversion emission on lanthanides doped ZrO2 nanocrystals coated with SiO2 for biological applications, Tzarara López Luke, Ctr. de Investigaciones en Optica (Mexico); Elder De La Rosa, Ctr. de Investigaciones en Óptica (Mexico); Carlos Angeles Chavez, Instituto Mexicano del Petroleo (Mexico); Pedro Salas, CFATA, Univ. Nacional Autónoma de México (Mexico) [7576-25]

Lunch Break 12:25 to 1:45 pm

BIOS

SESSION 7

Room: 300 (Esplanade). Tues. 1:45 to 2:50 pm

Gold-based Nanoparticles for Bioimaging I

Session Chair: Mikhail Berezin, Washington Univ. School of Medicine in St. Louis

1:45 pm: **Dynamic molecular imaging using nanoparticle plasmon resonance coupling** (*Invited Paper*), Konstantin V. Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Jesse Aaron, Kort Travis, Nathan Harrison, The Univ. of Texas at Austin (USA)[7576-26]

2:10 pm: **Gold nanoparticle bioconjugates by laser ablation: a novel method aiming at pure nanomarkers for biomedical applications**, Svea Petersen, Stephan Barcikowski, Laser Zentrum Hannover e.V. (Germany)[7576-27]

2:30 pm: **Biodegradable near-infrared plasmonic nanoclusters for biomedical applications**, Justina O. Tam, Jasmine M. Tam, Avinash Murthy, Li Leo Ma, Kort A. Travis, Keith P. Johnston, Konstantin V. Sokolov, The Univ. of Texas at Austin (USA)[7576-28]

Coffee Break 2:50 to 3:20 pm

SESSION 8

Room: 300 (Esplanade). Tues. 3:20 to 5:00 pm

Gold-based Nanoparticles for Bioimaging II

Session Chair: Israel Gannot, Tel Aviv Univ. (Israel)

3:20 pm: **Gold nanoproboscopes for multi-modality tumor imaging**, Digant Davé, James Nyagilo, The Univ. of Texas at Arlington (USA)[7576-30]

3:40 pm: **Luminescent resonance energy transfer measurements from a novel core-shell nanoparticle**, Sudheendra Lakshmana, Jin-Hee Han, Ian M. Kennedy, Univ. of California, Davis (USA)[7576-31]

4:00 pm: **Gold nanorods for optical contrast in two photon microscopy of oral carcinogenesis**, Gracie Vargas, Sri Rajya L. Rudrabhatla, Saam Motamedi, Tuya Shilagard, Suimin Qiu, The Univ. of Texas Medical Branch (USA) .[7576-32]

4:20 pm: **Three-dimensional imaging of living cells labeled with gold nanobiomarkers using phase shifting heterodyne digital holographic microscopy**, Fadwa Joud, Lab. Kastler Brossel, Ecole Normale Supérieure (France); Nilanthi Warnasooriya, Lab. d'Optique, École Supérieure de Physique et de Chimie Industrielles (France); Philippe Bun, Institut Jacques Monod (France); Gilles Tessier, Michael Atlan, Lab. d'Optique, École Supérieure de Physique et de Chimie Industrielles (France); Pierre Desbiolles, Lab. Kastler Brossel, Ecole Normale Supérieure (France); Maite Coppey-Moisand, Institut Jacques Monod (France); Marie Abboud, Univ. Saint-Joseph (Lebanon); Michel Gross, Lab. Kastler Brossel, Ecole Normale Supérieure (France)[7576-33]

4:40 pm: **Multipurpose mode of heating nanoparticles by nanosecond, picosecond, and femtosecond pulses**, Renat R. Letfullin, Rose-Hulman Institute of Technology (USA)[7576-73]

Wednesday 27 January

SESSION 9

Room: 300 (Esplanade). Wed. 8:40 to 10:25 am

Fluorescence Lifetime and Hybrid Molecular Probes

Session Chair: Mikhail Berezin, Washington Univ. School of Medicine in St. Louis

8:40 am: **Biological applications of fluorescence lifetime imaging beyond microscopy** (*Invited Paper*), Walter J. Akers, Mikhail Berezin, Hyeran Lee, Washington Univ. School of Medicine in St. Louis (USA); Kevin Guo, Washington Univ. in St. Louis (USA); Adah Almutairi, Jean M. J. Frechet, Univ. of California, Berkeley (USA); Georg M. Fischer, Ewald Daltrozzo, Andreas Zumbusch, Univ. Konstanz (Germany); Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA)[7576-34]

9:05 am: **Targeted multi-functional multi-modal microspheres as optical contrast agents for cardiovascular disease and cancer**, Renu John, Freddy T. Nguyen, Eric J. Chaney, Marina Marjanovic, Kenneth Suslick, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA)[7576-35]

9:25 am: **Colon cancer targeting and screening with an enhanced contrast dual modality imaging system**, Nicusor V. Iftimia, Mircea Mujat, Daniel Hammer, Physical Sciences Inc. (USA); Yunpeng Ye, Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA); Sri Gunta, Mansoor Amiji, Northeastern Univ. (USA)[7576-36]

9:45 am: **Photoacoustic tomography offers simultaneous vasa vasorum and ruptured plaque assessments of atherosclerotic plaque with targeted gold nano beacons**, Dipanjan Pan, Manojit Pramanik, Angana Senpan, Mike Scott, Washington Univ. School of Medicine in St. Louis (USA); Patrick J. Gaffney, St. Thomas Hospital (United Kingdom); Samuel A. Wickline, Lihong V. Wang, Gregory M. Lanza, Washington Univ. School of Medicine in St. Louis (USA)[7576-37]

10:05 am: **Single fluorescent gold nanoclusters and its possible biomedical application**, Chi-Tsu Yuan, Academia Sinica (Taiwan); Wu-Ching Chou, National Chiao Tung Univ. (Taiwan); Jao Tang, Academia Sinica (Taiwan); Cheng-An J. Lin, Ji-Lin Shen, Chung Yuan Christian Univ. (Taiwan); Der-San Chuu, National Chiao Tung Univ. (Taiwan); Walter H. Chang, Chung Yuan Christian Univ. (Taiwan)[7576-38]

Coffee Break 10:25 to 10:50 am

SESSION 10

Room: 300 (Esplanade). Wed. 10:50 am to 12:35 pm

Molecular Fluorescence Spectroscopy

Session Chair: Richard B. Dorshow, Covidien

10:50 am: **Applications of fluorescence spectroscopy to problems of food safety: detection of fecal contamination and of the presence of central nervous system tissue and diagnosis of neurological disease** (*Invited Paper*), Jacob W. Petrich, Iowa State Univ. (USA); Thomas A. Casey, National Animal Disease Ctr., USDA (USA); Al Gapsch, TECHnical SOLutions Group, Inc. (USA); Mark A. Rasmussen, Ctr. for Veterinary Medicine, US Food & Drug Administration (USA)[7576-39]

11:15 am: **Characterization of the drug-binding site (subdomain IIA) of human serum albumin using 7-hydroxyquinoline as a molecular probe**, Osama K. Abou-Zied, Najla Al-Lawatia, Sultan Qaboos Univ. (Oman) . .[7576-40]

11:35 am: **Time-resolved fluorescence measurements of cyanine dyes in biomimetic systems**, Franziska Luschtinetz, Carsten Dosche, Michael Kumke, Univ. Potsdam (Germany)[7576-41]

11:55 am: **Smart pH cuvette for optical monitoring of pH of biological samples**, Derek A. Guenther, Mahmoud R. Shahriari, Ocean Optics, Inc. (USA)[7576-42]

12:15 pm: **Smart oxygen cuvette for optical monitoring of dissolved oxygen in biological samples**, Harish Dabhi, Ocean Optics Inc (USA)[7576-43]

Lunch Break 12:35 to 1:35 pm

SESSION 11

Room: 300 (Esplanade). Wed. 1:35 to 3:20 pm

Fluorescent Probes for Cell Imaging

Session Chair: Yasuteru Urano, The Univ. of Tokyo (Japan)

1:35 pm: **New fluorescent nucleosides for real-time exploration of nucleic acids** (*Invited Paper*), Yitzhak Tor, Univ. of California, San Diego (USA) [7576-44]

2:00 pm: **Sequence-dependent photophysical properties of Cy3-labeled DNA**, Marcia Levitus, Arizona State Univ. (USA)[7576-45]

2:20 pm: **Synthesis and characterization of new amine-reactive fluorene probes for two-photon bioimaging**, Alma R. Morales, Ciceron O. Yanez, Kevin D. Belfield, Univ. of Central Florida (USA)[7576-46]

2:40 pm: **Lysome-specific fluorene dyes for confocal and two-photon fluorescence microscopy**, Ciceron O. Yanez, Carolina D. Andrade, Xuhua Wang, Sheng Yao, Sabrina A. Coombs, Curtesa L. Arnett, Kevin D. Belfield, Univ. of Central Florida (USA)[7576-47]

3:00 pm: **Inhibition study of the oncogenic functionality of STAT3 at single molecule level**, Baoxu Liu, Daniel Badali, Miriam Avadissian, Steven Fletcher, Patrick T. Gunning, Claudiu Gradinaru, Univ. of Toronto Mississauga (Canada)[7576-48]

Coffee Break 3:20 to 3:45 pm

SESSION 12

Room: 300 (Esplanade) Wed. 3:45 to 4:45 pm

Organic Nanoparticles

Session Chairs: **Yasuteru Urano**, The Univ. of Tokyo (Japan);
Hisataka Kobayashi, National Institutes of Health

3:45 pm: **Lipid nanoparticles (LNP): a new technology for fluorescence contrast agents with improved properties**, Julien J.-M. Gravier, Thomas Delmas, Anne-Claude Couffin, Fabrice Navarro Y Garcia, Emilie Heinrich, Commissariat à l'Énergie Atomique (France); Sandrine Dufort, Jean-Luc Coll, INSERM, Institut Albert Bonniot (France); Françoise Vinet, Isabelle Texier-Nogues, Commissariat à l'Énergie Atomique (France) [7576-49]

4:05 pm: **Bioconjugated ICG-micelles as translational fluorescence agents for optical molecular imaging**, Yong-Ping Chen, Xingde Li, Johns Hopkins Univ. (USA) [7576-50]

4:25 pm: **Evaluation of arsenazo III as a contrast agent for photoacoustic imaging of calcium transients in glial cells**, Erika J. Cooley, Sandia National Labs. (USA); Pieter Kruizinga, The Univ. of Texas at Austin (USA); Todd C. Monson, Sandia National Labs. (USA); Stanislav Emelianov, The Univ. of Texas at Austin (USA); Darren W. Branch, Sandia National Labs. (USA) [7576-51]

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Plasmonics in Biology and Medicine VII

Conference Chairs: **Tuan Vo-Dinh**, Duke Univ.; **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine

Monday 25 January

POSTER SESSION

Room: 103/104 (Exhibit Level) Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday. View poster presentation guidelines on page 319.

Ultrathin silver coated gold nanoparticles in solution as suitable substrates for surface-enhanced Raman scattering. Concepcion Domingo, Luca Guerrini, Santiago Sanchez-Cortez, Jose Vicente Garcia-Ramos, Instituto de Estructura de la Materia, CSIC (Spain) [7577-40]

SERS+MEF of the anti tumoral drug emodin adsorbed on silver nanoparticles. Paz Sevilla, Univ. Complutense de Madrid (Spain) and Instituto de Estructura de la Materia, CSIC (Spain); Raquel De Llanos, Concepcion Domingo, Santiago Sanchez-Cortez, Jose Vicente Garcia-Ramos, Instituto de Estructura de la Materia, CSIC (Spain) [7577-41]

Spectroscopic and microscopic characterization of albumin / porous silica / gold nanorods. Fulvio Ratto, Paolo Matteini, Francesca Rossi, Roberto Pini, Istituto di Fisica Applicata Nello Carrara, CNR (Italy) [7577-42]

Stability of silica and polyethylene glycol modified gold nanorods upon near infrared laser excitation. Fulvio Ratto, Paolo Matteini, Francesca Rossi, Roberto Pini, Istituto di Fisica Applicata Nello Carrara, CNR (Italy) [7577-43]

Nanowire-enhanced localized surface plasmon resonance sensor for a detection of avian-influenza DNA hybridization. Shin Ae Kim, Seoul National Univ. (Korea, Republic of); Kyung Min Byun, Kyung Hee Univ. (Korea, Republic of); Kyujung Kim, Donghyun Kim, Yonsei Univ. (Korea, Republic of); Sung June Kim, Seoul National Univ. (Korea, Republic of) [7577-44]

The plasmonic Raman sensor using periodic nanofocusing arrays. Kenzo Yamaguchi, Toyohashi Univ. of Technology (Japan); Masamitsu Fujii, Toba National College of Maritime Technology (Japan); Martin L. Kurth, Steven J. Goodman, Dmitri K. Gramotnev, Peter Fredericks, Queensland Univ. of Technology (Australia); Mitsuo Fukuda, Toyohashi Univ. of Technology (Japan) [7577-45]

Momentum mismatch for improved plasmon enhanced fluorescence emission. Youngjin Oh, Kyujung Kim, Kyungjae Ma, Eunji Sim, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [7577-47]

Novel multilayer core-shell nanoprobe based on metal-enhanced FRET for biosensing applications. Maxime Rioux, Mathieu Lessard-Viger, Angel-Guillermo Bracamonte, Denis Boudreau, Univ. Laval (Canada) [7577-48]

Sensitivity enhancement in rotated-grating-coupled surface plasmon resonance based bio-detection of amyloid-beta labeled by colloidal gold particles. Maria Csete, University of Szeged, Department of Optics and Quantum Electronics (Hungary) and MIT, RLE, Nanostructures Laboratory (USA); Aron Sipos, Anna Mathesz, Aniko Szalai, University of Szeged, Department of Optics and Quantum Electronics (Hungary); Zsolt Bozsó, Livia Fülöp, University of Szeged, Department of Medical Chemistry (Hungary); Ambrus Kőházi-Kis, University of Szeged, Department of Optics and Quantum Electronics (Hungary); Maria Deli, Biological Research Center of Hungarian Academy of Sciences, Laboratory of Molecular Neurobiology (Hungary); Zsolt Bor, University of Szeged, Department of Optics and Quantum Electronics (Hungary); Botond Penke, University of Szeged, Department of Medical Chemistry (Hungary) [7577-49]

Wednesday 27 January

SESSION 1

Room: 301 (Esplanade) Wed. 9:00 to 10:00 am

Surface-Enhanced Raman Scattering (SERS)

Session Chair: **Tuan Vo-Dinh**, Duke Univ.

9:00 am: **Plasmonic nanostructures for biophotonic applications.** Jürgen Popp, Institute of Photonic Technology Jena e.V. (Germany) and Friedrich-Schiller Univ. Jena (Germany) [7577-01]

9:20 am: **Thermal therapy and optimization of EGFR over-expression imaging using surface-enhanced Raman spectroscopy.** Leanne Lucas, Patrick Lee, Kevin C. Hewitt, Dalhousie Univ. (Canada) [7577-02]

9:40 am: **Shape-dependent effect of surface-enhanced Raman scattering on gold nanostructured arrays.** Hsing-Ying Lin, Chen-Han Huang, Chih-Han Chang, Yun-Chiang Lan, Hsiang-Chen Chui, National Cheng Kung Univ. (Taiwan) [7577-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 301 (Esplanade) Wed. 10:30 to 11:30 am

Surface-Enhanced Raman Scattering (SERS) II

Session Chair: **Tuan Vo-Dinh**, Duke Univ.

10:30 am: **Functionalized nanoparticles for measurement of biomarkers using a SERS nanochannel platform.** Melodie E. Benford, Miao Wang, Jun Kameoka, Gerard Cote, Texas A&M Univ. (USA) [7577-04]

10:50 am: **Polarization selective optical antennas for Raman spectroscopy applications.** Jingjing Li, Wei Wu, Zhiyong Li, Hewlett-Packard Labs. (USA) [7577-05]

11:10 am: **Large-area plasmonics-active SERS substrates for chem-bio detection.** Anuj Dhawan, Hsin-Neng Wang, Duke Univ. (USA); Yan Du, North Carolina State Univ. (USA); Michael D. Gerhold, U.S. Army Research Office (USA); Veena Misra, North Carolina State Univ. (USA); Tuan Vo-Dinh, Duke Univ. (USA) [7577-06]

Lunch Break 11:50 am to 1:30 pm

SESSION 3

Room: 301 (Esplanade) Wed. 1:30 to 3:10 pm

Surface Plasmon Resonance Methods and Devices I

Session Chair: **Michael T. Canva**, Lab. Charles Fabry (France)

1:30 pm: **High sensitivity of SPR with microplasmonic structures.** Jean-Francois Masson, Ludovic Saiveng Live, Univ. de Montréal (Canada) [7577-07]

1:50 pm: **Quantitative analysis of calcification in MC3T3-e1 cells using surface plasmon resonance sensor.** Shin Ae Kim, Seoul National Univ. (Korea, Republic of); Kyung Min Byun, Kyung Hee Univ. (Korea, Republic of); Sung June Kim, Seoul National Univ. (Korea, Republic of) [7577-08]

2:10 pm: **The detection of small organic molecules based on a novel functionalized surface plasmon resonance sensor.** Rui Zheng, Brent D. Cameron, Univ. of Toledo (USA) [7577-09]

2:30 pm: **The ITO-based circular polarization interferometer via fault tolerance algorithm for surface plasmon biosensor.** Chia-Ming Jan, Yu-Hsun Lee, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [7577-10]

2:50 pm: **Development of plasmonic substrates for surface plasmon resonance imaging.** Anuj Dhawan, Duke Univ. (USA); Michael T. Canva, Lab. Charles Fabry (France); Hsin-Neng Wang, Tuan Vo-Dinh, Duke Univ. (USA) [7577-11]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 301 (Esplanade).....Wed. 3:40 to 6:00 pm

Surface Plasmon Resonance Methods and Devices II

Session Chair: Michael T. Canva, Lab. Charles Fabry (France)

3:40 pm: **Surface plasmon effects induced by uncollimated emission of semiconductor microstructures**, Dominic Lepage, Jan J. Dubowski, Univ. de Sherbrooke (Canada)[7577-12]

4:20 pm: **Integrated chip-level surface plasmon resonance biochemical sensors using patterned metallic nanostructures**, Junpeng Guo, Haisheng Leong, Yongbin Lin, Robert Lindquist, The Univ. of Alabama in Huntsville (USA); Jianjun Wei, CFD Research Corp. (USA); David Jones Brady, Duke Univ. (USA)[7577-14]

4:40 pm: **Surface plasmon resonance in effective nanostructured metal films**, Haisheng Leong, Junpeng Guo, Robert Lindquist, The Univ. of Alabama in Huntsville (USA); Qin Huo Liu, Duke Univ. (USA)[7577-15]

5:00 pm: **Miniature surface plasmon resonance fiber biosensor for in vitro diagnostics**, Yanina Yurievna Shevchenko, Tariq Francis, Milad Dakka, Maria C. DeRosa, Jacques Albert, Carleton Univ. (Canada)[7577-16]

5:20 pm: **Novel CMOS modulated light cameras for sensitive surface plasmon resonance imaging**, Nicholas S. Johnston, Roger Light, Univ. of Nottingham (United Kingdom); Ciaran Stewart, Univ. of Exeter (United Kingdom); Mike Somekh, Mark Pitter, Univ. of Nottingham (United Kingdom)[7577-17]

5:40 pm: **Biosensing with surface plasmon resonance polarimetry**, Sergiy V. Patskovsky III, Andre-Pierre Blanchard-Dionne, Laurent Guyot, Mathieu Maisonneuve, O. D'allivy Kelly, Michel Meunier, Ecole Polytechnique de Montréal (Canada)[7577-18]

Thursday 28 January

SESSION 5

Room: 301 (Esplanade).....Thurs. 8:00 to 10:10 am

Metal-Enhanced Fluorescence Methods and Devices

Session Chair: Joseph R. Lakowicz, Univ. of Maryland School of Medicine

8:00 am: **Nanoapertures to enhance single molecule fluorescence detection (Invited Paper)**, Heykel Aouani, Jérôme Wenger, Institut Fresnel, CNRS, Univ. Aix-Marseille (France); Davy Gérard, Institut Charles Delaunay, Univ. de Technologie Troyes (France); Hervé Rigneault, Institut Fresnel, CNRS, Univ. Aix-Marseille (France); Eloïse Devaux, Thomas Ebbesen, Institut de Science et d'Ingénierie Supramoléculaires, CNRS, Univ. Louis Pasteur (France); Steve Blair, The Univ. of Utah (USA)[7577-19]

8:30 am: **Metal-enhanced intrinsic fluorescence of proteins and label-free bioassays**, Krishanu Ray, Henryk Szmajcinski, Mustafa H. Chowdhury, Joseph R. Lakowicz, Univ. of Maryland School of Medicine (USA)[7577-20]

8:50 am: **Numerical and experimental study of fluorescence enhancement and quenching with SiO₂ encapsulated metallic nanospheres and nanorods**, Jing Bo Zhang, Li Chen, Qiao Qi Teo, National Univ. of Singapore (Singapore); Jia Yun Sze, A*STAR Data Storage Institute (Singapore); Boris Lukiyanchuk, National Univ. of Singapore (Singapore)[7577-21]

9:10 am: **FRET enhancement in multilayer core-shell nanoparticles**, Mathieu Lessard-Viger, Maxime Rioux, Luc Rainville, Denis Boudreau, Univ. Laval (Canada)[7577-22]

9:30 am: **ICG fluorescence enhancement by layer-by-layer assembly of polyelectrolytes between ICG molecules and gold nanorods**, Yong-Ping Chen, Xingde Li, Johns Hopkins Univ. (USA)[7577-23]

9:50 am: **The use of aluminum nanostructures as platforms for metal enhanced fluorescence of the intrinsic emission of biomolecules in the ultra-violet**, Mustafa H. Chowdhury, Krishanu Ray, Univ. of Maryland School of Medicine (USA); Stephen K. Gray, Argonne National Lab, (USA); James Pond, Lumerical Solutions Inc. (Canada); Joseph R. Lakowicz, Univ. of Maryland School of Medicine (USA)[7577-24]

Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 301 (Esplanade).....Thurs. 10:40 am to 12:20 pm

Plasmonics Applications

Session Chair: Joseph R. Lakowicz, Univ. of Maryland School of Medicine

10:40 am: **Plasmon resonance gold nanoparticles for improving optical diagnostics and photothermal therapy of tumor**, Elena V. Zagainova, Marina Alexandrovna Sirotkina, Marina Vadimovna Shirmanova, Vadim Elagin, Nizhny Novgorod State Medical Academy (Russian Federation); Mikhail Kirillin, Pavel Agrba, Vladislav Kamensky, Institute of Applied Physics, RAS (Russian Federation); Victor Nadtuchenko, N.N. Semenov Institute of Chemical Physics, RAS (Russian Federation)[7577-25]

11:00 am: **Sub-wavelength plasmonic readout for direct linear analysis of optically tagged DNA**, Jonathan J. Bernstein, The Charles Stark Draper Lab., Inc. (USA); Jonathan Varsanik, Massachusetts Institute of Technology (USA) and The Charles Stark Draper Lab., Inc. (USA); William Teynor, John LeBlanc, Heather A. Clark, The Charles Stark Draper Lab., Inc. (USA); Jeffrey R. Krogmeier, U.S. Genomics (USA); Tian Yang, Ken Crozier, Harvard Univ. (USA)[7577-26]

11:20 am: **Cell membrane imaging using time-resolved surface plasmon-mediated fluorescence microscopy**, Karla Balaa, Ecole Supérieure de Physique et de Chimie Industrielles (France); Viviane Devauges, CNRS, Univ. Paris-Sud 11 (France); Sandrine Lévêque-Fort, CNRS, Univ. Paris-Sud 11 (France); Emmanuel Fort, Ecole Supérieure de Physique et de Chimie Industrielles (France)[7577-27]

11:40 am: **Plasmon resonant gold-coated liposomes for spectrally controlled content release**, Sarah J. Leung, Marek Romanowski, The Univ. of Arizona (USA)[7577-28]

12:00 pm: **Photodynamic activity of gold nanorods on human erythrocytes**, Poorani G. Gananathan, S. Ganesan, P. Aruna, Anna Univ. (India)[7577-29]

Lunch Break 12:20 to 1:30 pm

SESSION 7

Room: 301 (Esplanade).....Thurs. 1:30 to 3:10 pm

Plasmonics Properties of Nanostructures I

Session Chair: Emmanuel Fort, Ecole Supérieure de Physique et de Chimie Industrielles (France)

1:30 pm: **Polarization effect of coupled gold nanorods and their use for contrast mechanism**, Kalpesh B. Mehta, Nanguang Chen, National Univ. of Singapore (Singapore)[7577-30]

1:50 pm: **Optical characterization for nearly spherical gold colloids via their polarization response**, Bassam Al-Qadi, Toshiharu Saiki, Keio Univ. (Japan)[7577-31]

2:10 pm: **Second harmonic generation enhancement in isolated metal nano-apertures**, Sophie Brasselet, Peter Schoen, Nicolas Bonod, Institut Fresnel, CNRS, Univ. de St. Jérôme (France); Thomas Ebbesen, Lab. des Nanostructures, Univ. Louis Pasteur (France); Jérôme Wenger, Hervé Rigneault, Institut Fresnel, CNRS, Univ. de St. Jérôme (France)[7577-32]

2:30 pm: **Extraction of complex refractive index dispersion from SPR data**, Mohamed Nakkach, Moreau Julien, Michael Canva, Institut d'Optique (France)[7577-33]

2:50 pm: **Aperiodic photonic-plasmonic structures for radiative rate enhancement and biosensing**, Svetlana V. Boriskina, Carlo Forestiere, Gary Walsh, Ashwin Gopinath, Björn M. Reinhard, Luca Dal Negro, Boston Univ. (USA)[7577-34]

Coffee Break 3:10 to 3:40 pm

SESSION 8

Room: 301 (Esplanade).....Thurs. 3:40 to 5:00 pm

Plasmonics Properties of Nanostructures II

Session Chair: Steve Blair, The Univ. of Utah

3:40 pm: **Experimental and numerical analysis of extraordinary optical transmission through nano-hole arrays in a thick metal film**, Mohamadreza Najiminaini, Simon Fraser Univ. (Canada); Fartash Fa Vasefi, Simon Fraser Univ. (Canada) and Lawson Health Research Institute (Canada); Jeffrey Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada); Bozena Kaminska, Simon Fraser Univ. (Canada)[7577-35]

4:00 pm: **Thermal analysis of gold nanostructures heated by pulsed laser irradiation**, Daniel S. Eversole, Sigfried Haering, The Univ. of Texas at Austin (USA); Ozgur Katici, Turkish Aerospace Industries (Turkey); Rick Harrison, Nicholas Durr, Adela Ben-Yakar, The Univ. of Texas at Austin (USA) ..[7577-36]

4:20 pm: **Combined AFM and multiphoton luminescence imaging of single gold nanoparticles**, Michael Ruosch, Dominik Marti, Jaro Ricka, Martin Frenz, Univ. Bern (Switzerland)[7577-38]

4:40 pm: **Biodegradable Polymer/Inorganic Nanoclusters for NIR Imaging**, Justina O. Tam, Jasmine M. Tam, Avinash Murthy, Davis Ingram, Leo L. Ma, Kort A. Travis, Keith P. Johnston, Konstantin V. Sokolov, The Univ. of Texas at Austin (USA)[7577-39]

Conferences

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Laser Source Engineering

Program Chair: **Gregory J. Quarles**, VLOC (USA)

- 7578 **Solid State Lasers XIX: Technology and Devices** (Clarkson/Hodgson/Shori)146
- 7579 **Laser Resonators and Beam Control XII** (Kudryashov/Paxton/Iichenko)151
- 7580 **Fiber Lasers VII: Technology, Systems, and Applications** (Tankala)154
- 7581 **High Energy/Average Power Lasers and Intense Beam Applications V** (Davis/Heaven/Schriempf)159

Nonlinear Optics

- 7582 **Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications IX** (Powers)161
- 7599 **Organic Photonic Materials and Devices XII** (Nelson/Kajzar/Kaino)207
- 7600 **Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIV** (Song/Tsen)210

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM Opto Semiconductors GmbH (Germany)

- 7583 **High-Power Diode Laser Technology and Applications VIII** (Zediker)164
- 7597 **Physics and Simulation of Optoelectronic Devices XVIII** (Witzigmann/Henneberger/Arakawa/Osin'ski)200
- 7602 **Gallium Nitride Materials and Devices V** (Chyi/Nanishi/Morkoç)215
- 7615 **Vertical-Cavity Surface-Emitting Lasers XIV** (Guenther/Choquette)250
- 7616 **Novel In-Plane Semiconductor Lasers IX** (Belyanin/Smowton)252
- 7617 **LEDs: Materials, Devices, and Applications for Solid State Lighting XIV** (Streubel/Jeon)256

Laser Micro-/Nanoengineering

Program Chairs: **Henry Helvajian**, The Aerospace Corp. (USA) **James S. Horwitz**, U.S. Dept. of Energy (USA)

- 7584 **Laser Applications in Microelectronic and Optoelectronic Manufacturing XV** (Niino/Meunier/Gu/Hennig)166
- 7585 **Laser-based Micro- and Nanopackaging and Assembly IV** (Pfleging/Lu/Washio)169
- 7586 **Synthesis and Photonics of Nanoscale Materials VII** (Dubowski/Geohegan/Träger)171
- 7590 **Micromachining and Microfabrication Process Technology XV** (Maher/Chiao/Resnick)183
- 7591 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics III** (Schoenfeld/Wang/Loncar/Suleski)184
- 7592 **Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices IX** (Kullberg/Ramesham)186

Laser Applications

- 7587 **Free-Space Laser Communication Technologies XXII** (Hemmati)173
- 7588 **Atmospheric and Oceanic Propagation of Electromagnetic Waves IV** (Korotkova)175
- 7589 **Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications X** Formerly: Commercial and Biomedical Applications of Ultrafast Lasers (Heisterkamp/Neev/Nolte/Trebino) 177
- 7613 **Complex Light and Optical Forces IV** (Galvez)247
- 7614 **Laser Refrigeration of Solids III** (Epstein/Sheik-Bahae)249

- LASE Special Events 18–19
- LASE Proceedings of SPIE/CD-ROM 325
- Index of Authors, Chairs, and Committee Members267-318



Photonics West maps:

Moscone Maps	pp. 2–5
Hilton Hotel Map	p. 3
Area Map	p. 322

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LASE Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
23 January	24 January	25 January	26 January	27 January	28 January

Laser Source Engineering

Program Chair: **Gregory J. Quarles**, VLOC

7578	Solid State Lasers XIX: Technology and Devices (Clarkson, Hodgson, Shori) p. 146
7579	Laser Resonators and Beam Control XII (Kudryashov, Paxton, Ilchenko) p. 151

Nonlinear Optics

7580	Fiber Lasers VII: Technology, Systems, and Applications (Tankala) p. 154
7581	High Energy/Average Power Lasers and Intense Beam Applications V (Davis, Heaven, Schriempf) p. 159

7582	Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications IX (Powers) p. 161
7599	Organic Photonic Materials and Devices XII (Nelson, Kajzar, Kaino) p. 207

7600	Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIV (Song, Tsen) p. 210
------	--

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM Opto Semiconductors GmbH (Germany)

7583	High-Power Diode Laser Technology and Applications VIII (Zediker) p. 164
------	---

7597	Physics and Simulation of Optoelectronic Devices XVIII (Witzigmann, Henneberger, Arakawa, Osirski) p. 200
------	--

7602	Gallium Nitride Materials and Devices V (Chyi, Nanishi, Morkoç) p. 215
------	---

7616	Novel In-Plane Semiconductor Lasers IX (Belyanin, Smowton) p. 252
------	--

7617	Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIV (Streubel, Jeon, Tu) p. 256
------	---

7615	Vertical-Cavity Surface-Emitting Lasers XIV (Guenter, Choquette) p. 250
------	--

Laser Micro-/Nanoengineering

Program Chairs: **Henry Helvajian**, The Aerospace Corp. (USA) **James S. Horwitz**, U.S. Dept. of Energy (USA)

7584	Laser Applications in Microelectronic and Optoelectronic Manufacturing XV (Niino, Meunier, Gu, Hennig) p. 166
------	--

7585	Laser-based Micro- and Nanopackaging and Assembly IV (Pfleging, Lu, Washio) p. 169
------	---

7586	Synthesis and Photonics of Nanoscale Materials VII (Dubowski, Geohegan, Träger) p. 171
------	---

7590	Micromachining and Microfabrication Process Technology XV (Maher, Chiao, Resnick) p. 183
------	---

7591	Advanced Fabrication Technologies for Micro/Nano Optics and Photonics III (Schoenfeld, Wang, Loncar, Suleski) p. 184
------	---

7592	Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices IX (Kullberg, Ramesham) p. 186
------	---

Saturday 23 January	Sunday 24 January	Monday 25 January	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
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Laser Applications

7589 Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications X (Formerly: Commercial and Biomedical Applications of Ultrafast Lasers) (<i>Heisterkamp, Neev, Nolte, Trebino</i>) p. 177	7614 Laser Refrigeration of Solids III (<i>Epstein, Sheik-Bahae</i>) p. 249
7588 Atmospheric and Oceanic Propagation of Electromagnetic Waves IV (<i>Korotkova</i>) p. 175	
7587 Free-Space Laser Communication Technologies XXII (<i>Hemmati</i>) p. 173	7613 Complex Light and Optical Forces IV (<i>Galvez</i>) p. 247

LASE Special Events

LASE Interactive Poster Session , 6:00 to 7:30 pm, p. 19	LASE PLENARY SESSION , 10:20 am to 12:30 pm, p.18	Best Oral Student Paper Competition, Fiber Lasers VI: Technology, Systems, and Applications (Conf. 7580) Award Ceremony, 5:40 to 6:00 pm, p. 19
TECHNICAL EVENT: Laser Communications (<i>Hemmati, Korotkova</i>), 7:30 to 9:00 pm, p. 19	<ul style="list-style-type: none"> Announcement of the LASE Best Student Paper Prize Winners Attosecond-Angstrom Science (<i>Corkum</i>) Ultrafast Fiber Laser Technology: Status and Prospects (<i>Tünnermann</i>) Challenges and Prospects of Ultrafast Lasers in Ophthalmology (<i>Lubatschowski</i>) 	
	Best Student Paper Competition and Ceremony, Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications X (Conf. 7589)— Competition, 8:00 to 9:00 am Award Ceremony, 10:00 to 10:20 am, p. 18	

LASE

SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

Photonics West maps:

Moscone Maps	pp. 2–5
Hilton Hotel Map	p. 3
Area Map	p. 322

Solid State Lasers XIX: Technology and Devices

Conference Chairs: **W. Andrew Clarkson**, Univ. of Southampton (United Kingdom); **Norman Hodgson**, Coherent, Inc.; **Ramesh K. Shori**, Naval Air Warfare Ctr.

Program Committee: **Santanu Basu**, Sparkle Optics Corp.; **Martin D. Dawson**, Univ. of Strathclyde (United Kingdom); **Adolf Giesen**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Hans-Dieter Hoffmann**, Fraunhofer-Institut für Lasertechnik (Germany); **Helena Jelinková**, Czech Technical Univ. in Prague (Czech Republic); **Jacob I. Mackenzie**, Univ. of Southampton (United Kingdom); **Michio Oka**, Sony Corp. (Japan); **Alan B. Petersen**, Newport Spectra-Physics; **Narasimha S. Prasad**, NASA Langley Research Ctr.; **Martin C. Richardson**, CREOL, The College of Optics and Photonics, Univ. of Central Florida; **Wolf Seelert**, Coherent Lubeck GmbH (Germany); **Irina T. Sorokina**, Norwegian Univ. of Science and Technology (Norway); **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom)

Sunday 24 January

INTRODUCTION

Room: 120 (Exhibit Level), Sun. 10:30 to 10:40 am

SESSION 1

Room: 120 (Exhibit Level), Sun. 10:40 am to 12:20 pm

Space-Qualified Lasers I

Session Chair: **Narasimha S. Prasad**, NASA Langley Research Ctr.

10:40 am: **Spaceborne laser instruments for high-resolution mapping** (*Invited Paper*), Anthony W. Yu, Michael Krainak, David Harding, James B. Abshire, Xiaoli Sun, NASA Goddard Space Flight Ctr. (USA) [7578-01]

11:10 am: **High energy 2-micron solid state laser development for NASA's 3-D winds measurement from space** (*Invited Paper*), Upendra N. Singh, Jirong Yu, Michael J. Kavaya, NASA Langley Research Ctr. (USA) [7578-02]

11:40 am: **Design and environmental testing of a compact pulsed UV laser system for spaceborne applications**, Christian Kolleck, Rajat Marwah, Sandra Mebben, Mathias Ernst, Tino Lang, Dietmar Kracht, Jörg Neumann, Laser Zentrum Hannover e.V. (Germany) [7578-03]

12:00 pm: **Quasi-CW laser diode arrays for space applications**, Antonios Seas, Elisavet Troupaki, Aleksey Vasilyev, Heather Conley, NASA Goddard Space Flight Ctr. (USA) [7578-04]

Lunch Break 12:20 to 1:50 pm

SESSION 2

Room: 120 (Exhibit Level), Sun. 1:50 to 3:10 pm

Space-Qualified Lasers II

Session Chair: **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom)

1:50 pm: **Extended testing of laser systems for Space applications**, Antonios Seas, Anthony Yu, NASA Goddard Space Flight Ctr. (USA); Anthony Melak, David Mostofi, Sigma Space Corp. (USA); Elisavet Troupaki, Aleksey Vasilyev, Heather Conley, NASA Goddard Space Flight Ctr. (USA) [7578-06]

2:10 pm: **Results of the 1319 laser subsystem of a guidestar laser system**, Zach Prezkuta, Munib P. Jalali, Ian Lee, Lockheed Martin Coherent Technologies (USA) [7578-07]

2:30 pm: **A highly reliable single mode laser for space application**, Steven X. Li, NASA Goddard Space Flight Ctr. (USA); Aleksey Vasilyev, Science Systems and Applications, Inc. (USA); Anthony Yu, Mark A. Stephen, George Shaw, Michael Krainak, NASA Goddard Space Flight Ctr. (USA); Alberto Rosanova, Honeywell Technology Solutions (USA); Timothy Filemyr, Bastion Technologies (USA) [7578-08]

2:50 pm: **Space laser transmitter development for ICESat-2 mission**, Anthony W. Yu, Mark A. Stephen, Steven X. Li, George Shaw, Antonios Seas, NASA Goddard Space Flight Ctr. (USA) [7578-09]

Coffee Break 3:10 to 3:40 pm

Monday 25 January

SESSION 3

Room: 120 (Exhibit Level), Mon. 8:00 to 9:50 am

Disk Lasers I

Session Chair: **Hans-Dieter Hoffmann**, Fraunhofer-Institut für Lasertechnik (Germany)

8:00 am: **700-W intracavity-frequency doubled Yb:YAG thin-disk laser at 100 kHz repetition rate** (*Invited Paper*), Christian Stolzenburg, Wolfgang Schüle, Ivo Zawischa, Alexander Killi, Dirk Sutter, TRUMPF Laser GmbH & Co. KG (Germany) [7578-10]

8:30 am: **Ytterbium-based disk amplifier for an ultrashort pulse laser**, John Vetrovec, Aqwest (USA); Bodo Schmidt, General Atomics Aeronautical Systems, Inc. (USA); Drew A. Copeland, Aqwest (USA) [7578-11]

8:50 am: **Latest advances in high-power disk lasers**, David L. Havrilla, TRUMPF Inc. (USA); Ruediger Brockmann, Alexander Killi, TRUMPF Laser GmbH & Co. KG (Germany) [7578-12]

9:10 am: **A design for a 100-kW rotary disk laser oscillator with good beam quality**, Santanu Basu, Sparkle Optics Corp. (USA) [7578-13]

9:30 am: **CW laser operation of a highly-doped Tm:KLu(WO₄)²/KLu(WO₄)² thin disk epitaxial laser**, Sergei Vatrik, Ivan Vedin, Institute of Laser Physics (Russian Federation); Maria Cinta Pujol, Xavier Mateos, Joan J. Carvajal, Magdalena Aguilo, Francesc Diaz, Univ. Rovira i Virgili (Spain); Uwe Griebner, Valentin Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7578-14]

Coffee Break 9:50 to 10:30 am

SESSION 4

Room: 120 (Exhibit Level), Mon. 10:30 am to 12:00 pm

Disk Lasers II

Session Chair: **Santanu Basu**, Sparkle Optics Corp.

10:30 am: **Improved bond strength characterization of CADB[®] epoxy-free bonded solid state laser materials** (*Invited Paper*), Nick Traggis, Neil Claussen, Precision Photonics Corp. (USA) [7578-15]

11:00 am: **Comparative performance of ASE suppressed ceramic Yb:YAG thin disks**, David J. Bossert, Petras V. Avizonis, Boeing-SVS, Inc. (USA) [7578-16]

11:20 am: **6.5 kW, Yb:YAG ceramic thin disk laser**, Ahmad Lobad, Boeing LTS (USA); Timothy Newell, William Latham, Air Force Research Lab. (USA) [7578-17]

11:40 am: **Thermal effect of cryogenic Yb:YAG total-reflection active-mirror laser**, Hiroaki Furuse, Taku Saiki, Kazuo Imasaki, Masayuki Fujita, Junji Kawanaka, Noriaki Miyanaga, Osaka Univ. (Japan); Kenji Takeshita, Shinya Ishii, Mitsubishi Heavy Industries, Ltd. (Japan) [7578-18]

Lunch Break 12:00 to 1:00 pm

SESSION 5

Room: 120 (Exhibit Level) Mon. 1:00 to 2:50 pm

Slab and Waveguide Lasers

Session Chair: Helena Jelinková,
Czech Technical Univ. in Prague (Czech Republic)

- 1:00 pm: **Review of high power bounce geometry solid-state lasers** (*Invited Paper*), Michael J. Damzen, Imperial College London (United Kingdom) and Midaz Lasers Ltd. (United Kingdom) [7578-19]
- 1:30 pm: **400W Yb:YAG planar waveguide laser using novel unstable resonators**, Ian J. Thomson, Howard J. Baker, Krystian Wlodarczyk, Natalia Trela, Denis R. Hall, Heriot-Watt Univ. (United Kingdom) [7578-20]
- 1:50 pm: **Power-scaling Nd:YAG's quasi-four-level transition**, Jacob I. Mackenzie, Univ. of Southampton (United Kingdom) [7578-21]
- 2:10 pm: **280W INNOSLAB amplifier for sub ns laser pulses with multi 100 MW peak power**, Marco Höfer, Dominik Esser, Henrik Sipma, Raphael Kasemann, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7578-22]
- 2:30 pm: **Recent progresses in INNOSLAB lasers and their harmonic generation**, Daijun Li, Shaojun Fu, Peng Shi, Jun Shen, Alexander Schell, Bingsong Qi, Claus-Ruediger Haas, Jingxiong Wang, Keming Du, EdgeWave GmbH (Germany) [7578-23]
- Coffee Break 2:50 to 3:30 pm

SESSION 6

Room: 131/132 (Exhibit Level) Mon. 3:30 to 6:10 pm

Visible and UV Lasers I

Joint Session with Conferences 7580 and 7582

Session Chairs: Norman Hodgson, Coherent, Inc.;
Dahv A. V. Kliner, JDSU; Peter E. Powers, Univ. of Dayton

- 3:30 pm: **RGB laser generation from fiber MOPAs coupled to external enhancement cavities** (*Invited Paper*), Jesse P. Anderegg, Tatyana A. Chernysheva, Dennis F. Elkins, Calvin L. Simmons, Richard C. Bishop, Christian L. Pedersen, Michael L. Murphy, Forrest L. Williams, Evans & Sutherland (USA) [7580-15]
- 4:00 pm: **Highly efficient and compact microchip green laser source for mobile projectors** (*Invited Paper*), John Khaydarov, Stepan Essaia, Gregory Nemet, Andrei V. Shchegrov, Natalia Simanovskaia, Spectralus Corp. (USA); Hakob Danielyan, Gevorg Gabrielyan, Armen R. Poghosyan, Suren Soghomonyan, Spectralus CJSC (Armenia) [7582-01]
- 4:30 pm: **Efficient, green laser based on a blue-diode pumped rare-earth-doped fluoride crystal in an extremely short resonator**, Michael Strotkamp, Thomas Schwarz, Bernd Jungbluth, Fraunhofer-Institut für Lasertechnik (Germany) [7578-24]
- 4:50 pm: **Highly reliable 198 nm light source for semiconductor inspection based on dual fiber lasers**, Shinichi Imai, Kazuto Matsuki, Nobutaka Kikui, Advanced Mask Inspection Technology, Inc. (Japan); Katsuhiko Takayama, Osamu Iwase, NuFlare Technology Inc. (Japan); Yoshiharu Urata, Tatsuya Shinozaki, Yoshio Wada, Satoshi Wada, Megaopto Co., Ltd. (Japan) . . [7580-16]
- 5:10 pm: **High-power green light generation by second harmonic generation of single-frequency tapered diode lasers**, Ole B. Jensen, Peter E. Andersen, Technical Univ. of Denmark (Denmark); Bernd Sumpff, Karl-Heinz Hasler, Goetz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany); Paul M. Petersen, Technical Univ. of Denmark (Denmark) . [7582-02]
- 5:30 pm: **Frequency doubling of fiber laser radiation of large spectral bandwidths**, Sebastian Nyga, Jens Geiger, Bernd Jungbluth, Fraunhofer-Institut für Lasertechnik (Germany) [7580-17]
- 5:50 pm: **High average and peak power pulsed fiber lasers at 1030 nm and 515nm**, Benjamin Cocquelin, Julien Saby, François L. Salin, Anthony Meunier, Eolite Systems (France) [7580-17]

Tuesday 26 January

SESSION 7

Room: 120 (Exhibit Level) Tues. 8:00 to 10:00 am

Visible and UV Lasers II

Session Chair: W. Andrew Clarkson,
Univ. of Southampton (United Kingdom)

- 8:00 am: **A 200 mW, CW, 355 nm laser based on DPSS side pumped, internally frequency tripled technology**, Steven M. Jarrett, Gandhar P. Shellikeri, Oscar Varela, DPSS Lasers Inc. (USA) [7578-92]
- 8:20 am: **Compact and efficient continuous wave UV DPSS laser**, Jonas Hellstrom, Gunnar Elgcröna, Hakan Karlsson, Cobolt AB (Sweden) . . [7578-26]
- 8:40 am: **Low-cost frequency-converted laser light sources**, Janne Konttinen, Pietari Tuomisto, Tuomas Vallius, Pirjo Leinonen, Pasi Pietilä, Tomi Jouhti, EpiCrystals, Inc. (Finland) [7578-27]
- 9:00 am: **Half-Watt single frequency yellow 561 nm DPSS laser with record 18% optical conversion efficiency**, Thierry Georges, Nicolas Janvier, OXXIUS (France) [7578-28]
- 9:20 am: **Short and long term frequency stability of linear monolithic intracavity frequency-doubled solid state laser**, Thierry Georges, Nicolas Janvier, OXXIUS (France) [7578-29]
- 9:40 am: **Frequency doubled pulsed single longitudinal mode Nd:YAG laser at 1319 nm with pulse build-up negative feedback controls**, Ramunas Bakanas, Julius Pileckas, Geola Digital uab (Lithuania) [7578-30]
- Coffee Break 10:00 to 10:30 am

SESSION 8

Room: 120 (Exhibit Level) Tues. 10:30 am to 12:00 pm

OPS Lasers I

Session Chair: Helena Jelinková,
Czech Technical Univ. in Prague (Czech Republic)

- 10:30 am: **Ten years OPS lasers: review, state-of-the-art, and future developments**, Volker Pfeufer, Christian Kannengiesser, Vasily Ostroumov, Wolf Seeler, Christoph Simon, Andreas Zuck, Coherent Lubeck GmbH (Germany) [7578-31]
- 10:50 am: **GaSb-based optically pumped semiconductor disk lasers emitting at a wavelength of 2.8 μm** (*Invited Paper*), Benno Rösener, Marcel Rattunde, Rüdiger Moser, Christian Manz, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [7578-32]
- 11:20 am: **~1200-nm tunable fiber vertical-cavity surface emitting laser**, Sharon L. Vetter, Nicolas Laurand, Martin D. Dawson, Stephane Calvez, Univ. of Strathclyde (United Kingdom) [7578-33]
- 11:40 am: **Low-temperature study of lasing characteristics for 1.3-μm AlGaInAs quantum-well laser pumped by an actively Q-switched Nd:YAG laser**, Kuan-Wei Su, S. C. Huang, A. Li, S. C. Liu, Yi-Fan Chen, Yung-Fu Chen, Kai-Feng Huang, National Chiao Tung Univ. (Taiwan) [7578-34]
- Lunch/Exhibition Break 12:00 to 1:50 pm

SESSION 9

Room: 120 (Exhibit Level) Tues. 1:50 to 3:00 pm

OPS Lasers II

Session Chair: Alan B. Petersen, Newport Spectra-Physics

- 1:50 pm: **New developments for MOVPE-grown OPS-laser in the 1180 nm emission wavelength range** (*Invited Paper*), Bernardette Kunert, NAsP III/V GmbH (Germany); T. L. Wang, Yushi Kaneda, Jörg Hader, Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA); Stephan W. Koch, Wolfgang Stolz, Philipps-Univ. Marburg (Germany) [7578-35]
- 2:20 pm: **A 7-W 1178-nm GaInNAs based disk laser for guide star applications**, Tomi Leinonen, Ville-Markus Korpjärvi, Janne Puustinen, Antti Härkönen, Mircea Guina, Markus Pessa, Tampere Univ. of Technology (Finland) [7578-36]
- 2:40 pm: **532 nm laser sources based on intracavity frequency doubling of multi-edge-emitting diode lasers**, Kang Li, Univ. of Glamorgan (United Kingdom); Nigel J. Copner, Univ. of Glamorgan (USA); Corin Gawith, Covision Ltd. (United Kingdom); Ian Knight, Oclaro, Inc. (United Kingdom) [7578-37]
- Coffee Break 3:00 to 3:30 pm

LASE

SESSION 10

Room: 120 (Exhibit Level), Tues. 3:30 to 5:00 pm

Ceramic Materials and Thermal Management

*Session Chair: W. Andrew Clarkson,
Univ. of Southampton (United Kingdom)*

3:30 pm: **Cryogenically cooled solid-state lasers: Recent developments and future prospects** (*Invited Paper*), John D. Hybl, Tso Yee Fan, Daniel J. Ripin, Juliet T. Gopinath, Anish K. Goyal, D. A. Rand, Steven J. Augst, Juan R. Ochoa, Lincoln Lab. (USA) [7578-40]

4:00 pm: **Development of rare earth doped ceramic solid state laser host materials**, Narasimha S. Prasad, NASA Langley Research Ctr. (USA); Vijay Shukla, Rajendra K. Sadangi, Rutgers, The State Univ. of New Jersey (USA); Uwe H. Hommerich, Hampton Univ. (USA); Witold Palosz, Chen-Chia Wang, Sudhir B. Trivedi, Brimrose Corp. of America (USA) [7578-38]

4:20 pm: **Yb:YAG composite ceramic laser**, Edgar Pawlowski, SCHOTT AG (Germany) [7578-39]

4:40 pm: **Thermally induced aberrations in solid-state lasers**, Michael M. Tilleman, Elbit Systems of America (USA) [7578-41]

POSTERS—TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Very compact and high-power CW self-Raman laser for ophthalmological applications, Tiago A. Ortega, Opto Eletrônica S.A. (Brazil) and Univ. of São Paulo (Brazil); Andrew Lee, Macquarie Univ. (Australia); Glaucio Z. Costal, Yuri C. Fontes, Guilherme Cunha de Castro, Alessandro D. Mota, Giuliano Rossi, Fatima M. M. Yasuoka, Opto Eletrônica S.A. (Brazil); Helen M. Pask, Macquarie Univ. (Australia) [7578-72]

A registration algorithm USING 'generalized points' for IKONOS image and LIDAR data in urban area, Chunjing Yao, Wuhan Univ. (China) [7578-73]

Quasi-continuously pumped passively mode-locked 2.4% doped Nd:YAG oscillator-amplifier system in a bounce geometry, Michal Jelinek, Vaclav Kubecek, Miroslav Cech, Petr Hirs, Czech Technical Univ. in Prague (Czech Republic) [7578-74]

Four micron radiation generated by dysprosium doped lead thiogallate laser, Maxim E. Doroshenko, General Physics Institute (Russian Federation); Helena Jelinková, Jan Šulc, Martin Fibrich, Michal Jelinek, Czech Technical Univ. in Prague (Czech Republic); Tasoltan T. Basiev, Vjatcheslav V. Osiko, General Physics Institute (Russian Federation); Valerii V. Badikov, Kuban State Univ. (Russian Federation) [7578-75]

Cr:ZnSe laser pumped with Tm:YAP microchip laser, Petr Koranda, Jan Šulc, Czech Technical Univ. in Prague (Czech Republic); Maxim E. Doroshenko, General Physics Institute (Russian Federation); Helena Jelinková, Czech Technical Univ. in Prague (Czech Republic); Tasoltan T. Basiev, Vjatcheslav V. Osiko, General Physics Institute (Russian Federation); Valerii V. Badikov, D. V. Badikov, Kuban State Univ. (Russian Federation) [7578-76]

Complex behavior of a Yb:GdVO₄ laser with bistability and polarization switching, Junhai Liu, Wenjuan Han, Qingdao Univ. (China); Huajin Zhang, Shandong Univ. (China); Hongwei Yang, Qingdao Univ. (China); Valentin Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7578-77]

Pr:YA₃O₃ and Pr:LiYF₄ laser emission comparison under GaN laser diode pumping, Martin Fibrich, Helena Jelinková, Jan Šulc, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Škoda, Crytur Ltd. (Czech Republic) [7578-78]

Temperature effects on the operation and input/output wavelengths of a high-power fiber-coupled diode end-pumped Nd:YVO₄ laser, Ashraf F. El-Sherif, Military Technical College (Egypt) [7578-79]

Pump laser effect on temporal jittering of pulses from passively Q-Switched Nd:YVO₄ laser, Kangin Lee, Yeungjung Kim, Jin-Hyuk Kwon, Jonghoon Yi, Yeungnam Univ. (Korea, Republic of) [7578-80]

Carbon nanotube saturable absorber mode-locked Tm:LiLuF₄ laser, Won Bae Cho, Ajou Univ. (Korea, Republic of); Andreas Schmidt, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Fabian Rotermund, Sun Young Choi, Jong Hyuk Yim, Soonil Lee, Ajou Univ. (Korea, Republic of); Uwe Griebner, Günter Steinmeyer, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Daniela Parisi, Mauro Tonelli, Univ. di Pisa (Italy); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7578-81]

Coherently pumped Er:YA₃O₃ lasers, Michal Nemeč, Helena Jelinková, Jan Šulc, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Škoda, Crytur Ltd. (Czech Republic) [7578-82]

Medium range high accuracy semiconductor laser range finder, Junewen Chen, Chung-Hua Univ. (Taiwan) [7578-83]

Influence of temperature on Nd:YAG/V:YAG compact laser generation at 1444 nm, Jan Šulc, Jakub Novak, Helena Jelinková, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Škoda, Crytur Ltd. (Czech Republic) [7578-84]

Powerful narrow-line source of blue light for laser cooling Yb/Er and Dysprosium atoms, Sergey M. Kobtsev, Novosibirsk State Univ. (Russian Federation) and Tekhnoscan JSC (Russian Federation); Benjamin Lev, Univ. of Illinois at Urbana-Champaign (USA); József Fortágh, Univ. of Tuebingen (Germany); Vladimir I. Baraulya, Tekhnoscan JSC (Russian Federation) [7578-86]

LIBS system with compact fiber spectrometer, head mounted spectra display and hand-held eye-safe erbium glass laser gun, Michael J. Myers, John D. Myers, John T. Sarracino, Christopher R. Hardy, Baoping Guo, Sean M. Christian, Jeffrey A. Myers, Franziska Roth, Abbey G. Myers, Kigre, Inc. (USA) [7578-87]

Dynamic 3D modeling of solid state laser resonators using a coupled thermo-optical finite element analysis, Matthias Wohlmuth, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Konrad Altmann, LAS-CAD GmbH (Germany); Johannes Werner, Christoph Pflaum, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [7578-88]

Enhanced 5-µm emission in Tm,Tb: KPb₂Br₅ and Tm,Nd:KPb₂Br₅ for mid-infrared laser applications, Althea G. Bluiett, Elizabeth City State Univ. (USA); Ei Brown, Uwe H. Hommerich, Hampton Univ. (USA); Sudhir B. Trivedi, Brimrose Corp. of America (USA); John M. Zavada, North Carolina State Univ. (USA) [7578-89]

Single frequency monolithic green DPSS laser, Jaroslaw Sotor, Arkadiusz Antonczak, Krzysztof Abramski, Wroclaw Univ. of Technology (Poland) [7578-90]

Wednesday 27 January

SESSION 11

Room: 120 (Exhibit Level), Wed. 8:00 to 10:00 am

Ultrafast Lasers

Session Chair: Alan B. Petersen, Newport Spectra-Physics

8:00 am: **Efficient, high power nonlinear mirror modelocking of a bounce geometry laser**, Gabrielle Thomas, Simon Chard, Michael J. Damzen, Imperial College London (United Kingdom) [7578-93]

8:20 am: **Multi-kHz multi-mJ phase stabilized OPCPA amplifier system**, Michaël Hemmer, Andreas Vaupel, Benjamin Webb, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7578-43]

8:40 am: **Intensity scaling of non-cryo-cooled Ti:sapphire amplifiers**, Alan R. Fry, Jean-Marc Y. Heritier, Kai-Chien J. Chu, Rimas Viselga, Arturo Magana, Coherent, Inc. (USA) [7578-44]

9:00 am: **Sectional chirped volume Bragg grating compressors for high-power chirped-pulse amplification**, Oleksiy G. Andrusyak, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Lionel Canioni, Univ. Bordeaux 1 (France); Ion Cohanoshi, OptiGrate Corp. (USA); Martin Delaigue, Amplitude Systemes (USA); Eugeniu V. Rotari, Vadim I. Smirnov, OptiGrate Corp. (USA); Leonid Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7578-45]

9:20 am: **A compact dispersive delay generator using angular dispersion amplification**, Santanu Basu, Sparkle Optics Corp. (USA) [7578-46]

9:40 am: **Time-gating processes in intra-cavity mode-locking devices like saturable absorbers and Kerr cells**, Narasimha S. Prasad, NASA Langley Research Ctr. (USA); Chandrasekhar Roychoudhuri, Univ. of Connecticut (USA) [7578-47]

Coffee Break 10:00 to 10:20 am

Thursday 28 January

SESSION 14

Room: 120 (Exhibit Level), Thurs. 8:10 to 10:00 am

Q-switched Lasers

Session Chair: Norman Hodgson, Coherent, Inc.

8:10 am: **Physical and engineering aspects of passively Q-switched microlasers** (*Invited Paper*), Yehoshua Y. Kalisky, Nuclear Research Ctr. Negev (Israel) [7578-56]

8:40 am: **An injection seeded single frequency Nd:YAG Q-switched laser with precisely controllable laser pulse firing time**, Frank F. Wu, Anatoliy Khizhnyak, Vladimir B. Markov, MetroLaser, Inc. (USA) [7578-57]

9:00 am: **2-MHz repetition rate, 200-ps pulse duration from a monolithic passively Q-switched microchip laser**, Alexander Steinmetz, Dirk Nodop, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Rico Hohmuth, Wolfgang Richter, BATOP GmbH (Germany). [7578-58]

9:20 am: **Intracavity frequency doubled Nd:YAG laser with dual-stability-range cavity emitting high-power near-diffraction-limited radiation in CW and Q-switched mode**, Dirk Woll, Jeffrey Gregg, James Lefort, James J. Morehead, Jennifer Lindahl, JDSU (USA) [7578-59]

9:40 am: **Reduction in timing jitter for a Q-switched Nd:YAG laser by direct bleaching of a Cr:YAG saturable absorber**, Brian Cole, Jonathan Lei, Tom DiLazaro, Bradley Schilling, Charlie W. Trussell, Lew Goldberg, US Army RDECOM CERDEC, Night Vision and Electronics Sensors Directorate (USA) [7578-60]

Coffee Break 10:00 to 10:30 am

SESSION 15

Room: 120 (Exhibit Level), Thurs. 10:30 am to 12:10 pm

Optics and Beam Delivery

Session Chair: David H. Titterton, Defence Science and Technology Lab. (United Kingdom)

10:30 am: **Comparison of small fiber connectors for high-power transmission**, Stuart Campbell, Ola Blomster, Magnus Pålsson, Optoskand AB (Sweden) [7578-61]

10:50 am: **Ultrashort pulse long distance fiber delivery**, Tuan Le, Gabriel Tempea, Zhao Cheng, Martin Hofer, Andreas Stingl, FEMTOLASERS Produktions GmbH (Austria) [7578-62]

11:10 am: **Reflective phase retarders enable multi-mJ hollow fiber pulse compression**, Gabriel Tempea, Martin Hofer, Thomas Prikoszovits, Zhao Cheng, Tuan Le, Andreas Assion, FEMTOLASERS Produktions GmbH (Austria) [7578-63]

11:30 am: **Faraday isolators for high average power fundamental mode radiation**, Kolja Nicklaus, Torsten Langer, JT Optical Engine GmbH + Co. KG (Germany) [7578-64]

11:50 am: **Deterministic single shot and multiple shots bulk damage thresholds for doped and undoped crystalline and ceramic YAG**, Binh Trong Do, Sandia National Labs. (USA); Arlee V. Smith, AS-Photonics, LLC (USA) [7578-65]

Lunch/Exhibition Break 12:10 to 1:20 pm

LASE Plenary Session

Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

10:20 am: **LASE Best Student Paper Prize**
SPIE will present awards to the best 3 student papers on the science and application of lasers.
Cash prizes of \$1500, \$1000, and \$500 will be awarded.

10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]

11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany). [7579-102]

11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]

Lunch/Exhibition Break 12:30 to 1:40 pm

SESSION 12

Room: 120 (Exhibit Level), Wed. 1:40 to 3:00 pm

Mid-Infrared Lasers I

Session Chair: Ramesh K. Shori, Naval Air Warfare Ctr.

1:40 pm: **Q-switched resonantly diode-pumped Er:YAG laser**, Igor Kudryashov, Alex Katsnelson, Princeton Lightwave, Inc. (USA) [7578-48]

2:00 pm: **Efficient, 1.5W CW and 7 mJ quasi-CW TEM00 mode operation of a compact diode-laser-pumped 2.94µm Er:YAG laser**, Gary Sousa, Sheaumann Laser, Inc. (USA) [7578-49]

2:20 pm: **Two-micron cryogenically cooled solid state lasers: recent progress and future prospects**, Jacob I. Mackenzie, Ji Won Kim, Lee Pearson, Wendell O. S. Bailey, Yifeng Yang, W. Andrew Clarkson, Univ. of Southampton (United Kingdom). [7578-50]

2:40 pm: **Atmospheric propagation testing with a high-power tunable thulium fiber laser system**, Timothy S. McComb, Lawrence Shah, Robert A. Sims, Vikas Sudesh, Martin C. Richardson, Townes Laser Institute, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7578-51]

Coffee Break 3:00 to 3:30 pm

SESSION 13

Room: 120 (Exhibit Level), Wed. 3:30 to 4:50 pm

Mid-Infrared Lasers II

Session Chair: Ramesh K. Shori, Naval Air Warfare Ctr.

3:30 pm: **Optically dense Fe:ZnSe crystals for energy scaled gain switched lasing**, NoSung Myoung, Univ. of Alabama at Birmingham (USA); Vladimir V. Fedorov, Sergey B. Mirov, Univ. of Alabama at Birmingham (USA) and Ctr. for Optical Sensors and Spectroscopies (USA) [7578-52]

3:50 pm: **Laser-spectroscopic study of Er doped PbWO₄ as laser and stimulated Raman scattering active crystals**, Ilya S. Mirov, Univ. of Richmond (USA); Vladimir V. Fedorov, The Univ. of Alabama at Birmingham (USA); Sergey Beloglovsky, Stanislav Burachas, Yuri Saveliev, North Crystals (Russian Federation) [7578-53]

4:10 pm: **Cr-ZnSe passively Q-switched fiber-bulk Ho:YAG hybrid laser**, Yuri Terekhov, Igor S. Moskalev, Vladimir V. Fedorov, Dmitri V. Martyshkin, The Univ. of Alabama at Birmingham (USA); Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) and Photonics Innovations, Inc. (USA) [7578-54]

4:30 pm: **InP diode-pumped Cr:ZnS and Cr:ZnSe highly-efficient widely-tunable mid-IR lasers**, Igor S. Moskalev, Vladimir V. Fedorov, The Univ. of Alabama at Birmingham (USA); Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) and Photonics Innovations, Inc. (USA) [7578-55]

LASE

SESSION 16

Room: 120 (Exhibit Level) **Thurs. 1:20 to 3:30 pm**

Applications

Session Chair: **Hans-Dieter Hoffmann**,
Fraunhofer-Institut für Lasertechnik (Germany)

1:20 pm: **Solid state laser tools for solar crystalline silicon wafer processing**
(*Invited Paper*), Allan Ashmead, Coherent, Inc. (USA) [7578-66]

1:50 pm: **New developments in STED microscopy**, Arnold Giske, Jochen Sieber, Marcus Dyba, Hilmar Gugel, Volker Seyfried, Dietmar Gnass, Leica Microsystems CMS (Germany) [7578-67]

2:10 pm: **Drilling of aluminum with a high-power Q-switched 532-nm laser**, Leonard R. Migliore, Coherent, Inc. (USA) [7578-68]

2:30 pm: **Enhanced productivity with high-power short and ultrashort thin disk lasers**, Jürgen Stollhof, TRUMPF Inc. (USA); Sascha Weiler, Uwe Stute, Severin Massa, Birgit Faisst, Christian Stolzenburg, Dirk Sutter, TRUMPF Laser GmbH & Co. KG (Germany) [7578-69]

2:50 pm: **Industrial high-power high-energy pulsed laser with feeding fiber for thin layer removal**, Alexander Straesser, Rofin-Sinar Laser GmbH (Germany) [7578-70]

3:10 pm: **Applications of INNOSLAB lasers with tailored beam profiles**, Keming Du, Peng Shi, Alexander Schell, Daijun Li, Claus-Ruediger Haas, Shaojun Fu, EdgeWave GmbH (Germany) [7578-71]



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See p. 10

Laser Resonators and Beam Control XII

Conference Chairs: Alexis V. Kudryashov, Moscow State Open Univ. (Russian Federation); Alan H. Paxton, Air Force Research Lab.; Vladimir S. Ilchenko, OEwaves, Inc.

Conference Co-Chair: Lutz Aschke, LIMO Lissotschenko Mikrooptik GmbH (Germany)

Program Committee: Jean-Claude M. Diels, The Univ. of New Mexico; Hans-Joachim Eichler, Technische Univ. Berlin (Germany); Andrew Forbes, Council for Scientific and Industrial Research (South Africa); Pierre Galarneau, Institut National d'Optique (Canada); Thomas Graf, Univ. Stuttgart (Germany); James R. Leger, Univ. of Minnesota; Andrey B. Matsko, OEwaves, Inc.; Shayan Mookherjea, Univ. of California, San Diego; Steve A. Pappert, Defense Advanced Research Projects Agency; Michael J. Scaggs, Haas Laser Technologies, Inc.

Sunday 24 January

SESSION 1

Room: 110 (Exhibit Level) Sun. 8:30 to 10:40 am

Adaptive Optics

Session Chairs: Alexis V. Kudryashov, Moscow State Open Univ. (Russian Federation); Alan H. Paxton, Air Force Research Lab.

- 8:30 am: **Laser power feeding to electric vehicle from solar power** (*Invited Paper*), Ken-ichi Ueda, The Univ. of Electro-Communications (Japan) [7579-01]
- 9:00 am: **Effective frequency doubled Nd:YAG laser with high beam quality**, Igor V. Glukhikh, D. V. Efremov Scientific Research Institute of Electrophysical Apparatus (Russian Federation); Sergey A. Dimakov, S.I. Vavilov State Optical Institute (Russian Federation); Sergey V. Frolov, D. V. Efremov Scientific Research Institute of Electrophysical Apparatus (Russian Federation); Vladimir Y. Shur, Ural State Univ. (Russian Federation) [7579-02]
- 9:20 am: **Laser beam formation with adaptive optics** (*Invited Paper*), Alexis V. Kudryashov, Moscow State Open Univ. (Russian Federation) [7579-03]
- 9:50 am: **Fast widely tunable external cavity laser (ECL)**, Christophe Moser, Frank Havermeier, Ondax, Inc. (USA) [7579-14]
- 10:10 am: **New paradigms for old problems: some (small) advances in laser resonator research at the CSIR** (*Invited Paper*), Andrew Forbes, Council for Scientific and Industrial Research (South Africa) [7579-05]
- Coffee Break 10:40 to 11:00 am

SESSION 2

Room: 110 (Exhibit Level) Sun. 11:00 am to 12:20 pm

Adaptive Optics and Laser Simulation

Session Chair: Vladimir S. Ilchenko, OEwaves, Inc.

- 11:00 am: **Saturation characteristics of gain guiding in index-antiguidded waveguides**, Tsinghua Her, Xianyu Ao, Lee Casperson, The Univ. of North Carolina at Charlotte (USA) [7579-07]
- 11:20 am: **Shaping of dark beams in resonators with a bi-lens reflector**, Yuriy N. Parkhomenko, Boris Spektor, Joseph Shamir, Technion-Israel Institute of Technology (Israel) [7579-08]
- 11:40 am: **Propagation of 3-D beams using a finite-difference algorithm: practical considerations**, Alan H. Paxton, Air Force Research Lab. (USA) [7579-09]
- 12:00 pm: **Precision control of the transfer matrix method for transverse-mode fields of laser resonators**, Dongxiong Ling, Dongguan Univ. of Technology (China) [7579-10]
- Lunch Break 12:20 to 1:30 pm

SESSION 3

Room: 110 (Exhibit Level) Sun. 1:30 to 3:30 pm

Microresonator Structures and Materials

Session Chair: Shayan Mookherjea, Univ. of California, San Diego

- 1:30 pm: **Photonic devices and circuits for electronic-photonic integration and on-chip interconnects in deeply scaled CMOS processes** (*Invited Paper*), Milos A. Popovic, Massachusetts Institute of Technology (USA) and Univ. of Colorado at Boulder (USA); Jason S. Orcutt, Anatoly M. Khilo, Charles W. Holzwarth, Hanqing Li, Massachusetts Institute of Technology (USA); Ajay Joshi, Massachusetts Institute of Technology (USA) and Boston Univ. (USA); Benjamin R. Moss, Michael Georgas, Jonathan Leu, Franz X. Kärtner, Rajeev J. Ram, Vladimir Stojanovic, Massachusetts Institute of Technology (USA) [7579-51]
- 2:00 pm: **Engineering optical forces in waveguides and cavities based on optical response** (*Invited Paper*), Peter T. Rakich, Sandia National Labs. (USA); Zheng H. Wang, Milos A. Popovic, Massachusetts Institute of Technology (USA) [7579-52]
- 2:30 pm: **Large tunable birefringence in silicon microcantilever waveguides via optomechanics** (*Invited Paper*), Michelle L. Povinelli, Jing Ma, The Univ. of Southern California (USA) [7579-53]
- 3:00 pm: **Integration of chalcogenide and titanium-diffused lithium-niobate waveguides** (*Invited Paper*), Mehmet Solmaz, Christi K. Madsen, Texas A&M Univ. (USA) [7579-54]

Monday 25 January

SESSION 4

Room: 110 (Exhibit Level) Mon. 8:00 to 10:30 am

Laser Beam Control and Applications in Manufacturing

Session Chair: Shayan Mookherjea, Univ. of California, San Diego

- 8:00 am: **Generation of multikilowatt radially or azimuthally polarized CO₂ laser beams by a triple-axicon optical resonator**, Masamori Endo, Tokai Univ. (Japan) [7579-11]
- 8:20 am: **Tolerance analysis for stable laser resonators**, Michael Kuhn, LightTrans GmbH (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany); Christian Hellmann, Torsten Schoening, LightTrans GmbH (Germany) [7579-12]
- 8:40 am: **Optimized high-power CO₂ laser resonators for direct laser engraving**, Markus Bohrer, Dr. Bohrer Lasertec GmbH (Austria); Dieter Schuoecker, Technische Univ. Wien (Austria) [7579-13]
- 9:00 am: **Multi dither adaptive system based on Shack-Hartmann wavefront sensor**, Julia V. Sheldakova, Moscow State Open Univ. (Russian Federation) [7579-04]
- 9:20 am: **Common cavity resonators for passive laser beam combining: effects of path length errors** (*Invited Paper*), James R. Leger, Mercedeh Khajavikhan, Univ. of Minnesota (USA) [7579-15]
- 9:50 am: **A novel technology based on CO₂ lasers for surface finishing and direct fiber fusion of beam delivery optics**, George Curatu, LightPath Technologies, Inc. (USA) [7579-16]
- 10:10 am: **All-fiber optical isolator for high-power optical transmission**, Thomas Liebig, Andreas Voss, Thomas Graf, Univ. Stuttgart (Germany) [7579-17]
- Coffee Break 10:30 to 11:00 am

LASE

SESSION 5

Room: 110 (Exhibit Level), Mon. 11:00 am to 12:00 pm

Beam Shaping

Session Chair: Alan H. Paxton, Air Force Research Lab.

11:00 am: **Gaussian beam shaping based on multimode interference**, Xiushan Zhu, Axel Schulzgen, Hongbo Li, Jerome V. Moloney, Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) [7579-18]

11:20 am: **Applying refractive beam shapers in creating spots of uniform intensity and various shapes**, Alexander Laskin, Molecular Technology GmbH (Germany) [7579-19]

11:40 am: **Overview: process-optimized beam transformers and their impact on high-power laser applications**, Oliver Homburg, Thomas Mitra, Lutz Aschke, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7579-20]

Lunch Break 12:00 to 1:10 pm

SESSION 6

Room: 110 (Exhibit Level), Mon. 1:10 to 3:30 pm

Beam Characterization and Diagnostics

Session Chair: James R. Leger, Univ. of Minnesota

1:10 pm: **Spatial laser beam characterization: state of the art** (*Invited Paper*), Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany) [7579-21]

1:40 pm: **Novel multi-sensor polarimeter for the characterization of inhomogeneously polarized laser beams**, Thomas Liebig, Marwan Abdou-Ahmed, Andreas Voss, Thomas Graf, Univ. Stuttgart (Germany) [7579-22]

2:00 pm: **Complete description of optical fields propagating in passive LMA fibers regarding amplitude, relative phase delay and polarization by means of optical correlation filters**, Daniel Flamm, Friedrich-Schiller-Univ. Jena (Germany); Siegmund Schroeter, Institut für Photonische Technologien Jena (Germany); Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany) . [7579-23]

2:20 pm: **Spectral shifts of stochastic electromagnetic beams in negative refractive index materials**, Zhisong Tong, Olga Korotkova, Univ. of Miami (USA) [7579-24]

2:40 pm: **Spatial control and diagnostics of femtosecond pulses with programmable micro-optics** (*Invited Paper*), Ruediger Grunwald, Martin Bock, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7579-25]

3:10 pm: **Fractional power in the bucket and M square**, Santanu Basu, Sparkle Optics Corp. (USA); Lee Gutheinz, Boeing-SVS, Inc. (USA) . . [7579-26]

Coffee Break 3:30 to 4:00 pm

SESSION 7

Room: 110 (Exhibit Level), Mon. 4:00 to 5:30 pm

Microresonators: Nonlinear Applications, Novel Devices, and Sensors I

Session Chair: Hans-Joachim Eichler, Technische Univ. Berlin (Germany)

4:00 pm: **Intracavity frequency conversion: from bow-ties to whispering galleries** (*Invited Paper*), Ingo Breunig, Univ. Bonn (Germany) [7579-27]

4:30 pm: **Tuning of whispering gallery modes of polymeric micro-spheres and shells using external electric field**, Tindaro Ioppolo, Ulas Ayaz, Volkan Otugen, Southern Methodist Univ. (USA) [7579-28]

4:50 pm: **Whispering-gallery-mode carousel nanoparticle sensors**, Frank Vollmer, Harvard Univ. (USA); Stephen Arnold, New York Univ. (USA) . [7579-29]

5:10 pm: **PDMS-based microfluidic lasers using whispering gallery modes for lab-on-a-chip applications**, Jonathan D. Suter, Daniel J. Howard, Univ. of Missouri, Columbia (USA); Eric Hoppmann, Ian M. White, Univ. of Maryland, College Park (USA); Xudong Fan, Univ. of Missouri, Columbia (USA) . [7579-30]

Tuesday 26 January

SESSION 8

Room: 110 (Exhibit Level), Tues. 8:00 to 10:00 am

Microresonators: Photonics Applications

Session Chair: Michael J. Scaggs, Haas Laser Technologies, Inc.

8:00 am: **RF photonic devices with WGM resonators** (*Invited Paper*), Vladimir S. Ilchenko, OEwaves, Inc. (USA) [7579-31]

8:30 am: **Resonant millimeter wave optical modulators** (*Invited Paper*), William H. Steier, Yoo Seung Lee, Sang Shin Lee, Hidehisa Tazawa, The Univ. of Southern California (USA); Bartosz J. Bortnik, Yu-Chueh Hung, Harold R. Fetterman, Univ. of California, Los Angeles (USA); Jingdong Luo, Alex K. Y. Jen, Larry R. Dalton, Univ. of Washington (USA) [7579-32]

9:00 am: **Frequency combs with resonators** (*Invited Paper*), Scott Diddams, National Institute of Standards and Technology (USA) [7579-33]

9:30 am: **Tunable photonic RF phase shifter using silicon microring resonator** (*Invited Paper*), Yikai Su, Shanghai Jiao Tong Univ. (China) . [7579-34]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 110 (Exhibit Level), Tues. 10:30 am to 12:20 pm

Microresonators: Cavity Optomechanics and QED I

Session Chair: Andrey B. Matsko, OEwaves, Inc.

10:30 am: **Cavity optomechanics with nano- and microscale oscillators at millikelvin temperatures** (*Invited Paper*), Tobias J. Kippenberg, Max-Planck-Institut für Quantenoptik (Germany) [7579-35]

11:00 am: **Mechanical amplification in cavities and ions** (*Invited Paper*), Kerry J. Vahala, California Institute of Technology (USA) [7579-36]

11:30 am: **Photonic MEMS vibrating at x-band (11-GHz) rates** (*Invited Paper*), Tal E. Carmon, Univ. of Michigan (USA) [7579-37]

12:00 pm: **Squeezing light from optical resonators**, Stephen Creagh, The Univ. of Nottingham (United Kingdom) [7579-38]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 10

Room: 110 (Exhibit Level), Tues. 1:30 to 3:30 pm

Microresonators: Cavity Optomechanics and QED II

Session Chair: Lutz Aschke, LIMO Lissotschenko Mikrooptik GmbH (Germany)

1:30 pm: **Strong coupling of single atoms with microtoroidal resonators** (*Invited Paper*), Nathaniel P. Stern, Daniel J. Alton, H. Jeff Kimble, California Institute of Technology (USA) [7579-39]

2:00 pm: **Hybrid approaches towards single emitter coupling to optical microresonators** (*Invited Paper*), Oliver Benson, Humboldt-Univ. zu Berlin (Germany) [7579-40]

2:30 pm: **Slow light rotation sensors and gyroscopes** (*Invited Paper*), Jacob Scheuer, Tel Aviv Univ. (Israel) [7579-41]

3:00 pm: **Three mode opto-acoustic interactions in optical cavities: introducing the three mode opto-acoustic parametric amplifier** (*Invited Paper*), Francis A. Torres, David G. Blair, Li Ju, Chunnong Zhao, Haixing Miao, The Univ. of Western Australia (Australia) [7579-42]

Coffee Break 3:30 to 4:00 pm

SESSION 11

Room: 110 (Exhibit Level) Tues. 4:00 to 5:40 pm

Microresonators: Nonlinear Applications, Novel Devices, and Sensors II

Session Chair: Steve A. Pappert,
Defense Advanced Research Projects Agency

4:00 pm: **High-Q optical resonators: characterization and application to stabilization of lasers and high spectral purity microwave oscillators** (*Invited Paper*), Aude Bouchier, Pierre-Henri Merrer, Olivier Llopis, LAAS-CNRS (France) [7579-43]

4:30 pm: **Ultra-narrowband fiber Bragg gratings for laser linewidth reduction and RF filtering** (*Invited Paper*), Michel Poulin, Yves Painchaud, Maryse Aubé, Simon Ayotte, Christine Latrasse, Guillaume Brochu, François Pelletier, Michel Morin, Martin Guy, Jean-François Cliche, TeraXion Inc. (Canada) [7579-44]

5:00 pm: **Single cavity filters on end-faces of optical fibers**, Stefan Meister, Marcus Dziedzina, Dawid Schweda, Aws Al-Saadi, Bülent A. Franke, Chris Scharfenorth, Technische Univ. Berlin (Germany); Bernhard Grimm, Daniela Dufft, Sigurd Schrader, Univ. of Applied Sciences Wildau (Germany); Hans-Joachim Eichler, Technische Univ. Berlin (Germany) [7579-45]

5:20 pm: **Active critical coupling of a resonant cavity**, Jong H. Chow, The Australian National Univ. (Australia); David S. Rabeling, Vrije Univ. Amsterdam (Netherlands); Malcolm B. Gray, National Measurement Institute (Australia); David E. McClelland, The Australian National Univ. (Australia) [7579-46]

POSTERS—TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Optical-axis perturbation in triaxial ring resonators II: induced by spherical mirror's axial displacement, Xingwu Long, Jie Yuan, National Univ. of Defense Technology (China) [7579-47]

Numerical analysis of random lasing properties in a waveguide structure surrounded by a random medium, Hideki Fujiwara, Hokkaido Univ. (Japan) and JST-PRESTO (Japan); Keiji Sasaki, Hokkaido Univ. (Japan) [7579-48]

Spectra, coherence, and polarization of diffracted electromagnetic Gaussian Schell-model beams, Liuzhan Pan, Luoyang Normal Univ. (China); Chaoliang Ding, Sichuan Univ. (China); Zhiguo Zhao, Luoyang Normal Univ. (China) [7579-49]

Temperature-dependent random lasing from GaAs powders, Toshihiro Nakamura, Toru Takahashi, Sadao Adachi, Gunma Univ. (Japan) [7579-50]

Wednesday 27 January

LASE Plenary Session

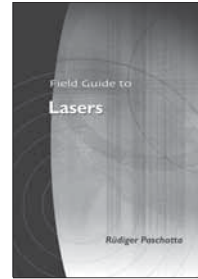
Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

- 10:20 am: **LASE Best Student Paper Prize**
SPIE will present awards to the best 3 student papers on the science and application of lasers.
Cash prizes of \$1500, \$1000, and \$500 will be awarded.
- 10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]
- 11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) [7579-102]
- 11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]

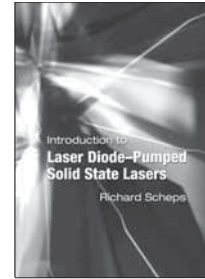
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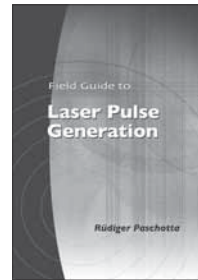
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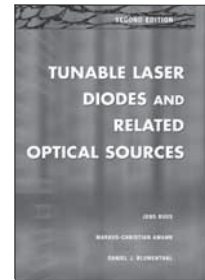
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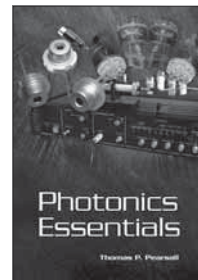
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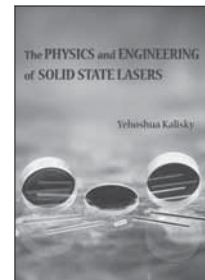
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Vol. PM144



Vol. PM167



Vol. TT71

LASE

Fiber Lasers VII: Technology, Systems, and Applications

Conference Chair: **Kanishka Tankala**, Nufern

Conference Co-Chair: **Jay W. Dawson**, Lawrence Livermore National Lab.

Program Committee: **Jes Broeng**, Crystal Fibre A/S (Denmark); **Fabio Di Teodoro**, Northrop Grumman Space Technology; **Mark Dubinskii**, Army Research Lab.; **Benjamin J. Eggleton**, The Univ. of Sydney (Australia); **Jean-Philippe Fève**, Directed Energy Solutions; **Almantas Galvanauskas**, Univ. of Michigan; **Denis V. Gapontsev**, Consultant (Russian Federation); **Anatoly B. Grudinin**, Fianium Ltd. (United Kingdom); **Clifford Headley III**, OFS Labs.; **Eric C. Honea**, Lockheed Martin Aculight; **Yoonchan Jeong**, Univ. of Southampton (United Kingdom); **Dahv A. V. Kliner**, JDSU; **Oliver Schmidt**, Friedrich-Schiller-Univ. Jena (Germany); **L. Brandon Shaw**, Naval Research Lab.; **Thomas M. Shay**, Air Force Research Lab.; **James Roy Taylor**, Imperial College London (United Kingdom); **William E. Torruellas**, The Johns Hopkins Univ. Applied Physics Lab.; **Andreas Tünnermann**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Robert G. Waarts**, nLIGHT Corp.; **Ji Wang**, Corning Inc.; **Benjamin G. Ward**, U.S. Air Force Academy; **Frank W. Wise**, Cornell Univ.



Monday 25 January

Welcome Remarks

Room: 131/132 (Exhibit Level) Mon. 8:00 to 8:10 am

Kanishka Tankala, Nufern and **Jay W. Dawson**,
Lawrence Livermore National Lab.

SESSION 1

Room: 131/132 (Exhibit Level) Mon. 8:10 to 10:20 am

Pulsed Sources

Session Chair: **Robert G. Waarts**, nLIGHT Corp.

8:10 am: **Programmable lasers: design and applications** (*Invited Paper*),
Alain Villeneuve, AGT Lasers (Canada) [7580-01]

8:40 am: **High-energy Q-switched Tm³⁺-doped polarization maintaining silica fiber laser**,
Lawrence Shah, Christina C. Willis, Timothy S. McComb, Robert A. Sims, Vikas Sudesh, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7580-02]

9:00 am: **100-Watt fiber-based green laser with near diffraction-limited beam quality**,
Dan Hu, Eric C. Eisenberg, Khushvinder Brar, Tolga Yilmaz, Eric C. Honea, Lockheed Martin Aculight (USA) [7580-03]

9:20 am: **Yb-doped fiber laser system generating 12 ns, 0.7 mJ pulses at 82 kHz at 977 nm**,
Johan Boullet, Eric Cormier, Univ. Bordeaux 1 (France); Romain Dubrasquet, Ramatou Bello Doua, Nicholas Traynor, ALPhANOV (France) [7580-04]

9:40 am: **100micron core, Yb-doped, single-transverse-mode and single-polarization rod-type photonic crystal fiber amplifier**,
Fabio Di Teodoro, Northrop Grumman Aerospace Systems (USA) [7580-05]

10:00 am: **Over 55W of frequency doubled light at 530nm pumped by an all-fiber, diffraction limited, picosecond fibre MOPA**,
Shaif-ul Alam, Kangkang Chen, John R. Hayes, Dejiao Lin, Andrew Malinowski, Univ. of Southampton (United Kingdom); Howard J. Baker, Natalia Trela, Harriot-Watt Univ. (United Kingdom); Roy McBride, PowerPhotonic, Ltd. (United Kingdom); David J. Richardson, Univ. of Southampton (United Kingdom) [7580-06]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 131/132 (Exhibit Level) Mon. 10:50 am to 12:20 pm

Materials Properties and Photodarkening

Session Chair: **Yoonchan Jeong**, Univ. of Southampton (United Kingdom)

10:50 am: **Ytterbium-doped fibers co-doped with Cerium: Next generation of fibers for high power fiber lasers?** (*Invited Paper*),
Magnus Engholm, Fiber Optic Valley AB (Sweden); Lars O. Norin, Acreo AB (Sweden) [7580-07]

11:20 am: **Temperature dependence of photodarkening kinetics**,
Martin Leich, Sylvia Jetschke, Sonja Unger, Johannes Kirchhof, IPHT Jena (Germany) [7580-08]

11:40 am: **Mitigation of photodegradation in 790nm-pumped Tm-doped fibers**,
Gavin P. Frith, Macquarie Univ. (Australia); Adrian L. G. Carter, Bryce N. Samson, Julia Faroni, Kevin Farley, Kanishka Tankala, Nufern (USA); Graham E. Town, Macquarie Univ. (Australia) [7580-09]

12:00 pm: **Thermal bleaching of photodarkening in ytterbium-doped fibers**,
Mikko J. Söderlund, Joan J. Montiel i Ponsoda, Helsinki Univ. of Technology (Finland); Jeffrey P. Koplow, Sandia National Labs. (USA); Seppo K. Honkanen, Helsinki Univ. of Technology (Finland) [7580-10]

Lunch Break 12:20 to 1:30 pm

SESSION 3

Room: 131/132 (Exhibit Level) Mon. 1:30 to 3:00 pm

Mid-IR Sources and Frequency Conversion

Session Chair: **Fabio Di Teodoro**, Northrop Grumman Aerospace Systems

1:30 pm: **High-power single-mode and single-frequency Tm-doped fiber amplifier amenable to coherent beam combination** (*Invited Paper*),
Gregory D. Goodno, Lewis D. Book, Joshua E. Rothenberg, Northrop Grumman Aerospace Systems (USA) [7580-11]

2:00 pm: **23 watt 77% efficient CW OPO pumped by a fiber laser**,
Angus J. Henderson, Peter Esquinasi, Lockheed Martin Aculight (USA) [7580-12]

2:20 pm: **Efficient near-infrared light conversion to visible and mid-infrared radiation in an endlessly single-mode photonic crystal fiber**,
Dirk Nodop, Cesar Jauregui, Damian N. Schimpf, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7580-13]

2:40 pm: **Spectral narrowing and wavelength stabilization of thulium fiber lasers using guided-mode resonance filters**,
Robert A. Sims, Tanya Dax, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Zachary A. Roth, The Univ. of North Carolina at Charlotte (USA); Timothy S. McComb, Lawrence Shah, Vikas Sudesh, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Menelaos K. Poutous, Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA); Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7580-14]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 131/132 (Exhibit Level) Mon. 3:30 to 6:10 pm

Visible and UV Lasers

Joint Session with Conferences 7578 and 7582

Session Chairs: **Dahv A. V. Kliner**, JDSU;

Peter E. Powers, Univ. of Dayton; **Norman Hodgson**, Coherent, Inc.

3:30 pm: **RGB laser generation from fiber MOPAs coupled to external enhancement cavities** (*Invited Paper*),
Jesse P. Anderegg, Tatyana A. Chernysheva, Dennis F. Elkins, Calvin L. Simmons, Richard C. Bishop, Christian L. Pedersen, Michael L. Murphy, Forrest L. Williams, Evans & Sutherland (USA) [7580-15]

4:00 pm: **Highly efficient and compact microchip green laser source for mobile projectors** (*Invited Paper*),
John Khaydarov, Stepan Essaian, Gregory Nemet, Andrei V. Shchegrov, Natalia Simanovskaia, Spectralus Corp. (USA); Hakob Danielyan, Gevorg Gabrielyan, Armen R. Poghosyan, Suren Soghomonyan, Spectralus CJSC (Armenia) [7582-01]

4:30 pm: **Efficient, green laser based on a blue-diode pumped rare-earth-doped fluoride crystal in an extremely short resonator**, Michael Strotkamp, Thomas Schwarz, Bernd Jungbluth, Fraunhofer-Institut für Lasertechnik (Germany)[7578-24]

4:50 pm: **Highly reliable 198 nm light source for semiconductor inspection based on dual fiber lasers**, Shinichi Imai, Kazuto Matsuki, Nobutaka Kikui, Advanced Mask Inspection Technology, Inc. (Japan); Katsuhiko Takayama, Osamu Iwase, NuFlare Technology Inc. (Japan); Yoshiharu Urata, Tatsuya Shinozaki, Yoshio Wada, Satoshi Wada, Megaopto Co., Ltd. (Japan) . .[7580-16]

5:10 pm: **High-power green light generation by second harmonic generation of single-frequency tapered diode lasers**, Ole B. Jensen, Peter E. Andersen, Technical Univ. of Denmark (Denmark); Bernd Sumpff, Karl-Heinz Hasler, Goetz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany); Paul M. Petersen, Technical Univ. of Denmark (Denmark) . .[7582-02]

5:30 pm: **Frequency doubling of fiber laser radiation of large spectral bandwidths**, Sebastian Nyga, Jens Geiger, Bernd Jungbluth, Fraunhofer-Institut für Lasertechnik (Germany)[7578-25]

5:50 pm: **High average and peak power pulsed fiber lasers at 1030 nm and 515nm**, Benjamin Cocquelin, Julien Saby, François L. Salin, Anthony Meunier, Eolite Systems (France)[7580-17]

Tuesday 26 January

SESSION 5

Room: 131/132 (Exhibit Level) Tues. 8:30 to 10:00 am

Fiber Laser Market

Session Chair: Jes Broeng, NKT Photonics A/S (Denmark)

8:30 am: **The impact of the economy and technology evolution on the market for fiber lasers** (*Invited Paper*), Tom Hausken, Strategies Unlimited (USA)[7580-18]

9:00 am: **Power scaling of fiber lasers** (*Invited Paper*), Jörg Thieme, IPG Laser GmbH (Germany)[7580-19]

9:30 am: **Industrial fiber lasers** (*Invited Paper*), Ulrich Hefter, Rofin-Sinar Laser GmbH (Germany)[7580-20]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 131/132 (Exhibit Level) Tues. 10:30 am to 12:00 pm

Applications I

Session Chair: William E. Torruellas, The Johns Hopkins Univ.

10:30 am: **Fiber lasers for surface Navy applications** (*Invited Paper*), David H. Kiel, Naval Sea Systems Command (USA)[7580-21]

11:00 am: **Leveraging fiber laser technology into micro-machining applications**, Anthony P. Hout, Andrei V. Babushkin, IPG Photonics Corp. (USA)[7580-22]

11:20 am: **20 mW, 70 nm bandwidth ASE fiber optic source at 1060 nm wavelength region for optical coherence tomography**, Irina Trifanov, Multiwave Photonics, S.A. (Portugal); Paulo Caldas, Instituto de Engenharia de Sistemas e Computadores do Porto (Portugal); Liviu P. Neagu, Rosa Romero, Martin O. Berendt, José R. Salcedo, Multiwave Photonics, S.A. (Portugal); Adrian G. Podoleanu, Univ. of Kent (United Kingdom); António B. Lobo Ribeiro, Univ. Fernando Pessoa (Portugal)[7580-23]

11:40 am: **Optically switched erbium fiber laser using a tunable fiber Bragg grating**, Robert J. Williams, Nemanja Jovanovic, Graham D. Marshall, Michael J. Withford, Macquarie Univ. (Australia) and Ctr. for Ultrahigh bandwidth Devices for Optical Systems (CUDOS) (Australia)[7580-24]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 7

Room: 131/132 (Exhibit Level) Tues. 1:30 to 3:00 pm

Applications II

Session Chair: Anatoly B. Grudinin, Fianium Ltd. (United Kingdom)

1:30 pm: **Picosecond laser processing of semiconductor and thin film devices** (*Invited Paper*), Brian W. Baird, Summit Photonics (USA)[7580-25]

2:00 pm: **The supercontinuum laser as a flexible source for quasi-steady state and time resolved fluorescence studies**, Roger Fenske, Edinburgh Instruments Ltd. (United Kingdom) and Heriot Watt Univ. (United Kingdom); Dirk U. Näther, Richard B. Dennis, Stanley D. Smith, Edinburgh Instruments Ltd. (United Kingdom)[7580-26]

2:20 pm: **Fiber laser intensity noise suppression using cascaded resonators**, Thanh T. Nguyen, Jong H. Chow, Conor M. Mow-Lowry, Timothy T. Lam, David E. McClelland, The Australian National Univ. (Australia) .[7580-27]

2:40 pm: **High-energy femtosecond fiber laser at 1.6-µm for corneal surgery**, Franck Morin, Frédéric Druon, Marc Hanna, Patrick M. Georges, Institut d'Optique Graduate School (France)[7580-28]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Room: 131/132 (Exhibit Level) Tues. 3:30 to 5:40 pm

Ultrafast Sources

Session Chair: James Roy Taylor, Imperial College London (United Kingdom)

3:30 pm: **Giant-chirp fiber oscillators** (*Invited Paper*), William Renninger, Frank W. Wise, Cornell Univ. (USA)[7580-29]

4:00 pm: **2-GW peak power 71-fs pulses at 50 kHz based on nonlinear compression of a fiber CPA system**, Steffen Hädrich, Jan Rothhardt, Thomas Gottschall, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)[7580-30]

4:20 pm: **The critical role of intracavity dynamics in high-power mode-locked fiber lasers**, J. Nathan Kutz, Univ. of Washington (USA); Brandon G. Bale, Aston Univ. (United Kingdom)[7580-31]

4:40 pm: **Improved performance of nonlinear CPA-systems by spectral clipping**, Enrico Seise, Damian N. Schimpf, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany)[7580-32]

5:00 pm: **200W, 350fs fiber CPA system enabled by chirped-volume-Bragg-gratings and chirally-coupled-core fiber technology**, Matthew Rever, Shenghong Huang, Univ. of Michigan (USA); Vadim I. Smirnov, Eugeniu V. Rotari, Ion Cohanoshi, OptiGrate Corp. (USA); Sergiy Mokhov, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Almantas Galvanauskas, Univ. of Michigan (USA)[7580-33]

5:20 pm: **Spectral-temporal management of Yb-doped fiber CPA-systems**, Damian N. Schimpf, Fabian Röser, Tino Eidam, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany)[7580-34]

POSTERS-TUESDAY

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A novel DWDM method to design a 100-kW Laser, Santanu Basu, Sparkle Optics Corp. (USA)[7580-67]

Monolithic Yb-fiber femtosecond laser with intracavity all-solid PBG fiber and ex-cavity HC-PCF, Dmitry Turchinovich, Xiaomin Liu, Jesper Lægsgaard, Technical Univ. of Denmark (Denmark)[7580-68]

Relations between phosphorus/aluminum concentration ratio and photodarkening rate and loss in Yb-doped silica fibers, Pierre Laperle, Louis Desbiens, Huimin Zheng, Mathieu Drolet, Antoine Proulx, Yves Taillon, INO (Canada)[7580-69]

Characterizing the transition dynamics for multi-pulsing in mode-locked lasers, J. Nathan Kutz, Univ. of Washington (USA); Brandon G. Bale, Aston Univ. (United Kingdom)[7580-70]

LASE

- Operating regimes and performance optimization of the mode-locking dynamics of a laser cavity with passive polarizer**, Edwin Ding, J. Nathan Kutz, Univ. of Washington (USA) [7580-71]
- Coherent combination of fiber amplifiers with arbitrary optical phase differences**, Anatoly P. Napartovich, Troitsk Institute for Innovation and Fusion Research (Russian Federation); Nikolay Elkin, Dmitry Vysotsky, SRC RF TRINITI (Russian Federation) [7580-72]
- Energy enhancement in mode-locked laser cavities using multi-mode fiber lasers**, Edwin Ding, J. Nathan Kutz, Univ. of Washington (USA) [7580-73]
- Ultra-wide-tunable fibre source of femto- and picosecond pulses based on intracavity Raman conversion**, Sergey M. Kobtsev, Novosibirsk State Univ. (Russian Federation) and Tekhnoscan JSC (Russian Federation); Sergey Kukarin, Sergey Smirnov, Yurii Fedotov, Novosibirsk State Univ. (Russian Federation) [7580-74]
- Alleviate photo darkening by single-mode RMO fiber design**, Kent E. Mattsson, Thomas Nikolajsen, NKT Photonics A/S (Denmark) [7580-75]
- Reliable pulsed-operation of 1064-nm wavelength-stabilized diode lasers at high power: boosting fiber lasers from the seed side**, Mauro A. Bettiati, Gérard Beuchet, Philippe Pagnod-Rossiaux, Patrick Garabedian, Josiane Perinet, Stephane Fromy, Jean-Claude Bertreux, Jean-Pierre Hirtz, François Laruelle, 3S PHOTONICS SA (France) [7580-76]
- Prediction of dynamical instability in ring-geometry passively phased fiber laser array**, Erik J. Bochove, Air Force Research Lab. (USA); Alejandro Aceves, Southern Methodist Univ. (USA); Elena Kazantseva, Yehuda Braiman, Oak Ridge National Lab. (USA) [7580-77]
- Non-centered single mode launch affect on beam quality of a few mode fiber**, Yariv Shamir, Yoav Sintov, Ehud Shafir, Soreq Nuclear Research Ctr. (Israel); Mark Shtaf, Tel Aviv Univ. (Israel) [7580-78]
- Different generation regimes of mode-locked all-positive-dispersion all-fiber Yb laser**, Sergey M. Kobtsev, Novosibirsk State Univ. (Russian Federation) and Tekhnoscan JSC (Russian Federation); Sergey Kukarin, Sergey Smirnov, Novosibirsk State Univ. (Russian Federation) [7580-79]
- Modulation instability, Akhmediev breathers, and 'rogue waves' in nonlinear fiber optics**, John M. Dudley, Univ. de Franche-Comté (France); Goery Genty, Tampere Univ. of Technology (Finland); Frederic Dias, ENS Cachan (France); Nail Akhmediev, Australian National Univ. (Australia) [7580-80]
- Chirped pulse shaping via fiber dispersion modulation**, Alexej A. Sysoliatin, A.M. Prokhorov General Physics Institute (Russian Federation); Marina Yavtushenko, Igor Zolotovskii, Ulyanovsk State Univ. (Russian Federation); Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland) [7580-81]
- Quenching investigation on new erbium doped fibers using MCVD nanoparticle doping process**, David E. Boivin, Thomas Föhn, Ekaterina Burov, Alain Pastouret, Cédric Gonnet, Olivier Cavani, Christine Collet, Simon Lempereur, Draka Comteq France (France) [7580-82]
- Self-starting passive mode-locked ytterbium fiber laser with variable pulse width**, Seung Bum Cho, Hoseong Song, Sangyoung Gee, Dug Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7580-83]
- Efficient MM to SM conversion in a 61 port photonic lantern**, Danny Noordegraaf, Peter M. W. Skovgaard, Martin D. Maack, NKT Photonics A/S (Denmark); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Roger Haynes, Anglo-Australian Observatory (Australia); Jesper Lægsgaard, DTU Fotonik (Denmark) [7580-84]
- Advantage of circularly polarized light in nonlinear fiber-amplifiers**, Damian N. Schimpf, Enrico Seise, Tino Eidam, Steffen Hädrich, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7580-85]
- Monolithic all-glass device combining pump coupling and end cap scheme for high-power fiber lasers**, Jun Ki Kim, Christian Hagemann, Thomas Schreiber, Thomas Peschel, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7580-86]
- All-fiber higher order mode module with anomalous dispersion below 800 nm**, Kim G. Jespersen, Martin K. Garmund, Dan P. Jakobsen, Bera Palsdottir, Lars Grüner-Nielsen, OFS (Denmark) [7580-87]
- All-fiber regenerative amplification of low energy 40-ps seed pulses from a gain-switched laser diode at low repetition rates**, Sebastian Kanzelmeyer, Matthias Hildebrandt, Thomas Theeg, Maik Frede, Dietmar Kracht, Jörg Neumann, Laser Zentrum Hannover e.V. (Germany) [7580-88]
- Suppression of stimulated Raman scattering in high-power fiber laser systems by lumped spectral filters**, Florian Jansen, Dirk Nodop, Cesar Jauregui-Misas, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena. (Germany) [7580-90]
- Transform-limited pulses from a mJ-class nonlinear fiber CPA-system by phase shaping**, Enrico Seise, Tino Eidam, Damian N. Schimpf, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7580-91]
- Distributed side pumping using high brightness pumps: an architecture for power scaling beyond 1 kW**, Ray J. Horley, Laurence Cooper, SPI Lasers UK Ltd. (United Kingdom); Thomas Gabler, JT Optical Engine GmbH + Co. KG (Germany); Fabio Ghiringhelli, Andrew T. Harker, Stephen Norman, Mikhail N. Zervas, SPI Lasers UK Ltd. (United Kingdom); Hagen Zimer, JT Optical Engine GmbH + Co. KG (Germany) [7580-92]
- SBS suppression through seeding with narrow-linewidth and broadband signals: experimental results**, Chunte A. Lu, Iyad A. Dajani, Clint Zeringue, Christopher L. Vergien, Ahmad Lobad, Air Force Research Lab. (USA) . [7580-93]
- High-power fiber amplifier using a PM Yb-doped photodarkening-resistant LMA fiber with depressed-clad index profile design**, Mathieu Drolet, Claude Paré, Huimin Zheng, Pierre Laperle, Antoine Proulx, Yves Taillon, INO (Canada) [7580-96]
- Photodarkening-induced increase of temperature in ytterbium-doped fibers**, Joan J. Montiel i Ponsoda, Mikko J. Söderlund, Helsinki Univ. of Technology (Finland); Jeffrey P. Kopolow, Sandia National Labs. (USA); Joonas J. Koponen, nLIGHT Corp. (Finland); Seppo K. Honkanen, Helsinki Univ. of Technology (Finland) [7580-97]
- Fine adjustment of cavity loss by fiber optical loop mirror for dual-wavelength laser**, Manuel Durán-Sánchez, Benemérita Univ. Autónoma de Puebla (Mexico) and Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Evgeny A. Kuzin, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); R. I. Alvarez-Tamayo, Benemérita Univ. Autónoma de Puebla (Mexico); Baldemar Ibarra-Escamilla, Ariel Flores-Rosas, Miguel A. Bello-Jiménez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7580-98]
- Laser process control for high-power fiber laser applications**, Stefan Kaierle, Fraunhofer-Institut für Lasertechnik (Germany) [7580-99]
- Hybrid Fourier domain modelocked laser (FDML) utilizing an optical parametric amplifier (OPA) and an erbium doped fiber amplifier (EDFA)**, Ho Yiu K. Cheng, The Univ. of Hong Kong (Hong Kong, China); Beau A. Standish, Ryerson Univ. (Canada); Xiao Dong V. Yang, Ryerson Univ. (Canada) and Univ. of Toronto (Canada) and Sunnybrook Health Sciences Ctr. (Canada); Xijia J. Gu, Ryerson Univ. (Canada); Yin Mun E. Lam, Kin-yip K. Wong, The Univ. of Hong Kong (Hong Kong, China) [7580-100]
- Cascaded Raman fiber laser in Fourier domain mode lock operation**, Barry Vuong, Mark K. Harduar, Ryerson Univ. (Canada); Ho Yiu K. Cheng, The Univ. of Hong Kong (Hong Kong, China); Xijia J. Gu, Ryerson Univ. (Canada); Lawrence R. Chen, McGill Univ. (Canada); Beau A. Standish, Ryerson Univ. (Canada); Xiao Dong V. Yang, Ryerson Univ. (Canada) and Univ. of Toronto (Canada) and Sunnybrook Health Sciences Ctr. (Canada) [7580-101]
- Developing dual core ytterbium doped fiber ring laser in Fourier domain mode locked operation for swept-source optical coherence tomography**, Mark K. Harduar, Barry Vuong, Ryerson Univ. (Canada); Ho Yiu K. Cheng, The Univ. of Hong Kong (Canada); Adrian Mariampillia, Univ. of Toronto (Canada); Xijia J. Gu, Ryerson Univ. (Canada); Lawrence R. Chen, McGill Univ. (Canada); Beau A. Standish, Xiao Dong V. Yang, Ryerson Univ. (Canada) [7580-102]
- Ultra-low absorption and laser-induced heating of volume Bragg combiners recorded in photo-thermo-refractive glass**, Julien Lumeau, Karima Chamma, Larissa Glebova, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7580-103]
- High-energy pulses at a very low repetition rate from a self-mode-locked all-fiber erbium laser with large normal cavity dispersion**, Vladimir I. Denisov, Boris N. Nyushkov, Victor S. Pivtsov, Institute of Laser Physics (Russian Federation) [7580-104]
- Remote FBGs sensor interrogation based on 1.3 μm Fourier domain mode-locked wavelength swept laser**, Byoung Chang Lee, Min Hyun Oh, Min Yong Jeon, Chungnam National Univ. (Korea, Republic of) [7580-105]
- Pulsed single-mode Yb-doped fibre amplifier around 976 nm: numerical modelling and experimental study**, Aude Bouchier, Lab. d'Analyse et d'Architecture des Systèmes (France); Mikhael Myara, Univ. Montpellier 2 (France); Gaelle Lucas-Leclin, Patrick M. Georges, Lab. Charles Fabry de l'Institut d'Optique (France) [7580-106]
- Development, manufacturing and lasing behavior of Yb-doped ultra large mode area fibers based on Yb-doped fused bulk silica**, Andreas Langner, Mario Such, Gerhard Schötz, Heraeus Quarzglas GmbH & Co. KG (Germany); Volker Reichel, Stephan Grimm, Florian Just, Martin Leich, Johannes Kirchoff, Institut für Photonische Technologien e.V. (Germany); Björn Wedel, Gunnar Köhler, Olaf Strauch, HIGHYAG Lasertechnologie GmbH (Germany); Volker K. Krause, Georg Rehmann, Laserline GmbH (Germany) [7580-107]
- High power erbium doped fiber laser generating switchable radially and azimuthally polarized beams at 1.6 μm wavelength**, Qiwen Zhan, Renjie Zhou, Peter E. Powers, Joseph W. Haus, Univ. of Dayton (USA); Baldemar Ibarra-Escamilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7580-108]

Wednesday 27 January

SESSION 9

Room: 131 (Exhibit Level) Wed. 8:10 to 10:00 am

Fiber Designs and Fabrication I

Session Chair: Ji Wang, Corning Inc.

- 8:10 am: **Microstructured fibres for high power laser applications** (*Invited Paper*), David J. Richardson, John R. Hayes, Marco N. Petrovich, Francesco Poletti, Sonali Dasgupta, Peter Horak, Shaif-ul Alam, Kangkang Chen, Univ. of Southampton (United Kingdom); Jonathan H. V. Price, Univ. of Southampton (USA); Neil G. R. Broderick, Univ. of Southampton (United Kingdom) [7580-35]
- 8:40 am: **Photonic crystal fiber with resonant-coupling higher-order-mode suppression**, Benjamin G. Ward, Chad G. Carlson, Dallas Wright, Casey Eickholt, U.S. Air Force Academy (USA) [7580-36]
- 9:00 am: **Single-mode large-mode area fiber amplifier with higher-order mode suppression and distributed passband filtering of ASE and SRS**, Thomas T. Alkeskjold, NKT Photonics A/S (Denmark) [7580-37]
- 9:20 am: **Power-scalable long-wavelength Yb-doped photonic bandgap fiber sources**, Akira Shirakawa, Hiroki Maruyama, Ken-ichi Ueda, The Univ. of Electro-Communications (Japan); Christina B. Olausson, Jens K. Lyngso, Jes Broeng, NKT Photonics A/S (Denmark) [7580-38]
- 9:40 am: **Efficient bi-doped fiber lasers and amplifiers for the spectral region 1300-1500 nm**, Evgeny M. Dianov, Mikhail A. Melkumov, Sergey V. Firstov, Alexey V. Shubin, Oleg M. Medvedkov, Igor A. Bufetov, Fiber Optics Research Ctr. (Russian Federation) [7580-39]
- Coffee Break 10:00 to 10:20 am

LASE Plenary Session

Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

10:20 am: **LASE Best Student Paper Prize**
SPIE will present awards to the best 3 student papers on the science and application of lasers.
Cash prizes of \$1500, \$1000, and \$500 will be awarded.

10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]

11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) [7579-102]

11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 10

Room: 131 (Exhibit Level) Wed. 2:00 to 3:20 pm

Fiber Designs and Fabrication II

Session Chair: Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

- 2:00 pm: **Multiwavelength optical fiber refractive index profiling**, Andrew D. Yablon, Interfiber Analysis (USA) [7580-40]
- 2:20 pm: **Fiber amplifier utilizing an Yb-doped large-mode-area fiber with confined doping and tailored refractive index profile**, Teemu Kokki, Marko Laurila, Joonas J. Koponen, Changgeng Ye, nLIGHT Corp. (Finland) [7580-41]
- 2:40 pm: **750-W double-clad ytterbium tapered fiber laser with nearly theoretically limited efficiency**, Valery N. Filippov, Tampere Univ. of Technology (Finland); Yuri Chamorovskii, Institute of Radio Engineering and Electronics (Russian Federation); Juho Kerttula, Tampere Univ. of Technology (Finland); Konstantin Golant, Institute of Radio Engineering and Electronics (Russian Federation); Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland) [7580-42]

- 3:00 pm: **LMA fibers based on two-dimensional solid-core photonic bandgap fiber design**, Sergey L. Semjonov, Olga N. Egorova, Alexey F. Kosolapov, Andrey E. Levchenko, Vladimir V. Velmiskin, Andrey D. Pryamikov, Fiber Optics Research Ctr. (Russian Federation); Mikhail Y. Salganskiy, Vladimir F. Khopin, Mikhail V. Yashkov, Alexey N. Guryanov, Institute of Chemistry of High Purity Substances (Russian Federation); Evgeny M. Dianov, Fiber Optics Research Ctr. (Russian Federation) [7580-43]
- Coffee Break 3:20 to 3:50 pm

SESSION 11

Room: 131 (Exhibit Level) Wed. 3:50 to 6:20 pm

Components

Session Chair: Benjamin G. Ward, U.S. Air Force Academy

- 3:50 pm: **Novel designs for pump and signal fiber combiners** (*Invited Paper*), Francois Gonther, FG2 Tech (Canada) [7580-44]
- 4:20 pm: **7+1 to 1 pump/signal combiner for air-clad fiber with 15 µm MFD PM single-mode signal feed-through**, Danny Noordegraaf, Martin D. Maack, Peter M. W. Skovgaard, Søren Agger, Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Jesper Lægsgaard, Riso National Lab. (Denmark) [7580-45]
- 4:40 pm: **Simple and monolithic picosecond pulse shaper based on fiber Bragg gratings**, Jan Rothhardt, Steffen Hädrich, Thomas Gotschall, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany); Manfred Rothhardt, Martin Becker, Sven Brückner, Hartmut Bartelt, IPHT Jena (Germany) [7580-46]
- 5:00 pm: **A monolithic pump signal multiplexer for air-clad photonic crystal fiber amplifiers**, Benjamin G. Ward, U.S. Air Force Academy (USA); Jason D. Tafoya, Donald L. Sipes, Jr., Optical Engines, Inc. (USA) [7580-47]
- 5:20 pm: **Electrically tunable liquid crystal photonic bandgap fiber laser**, Christina B. Olausson, NKT Photonics A/S (Denmark) and Technical Univ. of Denmark (Denmark); Lara Scolari, Lei Wei, Technical Univ. of Denmark (Denmark); Danny Noordegraaf, NKT Photonics A/S (Denmark) and Technical Univ. of Denmark (Denmark); Johannes Weirich, Technical Univ. of Denmark (Denmark); Thomas T. Alkeskjold, Kim P. Hansen, NKT Photonics A/S (Denmark); Anders O. Bjarklev, Technical Univ. of Denmark (Denmark) [7580-48]
- 5:40 pm: **All-fiber side pump combiner for high-power fiber lasers and amplifiers**, Cesar Jauregui-Misas, Friedrich-Schiller-Univ. Jena (Germany); Steffen Böhme, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7580-49]
- 6:00 pm: **High-power tunable thulium fiber laser with volume Bragg grating spectral control**, Timothy S. McComb, Lawrence Shah, Robert A. Sims, Vikas Sudesh, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7580-50]

Thursday 28 January

SESSION 12

Room: 131 (Exhibit Level) Thurs. 8:30 to 10:00 am

Narrow Linewidth Sources and SBS Suppression

Session Chair: Mark Dubinskii, Army Research Lab.

- 8:30 am: **SBS suppression and acoustic management for high power narrow linewidth fiber lasers and amplifiers** (*Invited Paper*), Marc D. Mermelstein, Matthew J. Andrejco, John M. Fini, Clifford Headley III, David J. DiGiovanni, OFS Labs. (USA) [7580-51]
- 9:00 am: **High-power linear-polarized narrow linewidth photonic crystal fiber amplifier**, Christian Wirth, Friedrich-Schiller-Univ. (Germany); Thomas Schreiber, Igor Tsybin, Miroslaw Rekas, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7580-52]
- 9:20 am: **Experimental and theoretical studies of a single frequency PCF amplifier with pump-limited output of 260 W**, Craig A. Robin, Iyad A. Dajani, Christopher L. Vergien, Clint Zeringue, Thomas M. Shay, Air Force Research Lab. (USA) [7580-53]
- 9:40 am: **kW level narrow linewidth Yb fiber amplifiers for beam combining**, Victor Khitrov, Nufem (USA) [7580-54]
- Coffee Break 10:00 to 10:30 am

LASE

SESSION 13

Room: 131 (Exhibit Level) **Thurs. 10:30 to 11:50 am**

High Power Sources

Session Chair: Denis V. Gapontsev, Consultant (Russian Federation)

10:30 am: **Passively stabilized 215-W monolithic CW LMA-fiber laser with innovative transversal mode filter**, Fabian Stutzki, Cesar Jauregui, Christian Voigtländer, Jens U. Thomas, Jens Limpert, Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7580-55]

10:50 am: **Brightness enhancement limits in pulsed cladding-pumped fiber Raman amplifiers**, Junhua Ji, Christophe A. Codemard, Johan Nilsson, Univ. of Southampton (United Kingdom) [7580-56]

11:10 am: **Preferential gain ROD-type fiber for stable fundamental mode extraction at ultrahigh-power levels**, Tino Eidam, Friedrich-Schiller-Univ. Jena (Germany); Thomas V. Andersen, NKT Photonics A/S (Denmark); Enrico Seise, Stefan Hanf, Cesar Jauregui-Misas, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) . [7580-57]

11:30 am: **100 W CW cladding-pumped fiber Raman laser at 1120 nm**, Christophe A. Codemard, Junhua Ji, Jayanta K. Sahu, Johan Nilsson, Univ. of Southampton (United Kingdom) [7580-58]

Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 14

Room: 131 (Exhibit Level) **Thurs. 1:20 to 2:50 pm**

Beam Combining I

Session Chair: Eric C. Honea, Lockheed Martin Aculight

1:20 pm: **Optical phased array beam control for APPLE (Invited Paper)**, Terry A. Dorschner, Peter L. Hoover, Raytheon Co. (USA) [7580-59]

1:50 pm: **Creating discrete cylindrical vector beams using coherently combined fiber arrays**, R. Steven Kurti, Jr., Klaus Halterman, Ramesh K. Shori, Cyrus Arian, Naval Air Warfare Ctr. (USA); Michael Wardlaw, Office of Naval Research (USA) [7580-60]

2:10 pm: **Spectral beam combining of thulium fiber laser systems**, Robert A. Sims, Christina C. Willis, Pankaj Kadwani, Timothy S. McComb, Lawrence Shah, Vikas Sudesh, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Zachary A. Roth, Menelaos K. Poutous, Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA); Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7580-61]

2:30 pm: **All-fiber incoherent beam combining utilizing adiabatic local mode variations and cross coupling**, Yariv Shamir, Yoav Sintov, Soreq Nuclear Research Ctr. (Israel); Mark Shtaf, Tel Aviv Univ. (Israel) [7580-62]

Coffee Break 2:50 to 3:20 pm

SESSION 15

Room: 131 (Exhibit Level) **Thurs. 3:20 to 4:40 pm**

Beam Combining II

Session Chair: L. Brandon Shaw, U.S. Naval Research Lab.

3:20 pm: **Passive coherent locking of fiber lasers using volume Bragg gratings**, Apurva Jain, Oleksiy G. Andrusyak, George B. Venus, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim I. Smirnov, OptiGrate Corp. (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7580-63]

3:40 pm: **208-W average power and 6.3-mJ pulse energy from four spectrally combined fiber amplified Q-switched nanosecond laser sources using low-cost interference filter**, Oliver Schmidt, Dirk Nodop, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7580-64]

4:00 pm: **Thermal tuning of volume Bragg gratings for high power spectral beam combining**, Derrek R. Drachenberg, Oleksiy G. Andrusyak, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Ion Cohanoschi, OptiGrate Corp. (USA); Oleksy Mokhun, Vadim I. Smirnov, OptiGrate Corp. (USA) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); George B. Venus, Leonid Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and OptiGrate Corp. (USA) [7580-65]

4:20 pm: **A multi-channel phase locked fibre bundle laser**, David C. Jones, Andrew J. Turner, Andrew M. Scott, Steven M. Stone, QinetiQ Ltd. (United Kingdom); Roy G. Clarke, Christopher Stace, Craig D. Stacey, BAE Systems (United Kingdom) [7580-66]

SESSION 16

Room: 131 (Exhibit Level) **Thurs. 4:40 to 5:40 pm**

Late-Breaking News

Session Chair: Jay W. Dawson, Lawrence Livermore National Lab

See room sign or online program for List of accepted talks.

Accepted papers will be printed as submitted without further revision in the front matter of the proceedings (the front matter is not citable).

Best Student Oral Presentation Award Ceremony and Vote of Thanks

Room: 131 (Exhibit Level) **Thurs. 5:40 to 6:00 pm**

Session Chairs: Kanishka Tankala, Nufern; Jay W. Dawson, Lawrence Livermore National Lab.

We are pleased to announce that a prize in the amount of \$1,000 US will be awarded to the best student oral presentation. The award money has been donated by Fianium, Ltd. and the award will be presented by a Fianium representative.

Award Sponsor:  **Fianium**
ultrafast fiber lasers

High Energy/Average Power Lasers and Intense Beam Applications V

Conference Chairs: **Steven J. Davis**, Physical Sciences Inc.; **Michael C. Heaven**, Emory Univ.; **J. Thomas Schriempf**, Naval Sea Systems Command

Program Committee: **David L. Carroll**, CU Aerospace LLC; **Jarmila Kodymová**, Institute of Physics of the ASCR, v.v.i. (Czech Republic); **Timothy J. Madden**, Air Force Research Lab.; **William E. McDermott**, Univ. of Denver; **Wilson T. Rawlins**, Physical Sciences Inc.

Monday 25 January

SESSION 1

Room: 121 (Exhibit Level) Mon. 8:00 to 10:20 am

Iodine Transfer Lasers (COIL, EOIL, AGIL)

Session Chair: **Steven J. Davis**, Physical Sciences Inc.

8:00 am: **Enhanced performance of an electric oxygen-iodine laser**, David L. Carroll, Gabriel F. Benavides, CU Aerospace LLC (USA); Joseph W. Zimmerman, Brian S. Woodard, Univ. of Illinois at Urbana-Champaign (USA); Andrew D. Palla, Joseph T. Verdeyen, CU Aerospace LLC (USA); Wayne L. Solomon, Univ. of Illinois at Urbana-Champaign (USA) [7581-01]

8:20 am: **Singlet oxygen production in transverse gas flow slab RF discharge for electric discharge oxygen-iodine laser**, Andrey A. Ionin, Yurii M. Klimachev, P.N. Lebedev Physical Institute (Russian Federation); Igor V. Kochetov, Anatoly P. Napartovich, TRINITI (Russian Federation); Oleg A. Rulev, Leonid V. Seleznev, Dmitry V. Sinityn, P.N. Lebedev Physical Institute (Russian Federation) [7581-02]

8:40 am: **Kinetics and scaling of gain and lasing in a 1-5 kW microwave discharge oxygen-iodine laser**, Wilson T. Rawlins, Seonkyung Lee, David B. Oakes, Steven J. Davis, Physical Sciences Inc. (USA) [7581-03]

9:00 am: **Iodine dissociation in the photochemistry of iodine/nitrous oxide mixtures**, Michael C. Heaven, Emory Univ. (USA); Valeriy N. Azyazov, P.N. Lebedev Physical Institute (Russian Federation); David Postell, Emory Univ. (USA) [7581-04]

9:20 am: **An all gas-phase iodine laser based on NCl₃ reaction system**, Taizo Masuda, Keio Univ. (Japan); Tomonari Nakamura, Masamori Endo, Tokai Univ. (Japan); Taro Uchiyama, Keio Univ. (Japan) [7581-05]

9:40 am: **Catalytic enhancement of singlet oxygen for hybrid electric discharge oxygen-iodine laser systems**, Seonkyung Lee, Wilson T. Rawlins, Steven J. Davis, Physical Sciences Inc. (USA) [7581-06]

10:00 am: **O₂(a¹Δ) quenching in O/O₂/O₃/CO₂/He/Ar mixtures**, Michael C. Heaven, Emory Univ. (USA); Pavel A. Mikheyev, Valeriy N. Azyazov, P.N. Lebedev Physical Institute (Russian Federation); David Postell, Emory Univ. (USA) [7581-07]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 121 (Exhibit Level) Mon. 10:50 to 11:30 am

Short Pulse Lasers and Laser Applications I

Session Chair: **J. Thomas Schriempf**, Naval Sea Systems Command

10:50 am: **Ultrashort pulses exceeding 18-megawatt peak intensity directly produced by a Ti:sapphire chirped-pulse oscillator**, Wolfgang Koehler, Christoph Bartylla, Bernd Luerss, FEMTOLASERS Produktions GmbH (Austria) [7581-08]

11:10 am: **Femtosecond vacuum ultraviolet pulse generation at 126 nm by using a femtosecond infrared laser**, Shoichi Kubodera, Masanori Kaku, Masahito Katto, Univ. of Miyazaki (Japan) [7581-09]

Lunch Break 11:30 am to 1:00 pm

SESSION 3

Room: 121 (Exhibit Level) Mon. 1:00 to 2:20 pm

Short Pulse Lasers and Laser Applications II

Session Chair: **J. Thomas Schriempf**, Naval Sea Systems Command

1:00 pm: **Study on Nd:YAG laser emitting with high power and high efficiency at 1123 nm**, Sasa Zhang, Qingpu Wang, Xingyu Zhang, Zhaojun Liu, Wenjia Sun, Shandong Univ. (China) [7581-10]

1:20 pm: **Excimer laser deposition of super-hard coatings**, Ralph F. Delmdahl, Coherent GmbH (Germany) [7581-11]

1:40 pm: **Time-resolved imaging of material response following laser-induced breakdown in the bulk and surface of fused silica**, Rajesh N. Raman, Raluca A. Negres, Paul P. DeMange, Stavros G. Demos, Lawrence Livermore National Lab. (USA) [7581-12]

2:00 pm: **Improved spatial beam quality for chirped volume holographic gratings (CVHG)**, Christophe Moser, Frank Havermeier, Ondax, Inc. (USA) [7581-13]

SESSION 4

Room: 121 (Exhibit Level) Mon. 2:20 to 5:30 pm

Alkali Atom Lasers

Session Chair: **Michael C. Heaven**, Emory Univ.

2:20 pm: **Scaling of diode-pumped Cs laser: transverse pump, unstable cavity, MOPA**, Boris V. Zhdanov, Michael K. Shaffer, Randall J. Knize, U.S. Air Force Academy (USA) [7581-14]

2:40 pm: **Transverse-pumped alkali-vapor lasers**, Jason S. Zweiback, Aleksey M. Komashko, General Atomics Aeronautical Systems, Inc. (USA); William F. Krupke, WFK Lasers, LLC (USA); Tracy Ogul, General Atomics Aeronautical Systems, Inc. (USA) [7581-15]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Modeling laser performance of scalable side-pumped alkali laser**, Aleksey M. Komashko, Jason S. Zweiback, Tracy Ogul, General Atomics Aeronautical Systems, Inc. (USA) [7581-16]

3:50 pm: **Potential energy surfaces and line broadening in optically pumped alkali lasers**, L. Blank, David E. Weeks, Air Force Institute of Technology (USA) [7581-17]

4:10 pm: **Extended saturation and lineshape analysis and computational model of diode-pumped alkali lasers**, Shawn W. Hackett, Jeremy Holtgrave, Glen P. Perram, Air Force Institute of Technology (USA) [7581-18]

4:30 pm: **Excimer-pumped alkali vapor lasers: a new class of photoassociation lasers**, Jason D. Readle, Clark J. Wagner, Univ. of Illinois at Urbana-Champaign (USA); Joseph T. Verdeyen, CU Aerospace LLC (USA); Thomas M. Spinka, Univ. of Illinois at Urbana-Champaign (USA); David L. Carroll, CU Aerospace LLC (USA); J. Gary Eden, Univ. of Illinois at Urbana-Champaign (USA) [7581-19]

4:50 pm: **Modeling of the XPAL system**, Andrew D. Palla, David L. Carroll, Joseph T. Verdeyen, CU Aerospace LLC (USA); Jason D. Readle, Thomas M. Spinka, Clark J. Wagner, J. Gary Eden, Univ. of Illinois at Urbana-Champaign (USA) [7581-20]

5:10 pm: **Spectroscopic studies of alkali atom-rare gas systems**, Kristin L. Galbally-Kinney, William J. Kessler, Wilson T. Rawlins, Steven J. Davis, Physical Sciences Inc. (USA) [7581-21]

LASE

Tuesday 26 January

POSTERS-TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Fiber-based drive laser systems for the Cornell ERL electron photoinjector, Dimitre G. Ouzounov, Heng Li, Bruce M. Dunham, Charles K. Sinclair, Frank W. Wise, Cornell Univ. (USA). [7581-22]

A 20fs synchronization system for lasers and cavities in accelerators and FELs, Russell B. Wilcox, John M. Byrd, Lawrence R. Doolittle, Gang Huang, John W. Staples, Lawrence Berkeley National Lab. (USA) [7581-23]

KC Space Pirates and NASA Power Beaming Challenge, Brian Turner, Martin Lades, KC Space Pirates (USA) [7581-24]



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Daily Course Schedule, pp. 44-51.
See SPIE Cashier, North Lobby to register.

Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications IX

Conference Chair: **Peter E. Powers**, Univ. of Dayton

Program Committee: **Darrell J. Armstrong**, Sandia National Labs.; **Pinhas Blau**, Soreq Nuclear Research Ctr. (Israel); **Majid Ebrahim-Zadeh**, ICFO - Instituto de Ciencias Fotónicas (Spain); **Robert C. Eckardt**, Consultant; **Peter Günter**, ETH Zürich (Switzerland); **Richard Hammond**, U.S. Army Research Office; **Angus J. Henderson**, Lockheed Martin Aculight; **Baldemar Ibarra-Escamilla**, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); **Yehoshua Y. Kalisky**, Nuclear Research Ctr. Negev (Israel); **Kenji Kitamura**, National Institute for Materials Science (Japan); **Thomas J. Kulp**, Sandia National Labs.; **Fredrik Laurell**, Royal Institute of Technology (Sweden); **Yun-Shik Lee**, Oregon State Univ.; **Rita D. Peterson**, Air Force Research Lab.; **Kenneth L. Schepler**, Air Force Research Lab.; **Peter G. Schunemann**, BAE Systems; **Andrei V. Shchegrov**, Spectralus Corp.; **Wei Shi**, NP Photonics, Inc.; **Ramesh K. Shori**, Naval Air Warfare Ctr.; **Konstantin L. Vodopyanov**, Stanford Univ.

Monday 25 January

SESSION 1

Room: 131/132 (Exhibit Level) Mon. 3:30 to 6:10 pm

Visible and UV Lasers

Joint Session with Conferences 7578 and 7580

Session Chairs: **Peter E. Powers**, Univ. of Dayton;
Norman Hodgson, Coherent, Inc.; **Dahv A. V. Kliner**, JDSU

3:30 pm: **RGB laser generation from fiber MOPAs coupled to external enhancement cavities** (*Invited Paper*), Jesse P. Anderegg, Tatyana A. Chernysheva, Dennis F. Elkins, Calvin L. Simmons, Richard C. Bishop, Christian L. Pedersen, Michael L. Murphy, Forrest L. Williams, Evans & Sutherland (USA) [7580-15]

4:00 pm: **Highly efficient and compact microchip green laser source for mobile projectors** (*Invited Paper*), John Khaydarov, Stepan Essaian, Gregory Nemet, Andrei V. Shchegrov, Natalia Simanovskaia, Spectralus Corp. (USA); Hakob Danielyan, Gevorg Gabrielyan, Armen R. Poghosyan, Suren Soghomonyan, Spectralus CJSC (Armenia) [7582-01]

4:30 pm: **Efficient, green laser based on a blue-diode pumped rare-earth-doped fluoride crystal in an extremely short resonator**, Michael Strotkamp, Thomas Schwarz, Bernd Jungbluth, Fraunhofer-Institut für Lasertechnik (Germany) [7578-24]

4:50 pm: **Highly reliable 198 nm light source for semiconductor inspection based on dual fiber lasers**, Shinichi Imai, Kazuto Matsuki, Nobutaka Kikuri, Advanced Mask Inspection Technology, Inc. (Japan); Katsuhiko Takayama, Osamu Iwase, NuFlare Technology Inc. (Japan); Yoshiharu Urata, Tatsuya Shinozaki, Yoshio Wada, Satoshi Wada, Megaopto Co., Ltd. (Japan) . . [7580-16]

5:10 pm: **High-power green light generation by second harmonic generation of single-frequency tapered diode lasers**, Ole B. Jensen, Peter E. Andersen, Technical Univ. of Denmark (Denmark); Bernd Sumpf, Karl-Heinz Hasler, Goetz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany); Paul M. Petersen, Technical Univ. of Denmark (Denmark) . [7582-02]

5:30 pm: **Frequency doubling of fiber laser radiation of large spectral bandwidths**, Sebastian Nyga, Jens Geiger, Bernd Jungbluth, Fraunhofer-Institut für Lasertechnik (Germany) [7578-25]

5:50 pm: **High average and peak power pulsed fiber lasers at 1030 nm and 515nm**, Benjamin Cocquelin, Julien Saby, François L. Salin, Anthony Meunier, Eolite Systems (France) [7580-17]

Tuesday 26 January

SESSION 2

Room: 123 (Exhibit Level) Tues. 8:00 to 10:00 am

Visible Sources

Session Chair: **Andrei V. Shchegrov**, Spectralus Corp.

8:00 am: **Compact module of a frequency-doubled CW diode laser with an output power of more than 500 mW at 531 nm and a beam quality of less than 1.3**, Jochen Wueppen, Martin Traub, Enno Pawlowski, Fraunhofer-Institut für Lasertechnik (Germany); Karl-Heinz Hasler, Bernd Sumpf, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7582-03]

8:20 am: **Efficient green lasers for high resolution scanning micro-projector displays** (*Invited Paper*), Vikram Bhatia, Anthony S. Bauco, Hassan M. Oubei, David A. S. Loeber, Corning Inc. (USA) [7582-04]

8:50 am: **Simultaneous blue and red light generation with birefringent phase matching**, Kentaro Miyata, Nobuhiro Umemura, Kiyoshi Kato, Chitose Institute of Science and Technology (Japan) [7582-05]

9:10 am: **High-performance at low cost: manufacturing frequency doubled green semiconductor lasers for mass markets** (*Invited Paper*), Thomas Hoefer, OSRAM Opto Semiconductors GmbH (Germany); Ulrich Steegmueller, OSRAM Opto Semiconductors Inc. (USA); Michael Kuehnelt, Uwe Strauss, Thomas Schwarz, Heiko Unold, Michael Schmitt, Karsten Auen, Roland Schulz, Christoph Walter, Ines Pietzonka, Hans Lindberg, OSRAM Opto Semiconductors GmbH (Germany) [7582-06]

9:40 am: **Coupled ring resonators for efficient second harmonic generation**, Danilo Skoczowsky, Andreas Jechow, Ralf Menzel, Univ. Potsdam (Germany); Katrin Paschke, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7582-07]

Coffee Break 10:00 to 10:30 pm

SESSION 3

Room: 123 (Exhibit Level) Tues. 10:30 am to 12:10 pm

Ultrafast Nonlinear Devices and Applications I

Session Chair: **Yehoshua Y. Kalisky**, Nuclear Research Ctr. Negev (Israel)

10:30 am: **Limitation of optical frequency comb generation in whispering gallery mode resonators**, Yanne K. Chembo, Nan Yu, Jet Propulsion Lab. (USA) [7582-08]

10:50 am: **Optical frequency comb generation using dispersion-optimized nonlinear fiber arrangement**, Jose M. Chavez Boggio, Slaven Moro, Nikola Alic, Kevin Balch, Univ. of California, San Diego (USA); Magnus Karlsson, Chalmers Univ. of Technology (Sweden); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Stojan Radic, Univ. of California, San Diego (USA) . [7582-09]

11:10 am: **Two-stage bulk compressor for the generation of 10-MW few-cycle pulses at MHz repetition rates**, Wolfgang Koehler, Gabriel Tempea, FEMTOLASERS Produktions GmbH (Austria) [7582-10]

11:30 am: **Modal coupling of supercontinuum generation in a tapered fiber**, Kuei-Chu Hsu, National Central Univ. (Taiwan); Sen-Yih Chou, Ja-Hon Lin, National Chiao Tung Univ. (Taiwan); Nan-Kuang Chen, National United Univ. (Taiwan); Sien-Kuei Liaw, National Taiwan Univ. of Science and Technology (Taiwan); Yin-Chieh Lai, Sien Chi, National Chiao Tung Univ. (Taiwan) . [7582-11]

11:50 am: **Tunable broadband optical generation via giant Rabi shifting in micro-plasmas**, Ryan Compton, Alex Filin, Dmitri A. Romanov, Robert J. Levis, Temple Univ. (USA) [7582-12]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 4

Room: 123 (Exhibit Level), Tues. 1:30 to 3:10 pm

Optical Parametric Devices

Session Chair: Angus J. Henderson, Lockheed Martin Aculight

1:30 pm: **LiInSe₂ nanosecond optical parametric oscillator tunable from 4.7 to 8.7 μm**, Aleksey Tyazhev, Georgi Marchev, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Vitaliy Vedenyapin, Institute of Mineralogy and Petrography (Russian Federation); Dmitry B. Kolker, Novosibirsk State Technical Univ. (Russian Federation); Alexander P. Yeliseyev, Sergei Lobanov, Ludmila I. Isaenko, Institute of Mineralogy and Petrography (Russian Federation); Jean-Jacques Zondy, Conservatoire National des Arts et Métiers (France); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7582-13]

1:50 pm: **3.2-watt single-frequency CW source at 790 nm based on frequency conversion of a fiber laser**, Angus J. Henderson, Peter Esquinasi, Lockheed Martin Aculight (USA) [7582-14]

2:10 pm: **Synchronously pumped at 1064 nm OPO based on CdSiP₂ for generation of high-power picosecond pulses in the mid-infrared near 6.4 μm**, Andre Peremans, Dan Lis, Francesca Cechet, Facultes Univ. Notre Dame de la Paix (Belgium); Peter G. Schunemann, Kevin T. Zawilski, BAE Systems (USA); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7582-15]

2:30 pm: **A high peak power compact eye-safe optical parametric oscillator system**, Frank F. Wu, MetroLaser, Inc. (USA); Jeffrey W. Pierce, JP Innovations LLC (USA) [7582-16]

2:50 pm: **Excitation of individual Raman Stokes lines of up-to 10th order using rectangular shaped optical pulses at 530nm**, Kangkang Chen, Shaif-ul Alam, Christophe A. Codemard, Andrew Malinowski, David J. Richardson, Univ. of Southampton (United Kingdom) [7582-17]

Coffee Break 3:10 to 3:40 pm

SESSION 5

Room: 123 (Exhibit Level), Tues. 3:40 to 6:00 pm

Nonlinear Optics for Spectroscopic Applications

Session Chair: Wei Shi, NP Photonics, Inc.

3:40 pm: **Tunable nonlinear-optical devices for laser-spectroscopic sensing (Invited Paper)**, Brian J. Orr, Yabai He, Macquarie Univ. (Australia) [7582-18]

4:10 pm: **Seeded nanosecond optical parametric generator for trace gases measurement**, Kenji Numata, Univ. of Maryland, College Park (USA); Stewart T. Wu, Steven X. Li, Haris Riris, Anthony W. Yu, Michael A. Krainak, James B. Abshire, NASA Goddard Space Flight Ctr. (USA) [7582-19]

4:30 pm: **Optical parametric oscillator-based spectroscopy for sensitive chemical sensing (Invited Paper)**, Frans Harren, Radboud Univ. Nijmegen (Netherlands) [7582-20]

5:00 pm: **Filament-based spectroscopy self-compression to 8 fs for impulsive stimulated Raman spectroscopic sensing**, Johanan Odhner, Dmitri A. Romanov, Robert J. Levis, Temple Univ. (USA) [7582-21]

5:20 pm: **Generation of quasi-continuous wave 389-nm coherent light by frequency doubling of a Ti:sapphire laser for nuclear spin polarization of ³He atoms**, Shingo Maeda, Hiroshi Morioka, Tatsuya Ohira, Hiroshi Kumagai, Ataru Kobayashi, Osaka City Univ. (Japan) [7582-22]

5:40 pm: **Continuous-wave optical parametric oscillators on their way to the terahertz range**, Rosita Sowade, Ingo Breunig, Karsten Buse, Univ. Bonn (Germany) [7582-60]

POSTERS--TUESDAY

Room: 103/104 (Exhibit Level), Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Characterization of palladium thin film deposited by pulsed-laser deposition, Udaibir Singh, Nisha Jha, Tikendra P. Singh, Avinashi Kapoor, Univ. of Delhi (India) [7582-49]

Practical aspects of applying triple correlations to the characterization of high-frequency repetition trains of picosecond optical pulses, Alexandre S. Shcherbakov, Pedro P. Moreno Zarate, Ana Luz Muñoz Zurita, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Sergey A. Nemov, St. Petersburg State Polytechnical Univ. (Russian Federation); Joaquin Campos Acosta, Consejo Superior de Investigaciones Científicas (Spain) [7582-50]

Upconversion fluorescence spectroscopy in rare earth doped sol-gel nano-glass ceramics, Luciano A. Bueno, Artur S. Gouveia-Neto, Ernande da Costa, Andrea da Silva, Univ. Federal Rural de Pernambuco (Brazil) [7582-51]

Numerical analysis for optimum output of idler wave in nanosecond optical parametric oscillators of PPMgSLT, Bum Ku Rhee, Wha-Keun Ahn, Sogang Univ. (Korea, Republic of); Myoungsik Cha, Pusan National Univ. (Korea, Republic of) [7582-52]

A high Brillouin amplification using liquid fluorocarbon, Frank F. Wu, Anatoliy Khizhnyak, Vladimir B. Markov, MetroLaser, Inc. (USA) [7582-53]

Performance investigation on a quantum dots DFB laser by one- and two-photon pumping, Francesco Todescato, Ilaria Fortunati, Samuele Gardin, Raffaella Signorini, Univ. degli Studi di Padova (Italy); Jacek Jasieniak, Commonwealth Scientific and Industrial Research Organisation (Australia); Renato Bozio, Alessandro Martucci, Gioia Della Giustina, Giovanna Brusatin, Massimo Guglielmi, Univ. degli Studi di Padova (Italy); Mauro Prasciolu, Istituto Nazionale per la Fisica della Materia (Italy); Filippo Romanato, Univ. degli Studi di Padova (Italy) [7582-54]

Sellmeier and thermo-optic dispersion formulas for β-BaB₂O₄, Kiyoshi Kato, Nobuhiro Umemura, Chitose Institute of Science and Technology (Japan); Takuya Mikami, Okamoto Optics Co., Ltd. (Japan) [7582-55]

UV supercontinuum excitation source generated by SPM and XPM in photonic crystal fiber, Robert R. Alfano, Vladimir A. Kartazaev, Iosif S. Zeylikovich, The City College of New York (USA); Daniel A. Nolan, Corning Inc. (USA) [7582-56]

Accurate evaluation of free carrier refraction in InP, Leonel P. Gonzalez, Shekhar Guha, Air Force Research Lab. (USA) [7582-57]

1 W at 490 nm on a compact micro-optical bench by single-pass second harmonic generation, C. Fiebig, G. Blume, D. Feise, D. Jedrzycki, A. Sahm, M. Uebernickel, K. Paschke, G. Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7582-59]

Dense optical gain media based on buffer-gas cooled atomic vapors, Tao Hong, Shanghai Institute of Optics and Fine Mechanics (China); Alexey V. Gorshkov, David Patterson, Alexander S. Zibrov, John Doyle, Mikhail D. Lukin, Mara Goff Prentiss, Harvard Univ. (USA) [7582-61]

Wednesday 27 January

SESSION 6

Room: 123 (Exhibit Level), Wed. 8:00 to 10:10 am

Nonlinear Fiber Devices and Applications

Session Chair: Peter E. Powers, Univ. of Dayton

8:00 am: **Bound states of dissipative solitons in optical fiber systems**, Sofia Latas, Mário Ferreira, Univ. de Aveiro (Portugal) [7582-23]

8:20 am: **Extraction of a single soliton from a bunch of solitons generated by pulse breakup**, Miguel A. Bello-Jiménez, Evgeny A. Kuzin, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Olivier Pottiez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Baldemar Ibarra-Escamilla, Ariel Flores-Rosas, Manuel Durán-Sánchez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7582-24]

8:40 am: **Self-focusing in gain-guided optical fibers and pulse propagation characteristics**, Renjie Zhou, Baldemar Ibarra-Escamilla, Joseph W. Haus, Peter E. Powers, Qiwen Zhan, Univ. of Dayton (USA) [7582-25]

9:00 am: **Monolithic high SBS threshold pulsed fiber laser and frequency doubling for LIDAR and remote sensing spectroscopy**, Wei Shi, NP Photonics, Inc. (USA); Eliot B. Petersen, NP Photonics, Inc. (USA) and Univ. of Arizona (USA); Dan T. Nguyen, Zhidong Yao, Jie Zong, NP Photonics, Inc. (USA); Mark A. Stephen, NASA Goddard Space Flight Ctr. (USA); Arturo Chavez-Pirson, NP Photonics, Inc. (USA); Nasser Peyghambarian, NP Photonics, Inc. (USA) and College of Optical Sciences, The Univ. of Arizona (USA)[7582-26]

9:20 am: **Experimental demonstration of fiber optical parametric chirped-pulse amplification**, Yue Zhou, Ka-Yi Kim Cheung, Po-Ching Chui, Kin-Yip K. Wong, The Univ. of Hong Kong (Hong Kong, China)[7582-27]

9:40 am: **Far-UV solid state lasers for semiconductor processing** (*Invited Paper*), James J. Jacob, Actinix (USA); Darrell J. Armstrong, Sandia National Labs. (USA); Arlee V. Smith, AS-Photonics, LLC (USA)[7582-28]

Coffee Break 10:10 to 10:20 am

LASE Plenary Session

Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

10:20 am: **LASE Best Student Paper Prize**
SPIE will present awards to the best 3 student papers on the science and application of lasers.
Cash prizes of \$1500, \$1000, and \$500 will be awarded.

10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]

11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) [7579-102]

11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 7

Room: 123 (Exhibit Level) Wed. 1:30 to 3:40 pm

Terahertz Generation

Session Chair: Darrell J. Armstrong, Sandia National Labs.

1:30 pm: **Single-frequency pulsed fiber lasers at ~1.5 μm and fiber-based THz sources** (*Invited Paper*), Wei Shi, Eliot B. Petersen, Jonathan Meair, Dan T. Nguyen, Jie Zong, Zhidong Yao, Arturo Chavez-Pirson, Nasser Peyghambarian, NP Photonics, Inc. (USA)[7582-29]

2:00 pm: **Enhancement of optics-to-THz conversion efficiency by metallic slot waveguides**, Zhichao Ruan, Stanford Univ. (USA); Georgios Veronis, Louisiana State Univ. (USA); Konstantin L. Vodopyanov, Martin M. Fejer, Shanhui Fan, Stanford Univ. (USA)[7582-30]

2:20 pm: **High-efficiency terahertz generation in novel organic nonlinear optical crystals**, Peter Günter, ETH Zürich (Switzerland)[7582-31]

2:40 pm: **Terahertz and optical frequency mixing in semiconductor quantum-wells**, Yun-Shik Lee, Andrew D. Jameson, Joseph L. Tomaino, Oregon State Univ. (USA); Johannes T. Steiner, Mackillo Kira, Stephan W. Koch, Philipps-Univ. Marburg (Germany); John P. Prineas, The Univ. of Iowa (USA)[7582-32]

3:00 pm: **Efficient high power tunable THz sources using optical techniques**, Walter C. Hurlbut, Vladimir G. Kozlov, Microtech Instruments, Inc. (USA); Konstantin L. Vodopyanov, Stanford Univ. (USA)[7582-33]

3:20 pm: **Broadly tunable terahertz source**, Peter E. Powers, Kevan Krumb, Joseph W. Haus, Univ. of Dayton (USA)[7582-34]

Coffee Break :3:40 to 4:00 pm

SESSION 8

Room: 123 (Exhibit Level) Wed. 4:00 to 5:50 pm

Engineered Nonlinear Optics

Session Chair: Konstantin L. Vodopyanov, Stanford Univ.

4:00 pm: **Periodically poled silicon** (*Invited Paper*), Bahram Jalali, Nick K. Hon, Kevin K. Tsia, Daniel R. Solli, Univ. of California, Los Angeles (USA) ... [7582-35]

4:30 pm: **Polarization effects and fiber-laser-pumping of a 2-μm-pumped OP-GaAs OPO** (*Invited Paper*), Christelle Kieleck, Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France); David Faye, Eric Lallier, Thales Research & Technology (France); Stuart D. Jackson, The Univ. of Sydney (Australia)[7582-36]

5:00 pm: **Bulk quasi-phase-matched device: large aperture PPMgLN and PPMgLT** (*Invited Paper*), Takunori Taira, Institute for Molecular Science (Japan)[7582-37]

5:30 pm: **Adhesive-free bond quasi-noncritical phase-matched and quasi-phase-matched optical parametric oscillations**, Xiaodong Mu, Helmuth E. Meissner, Huai-Chuan Lee, Onyx Optics Inc. (USA)[7582-38]

Thursday 28 January

SESSION 9

Room: 123 (Exhibit Level) Thurs. 8:30 to 9:50 am

Ultrafast Nonlinear Devices and Applications II

Session Chair: Baldemar Ibarra-Escamilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)

8:30 am: **Mode-locking with phase-sensitive (parametric) amplification**, Christopher R. Jones, J. Nathan Kutz, Univ. of Washington (USA) ... [7582-39]

8:50 am: **Mode-locked laser pulse sources for wavelength division multiplexing**, Edward Farnum, Kean Univ. (USA); Brandon G. Bale, Aston Univ. (United Kingdom); J. Nathan Kutz, Univ. of Washington (USA)[7582-40]

9:10 am: **Dynamics of ultrashort pulse solutions of the complex Ginzburg-Landau equation**, Sofia Latas, Mário Ferreira, Margarida Facão, Univ. de Aveiro (Portugal)[7582-41]

9:30 am: **Novel high-sensitivity Z-scan technique based on a Hartmann-Shack wavefront sensor**, Renato E. de Araujo, Univ. Federal de Pernambuco (Brazil); Diego-Jose Rativa-Millan, Univ. College Dublin (Ireland); Anderson S. L. Gomes, Univ. Federal de Pernambuco (Brazil); Brian Vohnsen, Univ. College Dublin (Ireland)[7582-42]

Coffee Break 9:50 to 10:20 am

SESSION 10

Room: 123 (Exhibit Level) Thurs. 10:20 am to 12:30 pm

Nonlinear Materials and Characterization

Session Chair: Pinhas Blau, Soreq Nuclear Research Ctr. (Israel)

10:20 am: **The physical basis and modeling of Cr⁴⁺-based saturable absorbers** (*Invited Paper*), Yehoshua Y. Kalisky, Nuclear Research Ctr. Negev (Israel); Ofra Kalisky, Jerusalem College of Technology (Israel) [7582-43]

10:50 am: **Comparison of nonlinear absorption and carrier recombination times in GaAs grown by hydride vapor phase epitaxy and Bridgman processes**, Leonel P. Gonzalez, Amelia K. Carpenter, Joel M. Murray, Air Force Research Lab. (USA); Kevin T. Zawilski, Peter G. Schunemann, BAE Systems (USA); Shekhar Guha, Air Force Research Lab. (USA)[7582-44]

11:10 am: **Efficiency of a one-phonon Bragg anomalous light scattering in tellurium dioxide single crystal with variously polarized incident light of visible range**, Alexandre S. Shcherbakov, Daniel Sanchez, Sandra E. Balderas, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7582-45]

11:30 am: **One- and two-photon pumped soft lithographed DFB laser systems based on semiconductor core-shell quantum dots**, Ilaria Fortunati, Samuele Gardin, Francesco Todescato, Raffaella Signorini, Renato Bozio, Univ. degli Studi di Padova (Italy); Jacek Jasieniak, Commonwealth Scientific and Industrial Research Organisation (Australia); Alessandro Martucci, Gioia Della Giustina, Giovanna Brusatin, Massimo Guglielmi, Univ. degli Studi di Padova (Italy)[7582-46]

11:50 am: **Nonlinear optical properties of colloidal Au and Ag nanoparticles dispersed in ionic liquids**, Márcio A. R. C. Alencar, Cássio E. A. Santos, Univ. Federal de Alagoas (Brazil); Luciane F. Oliveira, Carla W. Scheeren, Jairton Dupont, Univ. Federal do Rio Grande do Sul (Brazil); Jandir M. Hickmann, Univ. Federal de Alagoas (Brazil) [7582-47]

12:10 pm: **Synthesis and optical limiting characteristics of TiO₂@SiO₂ core-shell nanoparticles**, K-Main Rahulan, G. Vinitha, Prakashrao Aruna, Singaravelu Ganesan, Anna Univ. (India)[7582-48]

LASE

High-Power Diode Laser Technology and Applications VIII

Conference Chair: **Mark S. Zediker**, Consultant

Program Committee: **Friedrich G. Bachmann**, Rofin-Sinar Laser GmbH (Germany); **Stefan W. Heinemann**, Fraunhofer USA, Inc.; **Volker K. Krause**, Laserline GmbH (Germany); **Robert J. Martinsen**, nLIGHT Corp.; **Kurt J. Linden**, Spire Corp.; **Erik P. Zucker**, JDSU

Monday 25 January

SESSION 1

Room: 130 (Exhibit Level), Mon. 8:00 to 10:00 am

Laser Diode Reliability

Session Chair: **Robert J. Martinsen**, nLIGHT Corp.

8:00 am: **Reliability of high-performance 9xx-nm single emitter laser diodes**, Ling Bao, Jun Wang, Mark A. Devito, Dapeng Xu, Damian Wise, Paul O. Leisher, Mike Grimshaw, Weimin Dong, Shiguo Zhang, Kirk Price, Daming Li, Chendong Bai, Steve Patterson, Robert J. Martinsen, nLIGHT Corp. (USA) [7583-01]

8:20 am: **Highly reliable 637-639 nm red high-power LDs for displays**, Takehiro Nishida, Tetsuya Yagi, Naoyuki Shimada, Kenichi Ono, Akihiro Shima, Mitsubishi Electric Corp. (Japan) [7583-02]

8:40 am: **Reliability of high-power QCW arrays**, Ryan Feeler, Jeremy Junghans, Jennifer Remley, Edward F. Stephens, Northrop Grumman Cutting Edge Optronics (USA) [7583-03]

9:00 am: **Reliability and performance of 808-nm single emitter multi-mode laser diodes**, Jun Wang, Ling Bao, Mark A. Devito, Dapeng Xu, Damian Wise, Mike Grimshaw, Weimin Dong, Shiguo Zhang, Chendong Bai, Paul O. Leisher, Daming Li, Hailong Zhou, Steve Patterson, Robert J. Martinsen, nLIGHT Corp. (USA) [7583-04]

9:20 am: **Reliable operation of 8xx mini-bar-based hermetic modules**, Xu Jin, Edmund Wolak, Oclaro, Inc. (USA) [7583-05]

9:40 am: **Root cause investigation of catastrophic degradation in high-power multi-mode InGaAs-AlGaAs strained quantum well lasers**, Yongkun Sin, Neil Ives, Nathan Presser, Steven C. Moss, The Aerospace Corp. (USA) [7583-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 130 (Exhibit Level), Mon. 10:30 to 11:50 am

Laser Diode Modules I

Session Chair: **Erik P. Zucker**, JDSU

10:30 am: **High-brightness fiber-coupled pump laser development**, Kirk Price, Scott R. Karlsen, Paul O. Leisher, Steve Patterson, Robert J. Martinsen, nLIGHT Corp. (USA) [7583-07]

10:50 am: **Roadmap to low cost, high brightness diode laser power out of the fiber**, Dominic Schröder, Ekkehard Werner, Alexander Franke, Lars Wagner, Guido F. Bonati, JENOPTIK Laserdiode GmbH (Germany); Falk Dörfel, Hagen Ziemer, Andreas Liem, Thomas Gabler, JT Optical Engine GmbH + Co. KG (Germany) [7583-08]

11:10 am: **High-brightness 9XX-nm pumps with wavelength stabilization**, Alexander Ovtchinnikov, Valentin P. Gapontsev, Niklay Moshogov, Pavel A. Trubenko, Alexey Komissarov, Igor E. Berishev, Nikolay Strougov, Vadim V. Chuyanov, Oleg Raisky, Oleg Maksimov, Lisa Wright, Glenn A. Ellis, IPG Photonics Corp. (USA) [7583-09]

11:30 am: **Dramatic advances in direct diode lasers**, David L. Havrilla, TRUMPF Inc. (USA); Ruediger Brockmann, Stephan G. Strohmaier, TRUMPF Laser GmbH & Co. KG (Germany) [7583-10]

Lunch Break 11:50 am to 1:20 pm

SESSION 3

Room: 130 (Exhibit Level), Mon. 1:20 to 3:00 pm

Laser Diode Modules II

Session Chair: **Friedrich G. Bachmann**, Rofin-Sinar Laser GmbH (Germany)

1:20 pm: **High duty cycle hard soldered kilowatt laser diode arrays**, Genady Klumel, Yoram Karni, Yaakov Oppenheim, Yuri Berk, Moshe Shamay, Renana Tessler, SCD Semiconductor Devices (Israel) [7583-11]

1:40 pm: **Micro-optic solutions for beam formation of individually addressable high-power single-mode diode laser arrays**, Martin Forrer, Dzelal Kura, Eckhard Langenbach, FISBA OPTIK AG (Switzerland) [7583-12]

2:00 pm: **KW-class industrial diode lasers comprised of single emitters**, Kirk Price, nLIGHT Corp. (USA); Frank Pfeffer, OptoTools GmbH (USA); Paul O. Leisher, Scott R. Karlsen, Steve Patterson, Robert J. Martinsen, nLIGHT Corp. (USA) [7583-13]

2:20 pm: **High-power diode laser modules from 630 nm to 2200 nm**, Bernd Köhler, Heiko Kissel, Marco Flament, Paul Zolichowski, Matthias Haag, Thomas Brand, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [7583-14]

2:40 pm: **Fiber coupling of high-power diode laser stack for direct polycarbonate processing**, Eva Vidal, Tekniker (Spain) and MONOCROM S.L. (Spain); Deitze Otaduy, Iban Quintana, Tekniker (Spain); Enrique Mendez, Gregorio Viera, Miguel Galán, MONOCROM S.L. (Spain) [7583-15]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 130 (Exhibit Level), Mon. 3:30 to 4:50 pm

Laser Diode Heat Removal

Session Chair: **Stefan W. Heinemann**, Fraunhofer USA, Inc.

3:30 pm: **Expansion matched heat sinks made by micro-metal injection molding**, Michael Leers, Erik Liermann, Fraunhofer-Institut für Lasertechnik (Germany); Philipp Imgrund, Lutz Kramer, Jörg Volkert, Fraunhofer-Institut für Fertigungstechnik Materialforschung (Germany) [7583-16]

3:50 pm: **Simple method for modeling thermoelectric cooler (TEC) performance of single-emitter semiconductor-laser packages with concentrated heat sources**, Jihua Du, Michael Au, Laura Zavala, Prasad Yalamanchili, Jay A. Skidmore, Erik P. Zucker, JDSU (USA) [7583-17]

4:10 pm: **Alternatives to copper microchannel coolers for high-powered laser diode arrays**, Ryan Feeler, Jeremy Junghans, Edward F. Stephens, Northrop Grumman Cutting Edge Optronics (USA) [7583-18]

4:30 pm: **Progress in the development of active heat sink for high-power laser diodes**, John Vetrovec, Aqwest (USA) [7583-19]

Tuesday 26 January

SESSION 5

Room: 130 (Exhibit Level), Tues. 8:00 to 10:00 am

Laser Diode Devices I

Session Chair: **Erik P. Zucker**, JDSU

8:00 am: **Recent development of high-power-efficiency 808-nm diode laser bar at Lasertel**, Li Fan, Chuanshun Cao, Irene Ai, Brian Caliva, Linfei Zeng, Prabhu Thiagarajan, Mark McElhinney, Lasertel, Inc. (USA) [7583-20]

8:20 am: **Extending the wavelength range in Oclaros high-brightness broad area modules**, Susanne Pawlik, Andrea Guarino, Boris N. Sverdlov, Jürgen Müller, Christopher Button, Sebastian Arlt, Dominik Jaeggi, Norbert Lichtenstein, Oclaro, Inc. (Switzerland) [7583-21]

8:40 am: **975-nm high-power broad area diode lasers optimized for narrow spectral linewidth applications**, Paul A. Crump, Christoph Schultz, Agnieska Pietrzak, Martin Spreemann, Steffen Knigge, Olaf Brox, Andre Maasdorf, Frank Bugge, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7583-22]

9:00 am: **Mid-infrared high-power diode lasers and modules**, Márc T. Kelemen, Juergen Gilly, m2k-laser GmbH (Germany); Marcel Rattunde, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Sandra Ahlert, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [7583-23]
 9:20 am: **High-temperature and high-peak-power 808-nm QCW bars and stacks**, Gianluca Bacchin, Arnaud Fily, Bocang Qiu, Derek Fraser, Stephen Robertson, Valentin Loyo-Maldonado, Stewart D. McDougall, Berthold E. Schmidt, Intense Ltd. (United Kingdom) [7583-24]
 9:40 am: **Eye safe high-power laser diode in the 1410-1550 nm range**, Julien Boucart, Oclaro, Inc. (Switzerland); Brian de Lary, Mark Q. Kearley, Oclaro, Inc. (United Kingdom); Norbert Lichtenstein, Oclaro, Inc. (Switzerland) [7583-25]
 Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 130 (Exhibit Level) Tues. 10:30 to 11:50 am

Laser Diode Devices II

Session Chair: Kurt J. Linden, Spire Corp.

10:30 am: **High-power DFB laser diodes**, Wolfgang Zeller, Johannes Koeth, nanoplus GmbH (Germany); Martin Kamp, Julius-Maximilians-Univ. Würzburg (Germany) [7583-26]
 10:50 am: **Comparison of concepts for high-brightness diode lasers at 976 nm**, Juergen Gilly, Patrick Friedmann, m2k-laser GmbH (Germany); Heiko Kissel, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany); Márc T. Kelemen, m2k-laser GmbH (Germany) [7583-27]
 11:10 am: **Scaling brilliance of high-power laser diodes**, Harald Koenig, Günther Groeninger, Christian Lauer, Wolfgang Reill, Markus Arzberger, OSRAM Opto Semiconductors GmbH (Germany); Heiko Kissel, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany); Arnd Koesters, Joerg Malus, Volker K. Krause, Laserline GmbH (Germany); Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) [7583-28]
 11:30 am: **JENOPTIK diode lasers and bars optimized for high-power applications in the NIR range**, Ralf Hülsewede, Martin Zorn, Haïke Schulze, Jürgen Sebastian, JENOPTIK Diode Lab GmbH (Germany); Petra Hennig, Dominic Schröder, JENOPTIK Laserdiode GmbH (Germany) [7583-29]
 Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 7

Room: 130 (Exhibit Level) Tues. 1:20 to 2:00 pm

Laser Diode Devices III

Session Chair: Kurt J. Linden, Spire Corp.

1:20 pm: **High-brightness 635-nm tapered diode lasers with optimized index guiding**, David Feise, Gunnar Blume, Helmar Dittrich, Christian Kaspari, Katrin Paschke, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7583-30]
 1:40 pm: **Characteristics of red-emitting broad area stripe laser diodes with zinc diffused window structures**, Tomoki Ohno, Mikio Takiguchi, Kazuya Wakabayashi, Hiroyuki Uchida, Kaori Naganuma, Satoshi Ito, Shoji Hirata, Sony Corp. (Japan) [7583-31]

SESSION 8

Room: 130 (Exhibit Level) Tues. 2:00 to 4:50 pm

Beam Combining

Session Chair: Volker K. Krause, Laserline GmbH (Germany)

2:00 pm: **Compact 500-W 200-µm fiber-coupled module based on single emitters**, Scott R. Karlson, Kirk Price, Aaron Brown, Ron Mehl, Steve Patterson, Robert J. Martinsen, nLIGHT Corp. (USA) [7583-32]
 2:20 pm: **Demonstration of high pointing accuracy dual-axis collimation of 49 emitter diode bar using a laser-written custom phase-plate**, Natalia Trella, Heriot-Watt Univ. (United Kingdom) [7583-33]
 2:40 pm: **Coherent beam combining for high-power broad-area laser diode array**, Bo Liu, Yun Liu, Yehuda Braiman, Oak Ridge National Lab. (USA) [7583-34]
 Coffee Break 3:00 to 3:30 pm
 3:30 pm: **Progress in high-brightness diode laser development at Coherent**, Sungwon D. Roh, Daniel M. Grasso, Nathan Shou, Qi Dong, David A. Schleuning, Rajiv Pathak, Coherent, Inc. (USA) [7583-35]
 3:50 pm: **Coherent polarization locking of a diode emitter array**, Siang Ping Ng, Nanyang Technological Univ. (Singapore); Poh Boon Phua, DSO National Labs. (Singapore) and Nanyang Technological Univ. (Singapore) [7583-36]

4:10 pm: **High-brightness emission from stripe-array broad area diode lasers operated in off-axis external cavities**, Andreas Jechow, Danilo Skoczowsky, Univ. Potsdam (Germany); Mark Lichtner, Mindaugas Radziunas, Weierstrass-Institute für Angewandte Analysis und Stochastik (Germany); Ralf Menzel, Univ. Potsdam (Germany) [7583-37]
 4:30 pm: **250W diode laser for low pressure Rb vapor pumping**, Alexey Podvyaznyy, George B. Venus, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim I. Smirnov, OptiGrate Corp. (USA); David A. Hostutler, Air Force Research Lab. (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7583-38]

POSTERS-TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Degradation analysis of individual emitters in 808-nm QCW laser diode array for space applications, Othman M. Rehioui, Lab. d'Intégration du Matériau au Système (France) and Quantel Laser Diode (France); Laurent Bechou, Yves Ousten, Lab. d'Intégration du Matériau au Système (France); Andreas Kohl, Thierry Fillardet, Gerard Volluet, Quantel Laser Diodes (France) [7583-40]
High-power single-lateral-mode InAs/GaAs quantum dot laser diode with double bend waveguide structures, Kyoung Chan Kim, Korea Institute of Science and Technology (Korea, Republic of) and Korea Univ. (Korea, Republic of); Il Ki Han, Jung Il Lee, Korea Institute of Science and Technology (Korea, Republic of); Dong Ho Kim, Tae Geun Kim, Korea Univ. (Korea, Republic of) [7583-41]
Methane concentration measurements with a mid-infrared quantum-cascade laser, Lei Li, Yiding Wang, Menglong Cong, Yupeng An, Bo Li, Jilin Univ. (China) [7583-42]
High-power distributed-feedback tapered master-oscillator power amplifiers emitting at 1064 nm, Daniel Jedrzejczyk, Olaf Brox, Frank Bugge, Jörg Fricke, Armin Ginolas, Katrin Paschke, Hans Wenzel, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7583-43]
CW to QCW power scaling of high-power laser bars, Jürgen Müller, René Todt, Martin Krejci, Yvonne Manz-Gilbert, Norbert Lichtenstein, Oclaro, Inc. (Switzerland) [7583-44]
1043-nm semiconductor disk laser, Yanrong Song, Peng Zhang, Jinrong Tian, Xinping Zhang, Beijing Univ. of Technology (China) [7583-45]
High-power high-brightness QCW bars, Hua Huang, Jun Wang, Mark A. DeVito, Aaron L. Hodges, Shiguo Zhang, Ling Bao, Damian Wise, Mike Grimshaw, Dapeng Xu, Chendong Bai, nLIGHT Corp. (USA) [7583-46]
Long-wavelength fiber-coupled diode laser modules, Paul O. Leisher, Kirk Price, Scott R. Karlson, Mitch Reynolds, Aaron Brown, Louis J. Bintz, Robert J. Martinsen, Steve Patterson, nLIGHT Corp. (USA) [7583-47]
Advancements in broad-area InP-based diode lasers operating from 1400 nm to >2100 nm, Paul O. Leisher, Weimin Dong, Xing G. Guan, Mike Grimshaw, Jason Patterson, Steve Patterson, nLIGHT Corp. (USA) [7583-48]
Development of asymmetrical epitaxial structures for 65% efficiency laser diodes in the 9xx-nm range, Moshe Levy, Yoram Karni, Noam Rapaport, Yaroslav Don, Yuri Berk, Dan A. Yanson, SCD Semiconductor Devices (Israel) [7583-50]
Progress and applications of on-chip wavelength stabilized high brightness laser diodes, Laurent Vaissie, Robert M. Lammert, Wentao Hu, Xiaodong Yang, Chun Wang, Thomas Liu, Jeffrey E. Ungar, QPC Lasers, Inc. (USA) [7583-51]
Laser-assisted shearing: new application for high-power diode lasers, Michael Emonts, Christian Brecher, Fraunhofer-Institut für Produktionstechnologie (Germany) [7583-53]
High brightness 975 nm surface-emitting distributed feedback laser and arrays, Manoj Kanskar, Jason Cai, D. Kedlaya, Don Olson, Y. Xiao, Thomas Klos, Michael G. Martin, Chris Galstad, Steven H. Macomber, Alfalight, Inc. (USA) [7583-54]
Beam shaping and fibre coupling of laser diode bars by means of a single micro optical element, Jens Meinschien, Lutz Aschke, Andreas Bayer, Udo Fornahl, Thomas Mitra, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7583-55]
High brightness fibre coupling of laser diodes for configurations with single and multiple minibars, Jens Meinschien, Daniel Bartoschewski, Udo Fornahl, Manfred Jarczyński, Thomas Mitra, Christian Schroers, Andre Timmermann, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7583-56]

LASE

Laser Applications in Microelectronic and Optoelectronic Manufacturing XV

Conference Chairs: **Hiroyuki Niino**, National Institute of Advanced Industrial Science and Technology (Japan); **Michel Meunier**, Ecole Polytechnique de Montréal (Canada); **Bo Gu**, IPG Photonics Corp.; **Guido Hennig**, MDC Max Daetwyler AG (Switzerland)

Honorary Chair: **Jan J. Dubowski**, Univ. de Sherbrooke (Canada)

Program Committee: **Craig B. Arnold**, Princeton Univ.; **Philippe Bado**, Translume, Inc.; **Tommaso Baldacchini**, Newport Corp.; **Stephan Barcikowski**, Laser Zentrum Hannover e.V. (Germany); **Stephen Y. Chou**, Princeton Univ.; **J. Thomas Dickinson**, Washington State Univ.; **Jan J. Dubowski**, Univ. de Sherbrooke (Canada); **Henry Helvajian**, The Aerospace Corp.; **Andrew S. Holmes**, Imperial College London (United Kingdom); **Godai Miyaji**, Kyoto Univ. (Japan); **Henry Peng**, GE China Technology Ctr. (China); **Rafael Piestun**, Univ. of Colorado at Boulder; **Alberto Piqué**, Naval Research Lab.; **Zbigniew Sagan**, ATT Advanced Track & Trace (France); **Tomokazu Sano**, Osaka Univ. (Japan); **Koji Sugioka**, RIKEN (Japan); **Alexander Szameit**, Friedrich-Schiller-Univ. Jena (Germany); **Sascha Weiler**, TRUMPF Laser GmbH & Co. KG (Germany)

Monday 25 January

WELCOME

Room: 122 (Exhibit Level) Mon. 8:30 to 8:40 am

Hiroyuki Niino, National Institute of Advanced Industrial Science and Technology (Japan)

SESSION 1

Room: 122 (Exhibit Level) Mon. 8:40 to 10:10 am

Laser Processing of Exotic Materials

Session Chair: **Hiroyuki Niino**, National Institute of Advanced Industrial Science and Technology (Japan)

8:40 am: **Black silicon** (*Invited Paper*), Eric D. Mazur, Harvard Univ. (USA) [7584-01]

9:10 am: **Femtosecond laser synthesis of metastable metallic nanoalloys in liquids**, Michel Meunier, Sebastien Besner, Paul M. Boyer, Ecole Polytechnique de Montréal (Canada) [7584-02]

9:30 am: **F₂ excimer laser generated transient absorption centers in single crystal CaF₂**, Sharon George, Steve C. Langford, J. Thomas Dickinson, Washington State Univ. (USA) [7584-03]

9:50 am: **Limits to the nanoscale control during pulsed laser deposition**, Giorgio Baraldi, Consejo Superior de Investigaciones Científicas (Spain); Vincenzo Resta, Consejo Superior de Investigaciones Científicas (Spain) and ENEA (Italy); Angel Perea Folgueras, Jose A. Gonzalo, Carmen N. Afonso, Consejo Superior de Investigaciones Científicas (Spain) [7584-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 122 (Exhibit Level) Mon. 10:40 to 11:50 am

Laser Direct Writing

Session Chair: **Bo Gu**, IPG Photonics Corp.

10:40 am: **Direct laser writing of photoresponsive colloids for microscale patterning of 3D porous structures** (*Invited Paper*), Paul V. Braun, Univ. of Illinois at Urbana-Champaign (USA) [7584-05]

11:10 am: **Burst-train filamentation assisted laser machining of high aspect ratio holes in glass**, Saeid Rezaei, Univ. of Toronto (Canada); Dagmar Esser, RWTH Aachen (Germany); Jianzhao Li, Peter R. Herman, Univ. of Toronto (Canada) [7584-06]

11:30 am: **Flexible 3D deep microstructure fabrication in silica glasses by laser-induced backside wet etching**, Tadadatake Sato, Ryoza Kurosaki, Aiko Narazaki, Yoshizo Kawaguchi, Hiroyuki Niino, National Institute of Advanced Industrial Science and Technology (Japan) [7584-07]

Lunch Break 11:50 am to 1:30 pm

SESSION 3

Room: 122 (Exhibit Level) Mon. 1:30 to 3:00 pm

The LAMOM 15th Year Anniversary Session I

Session Chair: **Jan J. Dubowski**, Univ. de Sherbrooke (Canada)

1:30 pm: **Pulsed laser deposition: 15 years later** (*Invited Paper*), Richard F. Haglund, Jr., Vanderbilt Univ. (USA) [7584-08]

2:15 pm: **Laser manufacturing of durable goods: a 15-year perspective** (*Invited Paper*), Jyotirmoy Mazumder, Univ. of Michigan (USA) [7584-09]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 122 (Exhibit Level) Mon. 3:30 to 5:45 pm

The LAMOM 15th Year Anniversary Session II

Session Chair: **Richard F. Haglund, Jr.**, Vanderbilt Univ.

3:30 pm: **Pulsed laser deposition in device research and manufacturing** (*Invited Paper*), Douglas B. Chrisey, Rensselaer Polytechnic Institute (USA) [7584-10]

4:15 pm: **Excimer ultraviolet sources for thin film deposition: a 15 year perspective** (*Invited Paper*), Ian W. Boyd, Univ. College London (United Kingdom) [7584-11]

5:00 pm: **Low-fluence laser interaction with materials: research and applications shaped by tools advancement** (*Invited Paper*), Henry Helvajian, The Aerospace Corp. (USA) [7584-12]

Tuesday 26 January

SESSION 5

Room: 122 (Exhibit Level) Tues. 8:20 to 10:10 am

Ultrashort Pulse Micromachining

Joint Session with Conference 7589

Session Chair: **Michel Meunier**, Ecole Polytechnique de Montréal (Canada)

8:20 am: **Holographic femtosecond laser processing** (*Invited Paper*), Yoshio Hayasaki, Utsunomiya Univ. (Japan) [7584-13]

8:50 am: **Micromachining of metal and silicon using high average power ultrafast fiber lasers**, Eric P. Mottay, Yoann Zaouter, Amplitude Systemes (France); Charlie Loumena, Marc Faucon, John Lopez, ALPhANOV (France) [7589-36]

9:10 am: **Ultrafast laser-based tools enable advanced silicon solar cell efficiency enhancement processes**, Finlay Colville, Coherent, Inc. (USA) [7589-37]

9:30 am: **Picosecond laser patterning of NiCr thin film strain gauges**, Oliver Suttman, Jan Duesing, Ulrich Klug, Rainer Kling, Laser Zentrum Hannover e.V. (Germany) [7589-38]

9:50 am: **High repetition rate femtosecond laser processing of metals**, Joerg Schille, Udo Loeschner, Robby Ebert, Univ. of Applied Sciences Mittweida (Germany); Patricia Scully, Nicholas Goddard, Univ. of Manchester (United Kingdom); Horst Exner, Univ. of Applied Sciences Mittweida (Germany) [7589-39]

Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 122 (Exhibit Level) Tues. 10:40 am to 12:10 pm

Femtosecond Laser Nanoprocessing

Joint Session with Conference 7589

Session Chair: Guido Hennig, MDC Max Daetwyler AG (Switzerland)

10:40 am: **Brighter light sources from the black metal** (*Invited Paper*), Anatoliy Y. Vorobyev, Chunlei Guo, Univ. of Rochester (USA)[7589-40]

11:10 am: **Gold nanorods enhanced femtosecond laser nanoablation of silicon**, Michel Meunier, Philippe Desjeans-Gauthier, Etienne Boulais, Ecole Polytechnique de Montréal (Canada)[7584-14]

11:30 am: **Efficient femtosecond laser nanohole processing on substrate surface using high dielectric constant particles with small size parameter**, Yuto Tanaka, Go Obara, Akira Zenidaka, Minoru Obara, Keio Univ. (Japan)[7584-15]

11:50 am: **Effect of target structure on interfering femtosecond laser processing**, Yoshiki Nakata, Takuya Hiromoto, Noriaki Miyanaga, Osaka Univ. (Japan)[7584-16]

Lunch/Exhibition Break12:10 to 1:40 pm

SESSION 7

Room: 122 (Exhibit Level) Tues. 1:40 to 3:20 pm

Nonlinear Processing

Joint Session with Conference 7589

Session Chair: Wataru Watanabe, National Institute of Advanced Industrial Science and Technology (Japan)

1:40 pm: **Femtosecond laser processing of hybrid micro- and nano-structures in silicate glasses**, Pavel Mardilovich, Jonathan J. Witcher, Luke B. Fletcher, Subhash H. Risbud, Denise M. Krol, Univ. of California, Davis (USA)[7584-17]

2:00 pm: **Structure modification of glass-ceramics thin films and layers by ultrashort laser action**, Vadim P. Veiko, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [7584-18]

2:20 pm: **Two-photon lithography and nanoprocessing with picosecond extreme ultrashort 12 femtosecond laser pulses**, Karsten König, Michael Schug, Huijing Zhang, Sumarie Saremi, Dara Feili, Helmut Seidel, Univ. des Saarlandes (Germany)[7584-19]

2:40 pm: **Individually controlled multi-focus laser processing for two-photon polymerization**, Kotaro Obata, Jürgen Koch, Boris N. Chichkov, Laser Zentrum Hannover e.V. (Germany)[7584-20]

3:00 pm: **Up-conversion of crystal oscillator frequency in silicon package by near infrared, ultra-short laser**, Yoshiro Ito, Rie Tanabe, Fumiya Sato, Yuuki Shinoue, Nagaoka Univ. of Technology (Japan); Kozo Tada, Citizen Finetech Miyota Co., Ltd. (Japan)[7584-21]

Coffee Break3:20 to 3:50 pm

SESSION 8

Room: 122 (Exhibit Level) Tues. 3:50 to 5:40 pm

Three-Dimensional Direct Writing

Joint Session with Conference 7589

Session Chair: Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)

3:50 pm: **A frontier in optical data storage: five-dimensional optical data storage** (*Invited Paper*), Min Gu, Swinburne Univ. of Technology (Australia)[7589-41]

4:20 pm: **The influence of glass structure on femtosecond laser waveguide writing in erbium-doped phosphate glass**, Luke B. Fletcher, Jonathan J. Witcher, Denise M. Krol, Univ. of California, Davis (USA); Richard K. Brow, Missouri Univ. of Science and Technology (USA)[7589-42]

4:40 pm: **Femtosecond laser fabrication of birefringent directional couplers in fused silica**, Luís A. Fernandes, Univ. of Toronto (Canada) and INESC Porto (Portugal); Jason R. Grenier, Peter R. Herman, J. S. Aitchison, Univ. of Toronto (Canada); Paulo V. S. Marques, INESC Porto (Portugal)[7584-22]

5:00 pm: **Birefringent elements based on femtosecond laser-induced nanogratings**, Lourdes Ramirez, Matthias Heinrich, Sören Richter, Felix Dreisow, Robert Keil, Friedrich-Schiller-Univ. Jena (Germany); Alexander V. Korovin, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Ulf Peschel, Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany)[7589-43]

5:20 pm: **Femtosecond laser written embedded diffractive optical elements and their applications**, Jiyeon Choi, Mark Ramme, Troy P. Anderson, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)[7589-44]

POSTERS-TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

An experimental identification of the relationship between laser scattering image and micro-surface roughness for solar cell wafer, Yeon-Ki Hong, Gyung-Bum Kim, Young-Jun Jin, Chungju National Univ. (Korea, Republic of)[7584-36]

Modeling of laser drilled microhole profiles in carbon fiber composites in low fluence regime, Frank F. Wu, MetroLaser, Inc. (USA)[7584-37]

Comparison of the modeling and experimental data of the laser drilled microhole profiles in carbon fiber composites in low fluence regime, Frank F. Wu, MetroLaser, Inc. (USA)[7584-38]

Second harmonic optimization of a hologram, Satoshi Hasegawa, Yoshio Hayasaki, Utsunomiya Univ. (Japan)[7584-39]

Near-IR femtosecond and VUV nanosecond laser processing of TeO₂ crystals in air, Szabolcs Beke, Koji Sugioka, RIKEN (Japan); Joern Bonse, Federal Institute for Materials Research and Testing (Germany); Katsumi Midorikawa, RIKEN (Japan)[7584-40]

Design of micron-scale universal optical logic gates, Akbar Rahmani Nejad, Islamic Azad Univ. (Iran, Islamic Republic of) and Iran Airports Co. (Iran, Islamic Republic of)[7584-41]

MOPA fiber laser with controlled pulse length and peak power for optimizing micromachining applications, Sami T. Hendow, Multiwave Photonics (USA); João M. Sousa, Multiwave Photonics, S.A. (Portugal)[7584-42]

Ronchi test with equivalent wavelength, Anmi Garcia Arellano, Fermin-Solomon Granados-Agustin, Instituto Nacional de Astrofisica, Óptica y Electrónica (Mexico)[7584-43]

Applicability of drilling with laser to deal with shally formations in Iranian oilfields: a case study, Saeed Ghadami, Mohammad Nabaei, Abbas Roohi, Ali Moazeni, Islamic Azad Univ. (Iran, Islamic Republic of)[7584-44]

Centimeter-long microfluidic channel with an aspect ratio above 1,000 directly fabricated in fused silica by femtosecond laser micromachining, Fei He, Ya Cheng, Zhizhan Xu, Shanghai Institute of Optics and Fine Mechanics (China); Koji Sugioka, Katsumi Midorikawa, RIKEN (Japan)[7584-45]

Wednesday 27 January

SESSION 9

Room: 122 (Exhibit Level) Wed. 8:40 to 10:00 am

Biological and Biomimetic Applications

Session Chair: Hiroyuki Niino, National Institute of Advanced Industrial Science and Technology (Japan)

8:40 am: **Optical protein patterning and microfabrication for cellular biology research** (*Invited Paper*), Santiago Costantino, Univ. de Montréal (Canada)[7584-23]

9:10 am: **Optical far- and near-field femtosecond laser micro/nanostructuring and applications** (*Invited Paper*), Vassilia Zorba, Lawrence Berkeley National Lab. (USA)[7584-24]

9:40 am: **Nano-aquarium fabrication with cut-off filters for mechanism study of Phormidium assemblage**, Yasutaka Hanada, Koji Sugioka, Ikuko Ishikawa, Hiroyuki Kawano, Atsushi Miyawaki M.D., Katsumi Midorikawa, RIKEN (Japan)[7584-25]

Coffee Break10:00 to 10:20 am

LASE Plenary Session

Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

- 10:20 am: **LASE Best Student Paper Prize**
 SPIE will present awards to the best 3 student papers on the science and application of lasers.
 Cash prizes of \$1500, \$1000, and \$500 will be awarded.
- 10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]
- 11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany). [7579-102]
- 11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 10

Room: 122 (Exhibit Level). Wed. 2:00 to 3:30 pm

Laser Texturing and Machining I

Session Chair: Koji Sugioka, RIKEN (Japan)

- 2:00 pm: **Processing of metals and dielectric materials with ps-laserpulses: Results, strategies, limitations and needs** (*Invited Paper*), Beat Neuenschwander, Guido F. Bucher, Christian Nussbaum, Benjamin Joss, Martin Mural, Urs W. Hunziker, Peter Schuetz, Berner Fachhochschule (Switzerland) [7584-26]
- 2:30 pm: **Laser texturing of doped borosilicate glasses**, Alexander M. Streltsov, James E. Dickinson, Jr., Richard R. Grzybowski, Daniel Harvey, Stephan L. Logunov, Alper Ozturk, Marcel Potuzak, James S. Sutherland, Corning Inc. (USA). [7584-27]
- 2:50 pm: **Lasers in the manufacturing of LEDs**, Marco Mendes, Mathew Hannon, Jeffrey P. Sercel, Jie Fu, Xiangyang Song, Christian Porneala, Joshua Stearns, JPISA (USA) [7584-28]
- 3:10 pm: **Recent advancements in technology of compact laser plasma EUV sources**, Henryk Fiedorowicz, Andrzej S. Bartnik, Military Univ. of Technology (Poland); Torsten Feigl, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Roman Jarocki, Jerzy Kostecki, Military Univ. of Technology (Poland); Ladislav Pina, Czech Technical Univ. in Prague (Czech Republic); Mirosław Szczurek, Przemysław W. Wachulak, Military Univ. of Technology (Poland) [7584-29]
- Coffee Break 3:30 to 4:00 pm

SESSION 11

Room: 122 (Exhibit Level). Wed. 4:00 to 5:40 pm

Laser Texturing and Machining II

Session Chair: Beat Neuenschwander, Berner Fachhochschule (Switzerland)

- 4:00 pm: **Femtosecond laser direct writing of volume Fresnel zone plates**, Pornsak Srisungsitthisunti, Okan K. Ersoy, Xianfan Xu, Purdue Univ. (USA) [7584-30]
- 4:20 pm: **High-quality percussion drilling of silicon with a CW fiber laser**, Joe X. Z. Yu, Paul J. L. Webster, James M. Fraser, Queen's Univ. (Canada) [7584-31]
- 4:40 pm: **MOPA based Yb fibre laser: a new low cost tool for micromachining**, Kun Li, William O'Neill, Univ. of Cambridge (United Kingdom). [7584-32]
- 5:00 pm: **Laser micromachining of metallic glasses: investigation of the material response to machining with micro-second and pico-second lasers**, Iban Quintana, Tekniker (Spain); Todor Dobrev, Cardiff Univ. (United Kingdom); Ana Aranzabe, Tekniker (Spain). [7584-33]
- 5:20 pm: **355nm DPSS UV laser micro-processing for semiconductor and electronics industry**, Fei Zhang, Jun Duan, Xiaoyan Zeng, Xiangyou Li, Wuhan National Lab. for Optoelectronics (China) [7584-34]

Thursday 28 January

SESSION 12

Room: 121 (Exhibit Level). Thurs. 1:50 to 5:00 pm

Photovoltaics

Joint Session with Conference 7585

Session Chair: Wilhelm Pfleging, Karlsruhe Institute of Technology (Germany)

- 1:50 pm: **Structuring of thin film solar cells** (*Invited Paper*), Gabriele Eberhardt, Uwe Wagner, JENOPTIK Automatisierungstechnik GmbH (Germany); Thomas Peschel, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7585-24]
- 2:20 pm: **'Green processing' of thin film with top-hat lasers and applications in photovoltaic**, Keming Du, EdgeWave GmbH (Germany) [7585-25]
- 2:40 pm: **Productivity and flexibility, the key factors for laser processing in photovoltaic manufacturing**, Michael Moody, InnoLas, Inc. (USA) . . . [7585-26]
- Coffee Break 1:50 to 2:20 pm
- 3:30 pm: **Microstructuring and wafering of silicon with laser chemical processing** (*Invited Paper*), Sybille Hopman, Andreas Fell, Kuno Mayer, Filip Graneek, Fraunhofer-Institut für Solare Energiesysteme (Germany) . . . [7585-27]
- 4:00 pm: **Advanced laser techniques from semiconductor manufacturing transition to solar PV production**, Marco Mendes, Rick Slagle, Jie Fu, Xiangyang Song, Christian Porneala, Mathew Hannon, Jeffrey P. Sercel, JPISA (USA) [7585-28]
- 4:20 pm: **Investigation on production of highly textured Sb doped polycrystalline silicon using solid state Nd:YAG laser for photovoltaic application**, Palani A. Iyamperumal, Indian Institute of Technology Madras (India); Nilesh J. Vasa, Indian Institute of Technology Madras (India) and Kyushu Univ. (Japan); Singaperumal Makaram, Indian Institute of Technology Madras (India); Okada Tatsuo, Kyushu Univ. (Japan) [7584-35]
- 4:40 pm: **Monolithic interconnection of CIGS solar cells by picosecond laser structuring**, Heinz P. Huber, Christian Hellwig, Gerhard Heise, Thomas Kuznicki, Sebastian Sarrach, Christian Menhard, Hochschule München (Germany); Andreas Heiss, Helmut Vogt, Joerg Palm, AVANCIS GmbH & Co KG (Germany) [7585-32]

Laser-based Micro- and Nanopackaging and Assembly IV

Conference Chairs: **Wilhelm Pfleging**, Karlsruhe Institute of Technology (Germany); **Yongfeng Lu**, Univ. of Nebraska, Lincoln; **Kunihiko Washio**, Paradigm Laser Research Ltd (Japan)

Conference Co-Chairs: **Jun Amako**, Seiko Epson Corp. (Japan); **Willem Hoving**, XiO Photonics (Netherlands)

Program Committee: **Friedrich G. Bachmann**, Rofin-Sinar Laser GmbH (Germany); **Ramona Eberhardt**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Matthew Henry**, Laser Materials Processing Specialist (United Kingdom); **Costas P. Grigoropoulos**, Univ. of California, Berkeley; **Andreas Grohe**, Fraunhofer-Institut für Solare Energiesysteme (Germany); **Bo Gu**, IPG Photonics Corp.; **Minghui Hong**, National Univ. of Singapore (Singapore); **Lan Jiang**, Beijing Institute of Technology (China); **Nam Seong Kim**, EO Technics Co., Ltd. (Korea, Republic of); **Udo Klotzbach**, Fraunhofer-Institut für Werkstoff- und Strahltechnik (Germany); **Thomas Klotzbücher**, Institut für Mikrotechnik Mainz GmbH (Germany); **Xinbing Liu**, Panasonic Technologies Co.; **Tomoaki Matsushima**, Panasonic Electric Works Co., Ltd. (Japan); **Akira Mori**, Komatsu Electronics, Inc. (Japan); **Roberto Osellame**, Istituto di Fotonica e Nanotecnologie, CNR, Politecnico di Milano (Italy); **Andreas Ostendorf**, Ruhr-Univ. Bochum (Germany); **Marius Przybylski**, ATL Lasertechnik GmbH (Germany); **Gurinder P. Singh**, Hitachi Global Storage Technologies, Inc.; **Koji Sugioka**, RIKEN (Japan); **Akira Watanabe**, Tohoku Univ. (Japan)

Tuesday 26 January

POSTERS—TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Thermal dissipation modeling in optical components modules for electrical power consumption optimization, Germain Sabot, Julien Chaudenson, Franck Raulin, Supélec (France); Romain Brenot, Alcatel-Thales 3-5lab (France); Joel Jacquet, Supélec (France) [7585-29]

Threshold measurement of two-photon laser induced photo-polymerization via Z-scan, Yuri B. Boiko, YBBR, Inc. (Canada) [7585-30]

Single femtosecond pulse nanochannel formation in glass, Jeffrey F. Herbstman, Alan J. Hunt, Univ. of Michigan (USA) [7585-31]

Wednesday 27 January

SESSION 1

Room: 121 (Exhibit Level) Wed. 8:20 to 10:00 am

Welding/Joining

Session Chair: **Kunihiko Washio**, Paradigm Laser Research Ltd (Japan)

8:20 am: Welding with brilliant lasers: prospects and limitations (*Invited Paper*), Sonja M. Kittel, Robert Bosch GmbH (Germany); Friedrich Dausinger, Dausinger + Giesen GmbH (Germany) [7585-01]

8:50 am: Compound characterization of laser brazed SiC-steel joints using tungsten reinforced SnAgTi-alloys, Isabelle J. Suedmeyer, Magnus Rohde, Tobias Fuerst, Karlsruhe Institute of Technology (Germany) [7585-02]

9:10 am: Laser-based joining for the packaging of miniature optoelectronic devices (*Invited Paper*), Duncan P. Hand, Norbert Lorenz, Suzanne Miller, Heriot-Watt Univ. (United Kingdom) [7585-03]

9:40 am: Submicron accuracy optimization for laser beam soldering processes, Erik Beckert, Thomas Burkhardt, Marcel Hornaff, Andreas Kamm, Ingo Scheidig, Cornelia Stiehl, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7585-04]

Coffee Break 10:00 to 10:20 am

LASE Plenary Session

Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

- 10:20 am: **LASE Best Student Paper Prize**
SPIE will present awards to the best 3 student papers on the science and application of lasers.
Cash prizes of \$1500, \$1000, and \$500 will be awarded.
- 10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]
- 11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany). [7579-102]
- 11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]

Lunch/Exhibition Break 12:30 to 1:45 pm

SESSION 2

Room: 121 (Exhibit Level) Wed. 1:45 to 3:35 pm

Advanced Deposition Processes

Session Chair: **Friedrich G. Bachmann**, Rofin-Sinar Laser GmbH (Germany)

1:45 pm: Laser sintering of thick-film microelectronics on plastic substrate (*Invited Paper*), Xianfan Xu, Purdue Univ. (USA) [7585-05]

2:15 pm: Deposition of polymer barrier materials by resonant infrared pulsed laser ablation, Sergey M. Avanesyan, Nicole L. Dygert, Vanderbilt Univ. (USA); Hee K. Park, AppliFlex LLC (USA); Kenneth E. Schriver, Richard F. Haglund, Jr., Vanderbilt Univ. (USA) [7585-06]

2:35 pm: Growth directions of carbon nanotubes controlled by different electrical bias polarities, Yang Gao, Yunshen Zhou, Wei Xiong, Masoud Mahjouri-Samani, M. Mitchell, Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) [7585-07]

2:55 pm: Mode-selective excitation of propylene molecules in diamond growth using a wavelength-tunable CO₂ laser, Zhiqiang Xie, Yunshen Zhou, Xiangnan He, Xiaokang Shen, Yang Gao, Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) [7585-08]

3:15 pm: Optical emission spectroscopy of the C₂H₄/C₂H₂/O₂ flame for diamond growth with and without the CO₂ laser excitation, Xiangnan He, Tadiyos T. Gebre, Xiaokang Shen, Yunshen Zhou, Zhiqiang Xie, Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) [7585-09]

Coffee Break 3:35 to 4:00 pm

LASE

SESSION 3

Room: 121 (Exhibit Level), Wed. 4:00 to 6:00 pm

Optical Components and Devices

Session Chair: Willem Hoving, XiO Photonics (Netherlands)

4:00 pm: **Femtosecond laser direct writing of diffractive optical elements in polymers** (*Invited Paper*), Wataru Watanabe, Hiroyuki Mochizuki, National Institute of Advanced Industrial Science and Technology (Japan)[7585-10]

4:30 pm: **Fabrication of micro-lenses using excimer laser ablation by means of laser-generated greytone-masks**, Thomas Klotzbücher, Dalibor Dadic, Institut für Mikrotechnik Mainz GmbH (Germany)[7585-11]

4:50 pm: **Integration of electronics and photonics in active material by fs laser for functional microdevice fabrication** (*Invited Paper*), Ya Cheng, Zhizhan Xu, Shanghai Institute of Optics and Fine Mechanics (China); Koji Sugioka, Katsumi Midorikawa, RIKEN (Japan)[7585-12]

5:20 pm: **Organic random laser in an optofluidic chip fabricated by femtosecond laser**, Krishna C. Vishnubhatla, Roberto Osellame, Guglielmo Lanzani, Roberta Ramponi, Tersilla Virgili, Istituto di Fotonica e Nanotecnologie, CNR, Politecnico di Milano (Italy)[7585-13]

5:40 pm: **Integrated optical circuits in fiber cladding by tightly focused femtosecond laser writing**, Valeria A. Maselli, Peter R. Herman, Univ. of Toronto (Canada)[7585-14]

Thursday 28 January

SESSION 4

Room: 121 (Exhibit Level), Thurs. 8:20 to 10:20 am

Micro- and Nanomachining

Session Chair: Jun Amako, Seiko Epson Corp. (Japan)

8:20 am: **Direct micro-pattern machining of metal molds using pico-second lasers** (*Invited Paper*), Shimpei Fujimaki, Toshiba Machine Co., Ltd. (Japan)[7585-15]

8:50 am: **Scaling ablation rates for picosecond lasers using burst micromachining**, Ralf Knappe, Hatim Haloui, Albert Seifert, Alexander J. Weis, Achim Nebel, LUMERA LASER GmbH (Germany)[7585-16]

9:10 am: **Enhancement of ablation efficiency by a femto/nano-second dual-beam micromachining system** (*Invited Paper*), Cheng-Hsiang Lin, Zhenghua Rao, Missouri Univ. of Science and Technology (USA); Lan Jiang, Beijing Institute of Technology (China); Wu-Jung Tsai, Ping-Han Wu, Chih-Wei Chien, Industrial Technology Research Institute (Taiwan); Hai-Lung Tsai, Missouri Univ. of Science and Technology (USA)[7585-17]

9:40 am: **Precise ablation milling with ultra short pulsed Nd:YAG lasers by optical and acoustical process control**, Patricia Weber, Volker Schulze, Karlsruhe Institute of Technology (Germany)[7585-18]

10:00 am: **Highest-speed dicing of thin silicon wafers with nanosecond-pulse 355nm q-switched laser source using line-focus fluence optimization technique**, James M. Bovatsek, Rajesh S. Patel, Newport Spectra-Physics (USA)[7585-19]

Coffee Break 10:20 to 10:50 am

SESSION 5

Room: 121 (Exhibit Level), Thurs. 10:50 am to 12:20 pm

Direct-Write Processing and Surface Modification

Session Chair: Yongfeng Lu, Univ. of Nebraska-Lincoln

10:50 am: **Femtosecond nanomachining: theory and applications in biomedical research and analysis** (*Invited Paper*), Alan J. Hunt, Jeffrey F. Herbstman, Univ. of Michigan (USA)[7585-20]

11:20 am: **Fabrication of dielectric and metallo-dielectric 3D nanostructures by direct laser writing and electroless plating**, André Radke, Frank Wolff, Thomas Klotzbücher, Institut für Mikrotechnik Mainz GmbH (Germany); Harald W. Giessen, Univ. Stuttgart (Germany)[7585-21]

11:40 am: **Micropatterning and crystallization of sol-gel-derived dielectric film by laser direct writing**, Akira Watanabe, Tomokazu Tanase, Kenji Miyajima, Yoshio Kobayashi, Mikio Konno, Tohoku Univ. (Japan)[7585-22]

12:00 pm: **Laser annealing of thin film cathode material for lithium ion batteries**, Robert Kohler, Michael Bruns, Peter Smyrek, Sven Ulrich, Karlsruhe Institute of Technology (Germany); Marius Przybylski, ATL Lasertechnik GmbH (Germany); Wilhelm Pfleging, Karlsruhe Institute of Technology (Germany)[7585-23]

Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 6

Room: 121 (Exhibit Level), Thurs. 1:50 to 5:00 pm

Photovoltaics

Joint Session with Conference 7584

Session Chair: Wilhelm Pfleging, Karlsruhe Institute of Technology (Germany)

1:50 pm: **Structuring of thin film solar cells** (*Invited Paper*), Gabriele Eberhardt, Uwe Wagner, JENOPTIK Automatisierungstechnik GmbH (Germany); Thomas Peschel, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)[7585-24]

2:20 pm: **'Green processing' of thin film with top-hat lasers and applications in photovoltaic**, Keming Du, EdgeWave GmbH (Germany)[7585-25]

2:40 pm: **Productivity and flexibility, the key factors for laser processing in photovoltaic manufacturing**, Michael Moody, InnoLas, Inc. (USA) . . .[7585-26]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Microstructuring and wafering of silicon with laser chemical processing** (*Invited Paper*), Sybille Hopman, Andreas Fell, Kuno Mayer, Filip Granek, Fraunhofer-Institut für Solare Energiesysteme (Germany)[7585-27]

4:00 pm: **Advanced laser techniques from semiconductor manufacturing transition to solar PV production**, Marco Mendes, Rick Slagle, Jie Fu, Xiangyang Song, Christian Porneala, Mathew Hannon, Jeffrey P. Sercel, JPSCA (USA)[7585-28]

4:20 pm: **Investigation on production of highly textured Sb doped polycrystalline silicon using solid state Nd:YAG laser for photovoltaic application**, Palani A. Iyampuram, Indian Institute of Technology Madras (India); Nilesh J. Vasa, Indian Institute of Technology Madras (India) and Kyushu Univ. (Japan); Singaperumal Makaram, Indian Institute of Technology Madras (India); Okada Tatsuo, Kyushu Univ. (Japan)[7584-35]

4:40 pm: **Monolithic interconnection of CIGS solar cells by picosecond laser structuring**, Heinz P. Huber, Christian Hellwig, Gerhard Heise, Thomas Kuznicki, Sebastian Sarrach, Christian Menhard, Hochschule München (Germany); Andreas Heiss, Helmut Vogt, Joerg Palm, AVANCIS GmbH & Co KG (Germany)[7585-32]

Synthesis and Photonics of Nanoscale Materials VII

Conference Chairs: **Jan J. Dubowski**, Univ. de Sherbrooke (Canada); **David B. Geohegan**, Oak Ridge National Lab.; **Frank Träger**, Univ. Kassel (Germany)

Program Committee: **Carmen N. Afonso**, Consejo Superior de Investigaciones Científicas (Spain); **J. Thomas Dickinson**, Washington State Univ.; **Costas P. Grigoropoulos**, Univ. of California, Berkeley; **Richard F. Haglund, Jr.**, Vanderbilt Univ.; **Tony F. Heinz**, Columbia Univ.; **Ilko K. Ilev**, U.S. Food and Drug Administration; **Hiroshi Kumagai**, Osaka City Univ. (Japan); **Thomas K. M. Lippert**, Paul Scherrer Institut (Switzerland); **Vladimir M. Shalaev**, Purdue Univ.; **Xianfan Xu**, Purdue Univ.

Tuesday 26 January

POSTERS—TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Generation of extended-area femtosecond laser induced periodic nanostructures on TiO₂ by moving samples through a line focus, Kiran Dasari, Susanta K. Das, Arkadi Rosenfeld, Ruediger Grunwald, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) . . . [7586-20]

Nuclear spin polarization of 3He atoms with a frequency doubled Ti:sapphire laser toward nuclear magnetic resonance of porous media, Yutaka Tabata, Hiroki Yamada, Shingo Maeda, Hiroshi Morioka, Hiroshi Kumagai, Ataru Kobayashi, Osaka City Univ. (Japan) [7586-21]

Visualization of nanostructure of α -Se prepared by pulsed laser photodeposition, Nina Mirchin, Simona A. Popescu, Igor Lapsker, Aaron Peled, Holon Institute of Technology (Israel) [7586-22]

Structural properties of Si and Ge nanocrystals embedded in silica, Flyura Djurabekova, Marie Backman, Univ. of Helsinki (Finland); Kai Nordlund, Univ. of Helsinki (Finland) and Helsinki Institute of Physics (Finland) [7586-23]

Laser interactions with vertically aligned carbon nanotube arrays, Christopher Rouleau, David B. Geohegan, Alex A. Puzosky, Jeremy J. Jackson, Oak Ridge National Lab. (USA); Gerd Duscher, The Univ. of Tennessee (USA); Karren L. More, Oak Ridge National Lab. (USA) [7586-24]

Wednesday 27 January

LASE Plenary Session

Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

- 10:20 am: **LASE Best Student Paper Prize**
SPIE will present awards to the best 3 student papers on the science and application of lasers.
Cash prizes of \$1500, \$1000, and \$500 will be awarded.
- 10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]
- 11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany). [7579-102]
- 11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]

Thursday 28 January

SESSION 1

Room: 110 (Exhibit Level) Thurs. 8:00 to 10:30 am

Plasmonic Nanostructures and Photonics

Session Chairs: **Jan J. Dubowski**, Univ. de Sherbrooke (Canada); **Xianfan Xu**, Purdue Univ.

8:00 am: **Surface plasmon enhanced photoelectron emission from metals with nanostructured surfaces** (*Invited Paper*), Chunlei Guo, Univ. of Rochester (USA) [7586-01]

8:30 am: **Tip-enhanced Raman spectroscopy and related techniques in studies of biological materials** (*Invited Paper*), Thomas Schmid, ETH Zürich (Switzerland) [7586-02]

9:00 am: **Discovery of very narrow and intense resonances in SERS spectra of single wall carbon nanotubes**, Alex A. Puzosky, David B. Geohegan, Christopher Rouleau, Oak Ridge National Lab. (USA) [7586-03]

9:20 am: **Plasmonic solar cells: status and prospects** (*Invited Paper*), Sudha Mokkaapati, Fiona Beck, The Australian National Univ. (Australia); Albert Polman, FOM Institute for Atomic and Molecular Physics (Netherlands); Kylie Catchpole, The Australian National Univ. (Australia) [7586-04]

9:50 am: **Spectral modulation of single hybrid plasmonic nanostructures**, Kannatassen Appavoo, Vanderbilt Univ. (USA); Danyuan Lei, Imperial College London (United Kingdom); Davon W. Ferrara, Joyeeta Nag, Vanderbilt Univ. (USA); Yannick Sonnefraud, Stefan A. Maier, Imperial College London (United Kingdom); Richard F. Haglund, Jr., Vanderbilt Univ. (USA) [7586-05]

10:10 am: **Surface plasmon effects induced by uncollimated emission of semiconductor microstructures**, Dominic Lepage, Jan J. Dubowski, Univ. of Sherbrooke (Canada) [7586-06]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: 110 (Exhibit Level) Thurs. 11:00 am to 12:10 pm

Nanocrystals and Nanoparticles I

Session Chairs: **Frank Träger**, Univ. Kassel (Germany); **Richard F. Haglund, Jr.**, Vanderbilt Univ.

11:00 am: **Melting mechanisms of embedded nanocrystals** (*Invited Paper*), Kai Nordlund, Univ. of Helsinki (Finland) and Helsinki Institute of Physics (Finland); Jukka Pakarinen, Flyura Djurabekova, Marie Backman, Univ. of Helsinki (Finland) [7586-07]

11:30 am: **Limits on the optical response of nano-objects: from isolated to interacting and self-organized particles**, Antonio Castelo, Consejo Superior de Investigaciones Científicas (Spain); Carmen N. Afonso, Consejo Superior de Investigaciones Científicas (Spain); Uma Gupta, Univ. Antwerpen (Belgium); Gustaf Van Tendeloo, Univ. of Antwerp (Belgium) [7586-08]

11:50 am: **Excimer laser interactions with single crystal ZnO: unconventional nanoparticle production**, J. Thomas Dickinson, Enamul H. Khan, Steve C. Langford, Washington State Univ. (USA) [7586-09]

Lunch/Exhibition Break 12:10 to 1:30 pm

LASE

SESSION 3

Room: 110 (Exhibit Level), Thurs. 1:30 to 3:30 pm

Nanocrystals and Nanoparticles II

Session Chairs: **J. Thomas Dickinson**, Washington State Univ.;
Thomas K. M. Lippert, Paul Scherrer Institut (Switzerland)

1:30 pm: **Synthesis and characterization of ZnO nanocrystals by nanoparticle-assisted pulsed laser deposition**, Daisuke Nakamura, Takafumi Matsumoto, Akio Kumeda, Kazuyuki Toya, Kota Okazaki, Mitsuhiro Higashihata, Kyushu Univ. (Japan); Bingqiang Cao, Univ. of Jinan (China); Tatsuo Okada, Kyushu Univ. (Japan). [7586-10]

1:50 pm: **Particle ejection in pulsed laser ablation: dependence on material and laser parameters**, Thomas K. M. Lippert, Sebastian Heiroth, Paul Scherrer Institut (Switzerland); Joachim Koch, Detlef Günther, ETH Zurich (Switzerland); Alexander Wokaun, Paul Scherrer Institut (Switzerland). [7586-11]

2:10 pm: **Nanophotonic fabrication in sub-nm scale** (*Invited Paper*), Takashi Yatsui, Motoichi Ohtsu, The Univ. of Tokyo (Japan). [7586-12]

2:40 pm: **Altering the synthesis of carbon nanohorns for new hybrid nanostructures**, David B. Geohegan, Alex A. Puzos, Christopher Rouleau, Mina Yoon, Norbert Thonard, Oak Ridge National Lab. (USA); Gerd Duscher, The Univ. of Tennessee (USA); Karren L. More, Oak Ridge National Lab. (USA). [7586-13]

3:00 pm: **Three-dimensional gold-helix photonic metamaterials made via two-photon direct laser writing** (*Invited Paper*), Justyna K. Gansel, Michael Thiel, Michael Rill, Manuel Decker, Univ. Karlsruhe (Germany); Klaus Bade, Volker Saile, Forschungszentrum Karlsruhe GmbH (Germany); Georg von Freymann, Stefan Linden, Martin Wegener, Univ. Karlsruhe (Germany). [7586-14]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 110 (Exhibit Level), Thurs. 4:00 to 5:40 pm

Nanostructured Surfaces and Thin Films

Session Chairs: **David B. Geohegan**, Oak Ridge National Lab.; **Carmen N. Afonso**, Consejo Superior de Investigaciones Cientificas (Spain)

4:00 pm: **Nanostructured polymers by a compact laser plasma EUV source** (*Invited Paper*), Henryk Fiedorowicz, Andrzej S. Bartnik, Military Univ. of Technology (Poland) [7586-16]

4:30 pm: **Long-time feedback in self-organized nanostructures formation upon multipulse femtosecond laser ablation** (*Invited Paper*), Juergen Reif, Olga Varlamova, Brandenburgische Technische Univ. Cottbus (Germany) and Cottbus Joint Lab. (Germany); Mourad Bounhalli, Brandenburgische Technische Univ. Cottbus (Germany) and Univ. Jean Monnet Saint-Etienne (France); Tzanimir Arguirov, Cottbus Joint Lab. (Germany) and IHP GmbH (Germany); Martin Schade, Hartmut Leipner, Martin-Luther-Univ. Halle-Wittenberg (Germany) [7586-17]

5:00 pm: **Local near field assisted parallel nanostructuring of fused silica**, Frank Hubenthal, Rodica Morarescu, Lars Englert, Lars Haag, Thomas Baumert, Frank Träger, Univ. Kassel (Germany). [7586-18]

5:20 pm: **Fabrication of Al₂O₃/TiO₂ multilayer mirrors for ‘water-window’ attosecond pulses**, Yuji Tanaka, Masaki Murata, Hiroshi Kumagai, Ataru Kobayashi, Osaka City Univ. (Japan); Tsutomu Shinagawa, Osaka Municipal Technical Research Institute (Japan) [7586-19]

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Free-Space Laser Communication Technologies XXII

Conference Chair: **Hamid Hemmati**, Jet Propulsion Lab.

Program Committee: **Don M. Boroson**, MIT Lincoln Lab.; **Ronald W. Burch**, The Boeing Co.; **Vincent W. Chan**, Massachusetts Institute of Technology; **Wayne R. Fenner**, The Aerospace Corp.; **G. Charmaine Gilbreath**, Naval Research Lab.; **Michael A. Krainak**, NASA Goddard Space Flight Ctr.; **Robert Lange**, Tesat-Spacecom GmbH & Co. KG (Germany); **Zoran Sodnik**, European Space Research and Technology Ctr. (Netherlands); **Morio Toyoshima**, National Institute of Information and Communications Technology (Japan); **Alan Eli Willner**, Univ. of Southern California; **Shiro Yamakawa**, Japan Aerospace Exploration Agency (Japan)

Tuesday 26 January

Technical Event

Room: Hilton Hotel, Golden Gate 2. Tues. 7:30 to 9:00 pm

Laser Communications

Session Chairs: **Hamid Hemmati**, Jet Propulsion Lab. (USA);
Olga Korotkova, Univ. of Miami (USA)

This technical event on Laser Communications will hold its annual meeting in conjunction with the Free-Space Laser Communication Technologies XXII and Atmospheric and Oceanic Propagation of Electromagnetic Waves IV conferences. All professionals involved in theory and applications of free-space, atmospheric and oceanic laser communications, remote sensing and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.

Wednesday 27 January

LASE Plenary Session

Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

10:20 am: LASE Best Student Paper Prize

SPIE will present awards to the best 3 student papers on the science and application of lasers. Cash prizes of \$1500, \$1000, and \$500 will be awarded.

10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]

11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany). [7579-102]

11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 1

Room: 112 (Exhibit Level) Wed. 1:30 to 3:35 pm

Invited Session

Session Chair: **Hamid Hemmati**, Jet Propulsion Lab.

1:30 pm: **Free space optical communication research at Naval Research Laboratory** (Invited Paper), William S. Rabinovich, Christopher I. Moore, Rita Mahon, Harris Rayvon Burris, James L. Murphy, Mike S. Ferraro, Peter G. Goetz, Michele R. Suite, Linda M. Thomas, Ben B. Xu, Reed Smith, G. Charmaine Gilbreath, Carlos Font, U.S. Naval Research Lab. (USA); Wade T. Freeman, SmartLogic, Inc. (USA) [7587-01]

1:55 pm: **Preliminary results of the OCTL to OICETS optical link experiment (OTOOLE)** (Invited Paper), Keith E. Wilson, Joseph M. Kovalik, Abhijit Biswas, Malcolm W. Wright, W. Thomas Roberts, Jet Propulsion Lab. (USA); Yoshihisa Takayama, National Institute of Information and Communications Technology (Japan); Shiro Yamakawa, Japan Aerospace Exploration Agency (Japan). [7587-02]

2:20 pm: **Lasercomm for interplanetary missions: Recent European activities, future possibilities, and synergy aspects** (Invited Paper), Thomas Dreischer, Klaus Kudielka, Thomas Weigel, Yann Tissot, Felix Arnold, RUAG Space AG (Switzerland). [7587-03]

2:45 pm: **Optical satellite communications in Europe** (Invited Paper), Zoran Sodnik, European Space Research and Technology Ctr. (Netherlands) [7587-04]

3:10 pm: **Free space quantum communications** (Invited Paper), Ronald E. Meyers, Army Research Lab. (USA) [7587-05]

Coffee Break 3:35 to 4:00 pm

SESSION 2

Room: 112 (Exhibit Level) Wed. 4:00 to 6:00 pm

Demonstrations

Session Chair: **Abhijit Biswas**, Jet Propulsion Lab.

4:00 pm: **Free-space gigabit laser link experiment incorporating Japan and Canada technology development**, Alexander Sergeevich Koujelev, Daniel Gratton, Louis Hotte, Canadian Space Agency (Canada); Yoshinori Arimoto, National Institute of Information and Communications Technology (Japan). [7587-06]

4:15 pm: **Near field laser transmission with Bidirectional beacon tracking for Tbps class wireless communications**, Yoshinori Arimoto, National Institute of Information and Communications Technology (Japan) [7587-07]

4:30 pm: **Laser communications for unmanned aircraft systems using differential GPS and IMU data**, Ziming Wang, Mariusz Czarnomski, Richie Spitsberg, Richard R. Schultz, William H. Semke, Univ. of North Dakota (USA) [7587-08]

4:45 pm: **Precision optical ranging by paired one-way time of flight**, Kevin M. Birnbaum, Yijiang Chen, Hamid Hemmati, Jet Propulsion Lab. (USA) [7587-09]

5:00 pm: **Ground to aircraft link emulation of a planetary access link**, Abhijit Biswas, Joseph M. Kovalik, Martin W. Regehr, Malcolm W. Wright, Jet Propulsion Lab. (USA) [7587-10]

5:15 pm: **Data products for the OCTL to OICETS optical link experiment**, Joseph M. Kovalik, Keith E. Wilson, Abhijit Biswas, Malcolm W. Wright, William T. Roberts, Jet Propulsion Lab. (USA) [7587-11]

5:30 pm: **Expanded laser communications demonstrations with OICETS and ground stations**, Yoshihisa Takayama, Morio Toyoshima, Yojo Shoji, Yoshisada Koyama, Hiroo Kunimori, National Institute of Information and Communications Technology (Japan); Minoru Sakaue, Shiro Yamakawa, Japan Aerospace Exploration Agency (Japan); Yoshiyuki Tashima, Nobuhiro Kura, SED Co. Ltd. (Japan). [7587-12]

5:45 pm: **Inter-satellite and satellite-ground communication laser links based on homodyne BPSK**, Robert Lange, Frank F. Heine, Mark Gregory, Hartmut Kämpfner, Tesat-Spacecom GmbH & Co. KG (Germany); Rolf Meyer, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [7587-13]

LASE

Thursday 28 January

SESSION 3

Room: 112 (Exhibit Level)Thurs. 8:20 to 11:50 am

Technologies: Flight and Ground I

Session Chair: Joseph M. Kovalik, Jet Propulsion Lab.

8:20 am: **Experimental demonstration of a retro-reflective laser communication link on a mobile platform**, Vladimir V. Nikulin, Binghamton Univ. (USA); John Edward Malowicki, Air Force Research Lab. (USA); Rahul M. Khandekar, Victor Skormin, Binghamton Univ. (USA); David J. Legare, Air Force Research Lab. (USA)[7587-14]

8:40 am: **High energy laser testbed for accurate beam pointing control**, Dojong Kim, Agency for Defense Development (Korea, Republic of); Jae Jun Kim, Duane Frist, Brij Agrawal, Naval Postgraduate School (USA)[7587-15]

9:00 am: **Low complexity transceivers and autonomous concept of operations for optical planetary access links**, Abhijit Biswas, Joseph M. Kovalik, Martin W. Regehr, Malcolm W. Wright, Jet Propulsion Lab. (USA)[7587-16]

9:20 am: **Modeling and measurement of effects of atmospheric turbulence and platform jitter on free-space laser communication**, Zhao Liu, Vladimir V. Nikulin, Rahul M. Khandekar, Binghamton Univ. (USA)[7587-17]

9:40 am: **Statistical characteristics of free space optical systems with spatial diversity**, Jose Paulo G. de Oliveira, Univ. Karlsruhe (Germany)[7587-18]

Coffee Break10:00 to 10:30 am

10:30 am: **Low voltage actuator using carbon nanotube to tilt mirror angle**, Yoshihisa Takayama, Morio Toyoshima, National Institute of Information and Communications Technology (Japan)[7587-19]

10:50 am: **System level designing of FSO link through VCSEL and NRZ modulation technique by using different filters**, Muhammad Irfan, Sir Syed Univ. of Engineering & Technology (Pakistan)[7587-20]

11:10 am: **Transmitter and translating receiver design for 64-ary pulse position modulation (PPM)**, Antonio J. Mendez, Mendez R&D Associates (USA); Vincent J. Hernandez, Lawrence Livermore National Lab. (USA); Robert M. Gagliardi, The Univ. of Southern California (USA); Corey V. Bennett, Lawrence Livermore National Lab. (USA)[7587-21]

11:30 am: **A review of the information capacity of single-mode free-space optical communication**, Baris I. Erkmn, Bruce Moision, Kevin M. Birnbaum, Jet Propulsion Lab. (USA)[7587-22]

Lunch/Exhibition Break11:50 am to 1:20 pm

SESSION 4

Room: 112 (Exhibit Level)Thurs. 1:20 to 4:10 pm

Technologies: Flight and Ground II

Session Chair: Keith E. Wilson, Jet Propulsion Lab.

1:20 pm: **Estimation-based optimum receiver for free space optics using pilot-aided modulation**, Hassan Moradi, Hazem Refai, Univ. of Oklahoma (USA); Peter G. LoPresti, The Univ. of Tulsa (USA); Mohammed Atiquzzaman, Univ. of Oklahoma (USA)[7587-23]

1:40 pm: **JAXA's efforts toward next generation space data-relay satellite using optical inter-orbit communication technology**, Shiro Yamakawa, Japan Aerospace Exploration Agency (Japan)[7587-24]

2:00 pm: **Separating and tracking multiple beacon sources for deep space optical communications**, Kevin M. Birnbaum, Adit Sahasrabudhe, William H. Farr, Jet Propulsion Lab. (USA)[7587-25]

2:20 pm: **High-efficiency, high-power, fiber master oscillator power amplifier for deep-space communication operating at 1532 nm**, Donald L. Sipes, Jr., Optical Engines, Inc. (USA); Alan Sugg, Tony Moretti, Vega Wave Systems (USA)[7587-26]

2:40 pm: **Free space optical communication utilizing mid-infrared interband cascade laser**, Alexander Soibel, Malcolm W. Wright, William H. Farr, Sam Keo, C. Hill, Jet Propulsion Lab. (USA); R. Q. Yang, Univ. of Oklahoma (USA); H. C. Liu, National Research Council Canada (Canada)[7587-27]

Coffee Break3:00 to 3:30 pm

3:30 pm: **Challenges of developing resonant cavity photon-counting detectors at 1064nm**, Stefan A. Vasile, aPeak, Inc. (USA); Selim M. Unlu, Boston Univ. (USA); Jerold Lipson, aPeak, Inc. (USA)[7587-28]

3:50 pm: **Study of the fiber-coupling efficiency for ground-to-satellite laser communications**, Hideki Takenaka, The Univ. of Electro-Communications (Japan); Morio Toyoshima, National Institute of Information and Communications Technology (Japan)[7587-29]

SESSION 5

Room: 112 (Exhibit Level)Thurs. 4:10 to 5:30 pm

Concepts and Analysis

Session Chair: Robert Lange, Tesat-Spacecom GmbH & Co. KG (Germany)

4:10 pm: **Stray light modeling and performance of the deep space optical communications terminal**, W. Thomas Roberts, Gerardo G. Ortiz, Jeffrey R. Charles, Jet Propulsion Lab. (USA)[7587-30]

4:30 pm: **Intensity distribution based space and time division multiple access technique for hybrid-LOS indoor optical wireless communication**, Shinichi Miyamoto, Kenji Kawamoto, Seiichi Sempel, Osaka Univ. (Japan)[7587-31]

4:50 pm: **Toward an optimal combined FSO/RF system via an adaptive bit rate procedure**, Hassan Moradi, Maryam Falahpour, Hazem Refai, Univ. of Oklahoma (USA); Peter G. LoPresti, The Univ. of Tulsa (USA); Mohammed Atiquzzaman, Univ. of Oklahoma (USA)[7587-32]

5:10 pm: **OTOOLE system design**, W. Thomas Roberts, Malcolm W. Wright, Joseph M. Kovalik, Keith E. Wilson, Jet Propulsion Lab. (USA)[7587-34]



Atmospheric and Oceanic Propagation of Electromagnetic Waves IV

Conference Chair: **Olga Korotkova**, Univ. of Miami

Program Committee: **Larry C. Andrews**, Univ. of Central Florida; **Yahya K. Baykal**, Çankaya Univ. (Turkey); **Yangjian Cai**, Soochow Univ. (China); **Frank D. Eaton**, Air Force Research Lab.; **Greg Gbur**, The Univ. of North Carolina at Charlotte; **G. Charmaine Gilbreath**, Naval Research Lab.; **Merrick C. Haller**, Oregon State Univ.; **Alex S. Mahalov**, Arizona State Univ.; **Ronald L. Phillips**, Florida Space Institute; **Jixiong Pu**, Huaqiao Univ. (China); **Robert K. Tyson**, The Univ. of North Carolina at Charlotte; **Daomu Zhao**, Zhejiang Univ. (China)

Monday 25 January

SESSION 1

Room: 123 (Exhibit Level) Mon. 8:00 to 10:00 am

Mitigation of Atmospheric Effects and Adaptive Optics

Session Chair: **Olga Korotkova**, Univ. of Miami

- 8:00 am: **Understanding the performance of atmospheric free-space laser communications systems using coherent detection** (*Invited Paper*), Aniceto M. Belmonte, Univ. Politècnica de Catalunya (Spain); Joseph M. Kahn, Stanford Univ. (USA) [7588-01]
- 8:30 am: **Multi-beam transmitter geometries for free-space optical communications**, Jason A. Tellez, Jason D. Schmidt, Air Force Institute of Technology (USA) [7588-02]
- 8:45 am: **The effects of phase-diffuser on scintillations of laser radiation for long-distance propagation in the atmosphere**, Gennady P. Berman, Los Alamos National Lab. (USA); Aleksandr A. Chumak, Vyacheslav N. Gorshkov, Institute of Physics (Ukraine); Alan R. Bishop, Boris M. Chernobrod, Los Alamos National Lab. (USA); Svetlana V. Torous, National Technical Univ. (Ukraine) [7588-03]
- 9:00 am: **Adaptive control of laser beam with sensing of the reference source channel** (*Invited Paper*), Vladimir P. Lukin, Institute of Atmospheric Optics (Russian Federation) [7588-04]
- 9:30 am: **Improved iteratively weighted centroiding for accurate spot detection in laser guide star based Shack Hartmann sensor**, Vyas Akondi, Indian Institute of Astrophysics (India) and Indian Institute of Science (India); M. B. Roopashree, Raghavendra Prasad Budihala, Indian Institute of Astrophysics (India) [7588-05]
- 9:45 am: **Novel approach for beacon formation through simulated turbulence: initial lab-test results**, Anatoliy Khizhnyak, Vladimir B. Markov, MetroLaser, Inc. (USA) [7588-06]
- Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 123 (Exhibit Level) Mon. 10:30 to 11:45 am

Modeling of Atmospheric Channels and Experiments

Session Chair: **Olga Korotkova**, Univ. of Miami

- 10:30 am: **Generalized atmospheric turbulence: implications regarding imaging and communications** (*Invited Paper*), Norman S. Kopeika, Arkadi Zilberman, Ephim Golbraikh, Ben-Gurion Univ. of the Negev (Israel) . . . [7588-07]
- 11:00 am: **Atmospheric channel characterization for ORCA testing at NTRT**, Larry C. Andrews, Ronald L. Phillips, Robert F. Crabbs, David T. Wayne, Troy Leclerc, Paul Sauer, Univ. of Central Florida (USA) [7588-08]
- 11:15 am: **Real-time wind speed measurement using wavefront sensor data**, M. B. Roopashree, Vyas Akondi, B. Raghavendra Prasad, Indian Institute of Astrophysics (India) [7588-09]
- 11:30 am: **Simplified model for reduction of laser intensity scintillations in turbulent atmospheres using a partially coherent beam**, Gennady P. Berman, Alan R. Bishop, Boris M. Chernobrod, Los Alamos National Lab. (USA); Vyacheslav N. Gorshkov, Institute of Physics (Ukraine); David C. Lizon, Daniela I. Moody, Dinh C. Nguyen, Los Alamos National Lab. (USA); Svetlana V. Torous, National Technical Univ. (Ukraine) [7588-10]
- Lunch Break 11:45 am to 1:30 pm

SESSION 3

Room: 123 (Exhibit Level) Mon. 1:30 to 3:00 pm

Scattering and Absorption in Atmosphere and Ocean and Imaging Techniques

Session Chair: **Olga Korotkova**, Univ. of Miami

- 1:30 pm: **A review of selected oceanic EM scattering problems** (*Invited Paper*), Merrick C. Haller, Oregon State Univ. (USA) [7588-11]
- 2:00 pm: **Inverse near-critical-angle scattering as a tool to characterize bubble clouds**, Fabrice R. A. Onofri, Mariusz Krzysiek, Mariusz Wozniak, IUSTI (France); Janusz Mroczka, Wroclaw Univ. of Technology (Poland); Yijia Yuan, Fang Ren, Univ. de Rouen (France) [7588-12]
- 2:15 pm: **Novel device for aerosol light scattering measurements including its angular and polarization characteristics and aerosol spectral absorption measurement instrumentation**, Gergely Dolgos, J. Vanderlei Martins, Univ. of Maryland, Baltimore County (USA); Lorraine A. Remer, Alexandre L. Correia, NASA Goddard Space Flight Ctr. (USA); Manfredo Tabacniks, Adriana R. Lima, Univ. of Maryland, Baltimore County (USA) [7588-13]
- 2:30 pm: **Ghost imaging with partially coherent light in turbulent atmosphere**, Yangjian Cai, Soochow Univ. (China); Olga Korotkova, Univ. of Miami (USA); Fei Wang, Soochow Univ. (China) [7588-14]
- 2:45 pm: **Radiation transfer in semitransparent medium containing bubbles**, Laurent Pilon, Univ. of California, Los Angeles (USA) [7588-16]
- Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 123 (Exhibit Level) Mon. 3:30 to 5:45 pm

Studies of EM Beam Propagation in the Atmosphere

Session Chair: **Olga Korotkova**, Univ. of Miami

- 3:30 pm: **Intensity fluctuations of incoherently superposed Gaussian beams in atmospheric turbulence**, Yahya K. Baykal, Çankaya Univ. (Turkey) [7588-17]
- 3:45 pm: **Propagation of elegant higher-order Gaussian beams in turbulent atmosphere**, Fei Wang, Yangjian Cai, Soochow Univ. (China); Halil T. Eyyuboglu, Yahya K. Baykal, Çankaya Univ. (Turkey) [7588-18]
- 4:00 pm: **Profile ground impact on scintillation: 50km and 200-km slant paths from airplane to Antelope peak**, Italo Toselli, Florida Space Institute (USA); Larry C. Andrews, Univ. of Central Florida (USA); Ronald L. Phillips, David T. Wayne, Florida Space Institute (USA) [7588-19]
- 4:15 pm: **Fluctuations and deviation of image mass center in conditions of atmospheric turbulence and thermal blooming**, Grigory A. Filimonov, Vadim V. Dudorov, Valeriy V. Kolosov, Institute of Atmospheric Optics (Russian Federation) [7588-20]
- 4:30 pm: **Propagation limits for optical beams generated by diffraction**, Adrián Carbajal-Domínguez, Univ. Juárez Autónoma de Tabasco (Mexico) [7588-21]
- 4:45 pm: **Comparison of fractional power of various classes of beams in turbulent atmosphere**, Serkan Sahin, Olga Korotkova, Univ. of Miami (USA); Reza Malek-Madani, U.S. Naval Academy (USA); Yangjian Cai, Soochow Univ. (China) [7588-22]
- 5:00 pm: **Beam wander characteristics of flat-topped, dark hollow, cos and cosh-Gaussian, J₀- and I₀- Bessel Gaussian beams propagating in turbulent atmosphere: a review**, Celal Z. Çil, Halil T. Eyyuboglu, Yahya K. Baykal, Çankaya Univ. (Turkey); Olga Korotkova, Univ. of Miami (USA); Yangjian Cai, Soochow Univ. (China) [7588-23]
- 5:15 pm: **Propagation factor of a radial laser array beam in turbulent atmosphere**, Chengliang Zhao, Yangjian Cai, Soochow Univ. (China) . [7588-24]
- 5:30 pm: **Wave optics simulation of Gaussian Schell-model vortex beam propagation in turbulence: intensity profile and scintillation analysis**, Xifeng Xiao, David G. Voelz, New Mexico State Univ. (USA) [7588-25]

LASE

Tuesday 26 January

POSTERS-TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Laser magnetometer for planetary field measurements, George Dekoulis, Lancaster Univ. (United Kingdom). [7588-26]

Propagation of spirally polarized beams in a turbulent atmosphere, Jixiong Pu, Tao Wang, Huaqiao Univ. (China). [7588-27]

Polarization changes in stochastic electromagnetic beams propagating in the oceanic turbulence, Nathan H. Farwell, Olga Korotkova, Univ. of Miami (USA) [7588-29]

Technical Event

Room: Hilton Hotel, Golden Gate 2. Tues. 7:30 to 9:00 pm

Laser Communications

Session Chairs: **Hamid Hemmati**, Jet Propulsion Lab. (USA);
Olga Korotkova, Univ. of Miami (USA)

This technical event on Laser Communications will hold its annual meeting in conjunction with the Free-Space Laser Communication Technologies XXII and Atmospheric and Oceanic Propagation of Electromagnetic Waves IV conferences. All professionals involved in theory and applications of free-space, atmospheric and oceanic laser communications, remote sensing and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.

Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications X

(Formerly: Commercial and Biomedical Applications of Ultrafast Lasers)

Conference Chairs: Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany); Joseph Neev, Femto-Sec Tech, Inc.; Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany); Rick P. Trebino, Georgia Institute of Technology

Program Committee: Craig B. Arnold, Princeton Univ.; Adela Ben-Yakar, The Univ. of Texas at Austin; James E. Carey III, SiOnyx Inc.; Denise M. Krol, Univ. of California, Davis; Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany); Eric D. Mazur, Harvard Univ.; Eric Mottay, Amplitude Systemes (France); Christopher B. Schaffer, Cornell Univ.; Alexander Szameit, Friedrich-Schiller-Univ. Jena (Germany); Alfred Vogel, Institute of Biomedical Optics, Univ. zu Lübeck (Germany); Wataru Watanabe, National Institute of Advanced Industrial Science



Coffee Break 10:30 to 11:00 am

SESSION 2

Room: 300 (Esplanade Level) Sun. 11:00 am to 12:10 pm

Multiphoton Imaging

Session Chair: Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany)

11:00 am: **Brain plasticity and functionality explored by non-linear optical microscopy** (*Invited Paper*), Leonardo Sacconi, Univ. degli Studi di Firenze (Italy) [7589-04]

11:30 am: **A novel flexible clinical multiphoton tomograph for early melanoma detection, skin analysis, testing of anti-age products, and in situ nanoparticle tracking**, Karsten König, Martin Weinigel, Rainer Bückle, Hans G. Breunig, A. Georgy, JenLab GmbH (Germany) [7589-05]

11:50 am: **Temporal focusing for FLIM using a high peak power laser**, Carine Julien, Aurelie Jacquart, Elena Ishow, École Normale Supérieure de Cachan (France); Antoine Courjaud, Amplitude Systèmes (France); Dan Oron, Weizmann Institute of Science (Israel); Eric P. Mottay, Amplitude Systèmes (France); Robert B. Pansu, CNRS (France) [7589-06]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 3

Room: 300 (Esplanade Level) Sun. 1:40 to 3:00 pm

fs Lasers for Cell Manipulation

Session Chair: Adela Ben-Yakar, The Univ. of Texas at Austin

1:40 pm: **Femtosecond laser based enucleation of porcine oocytes for somatic cell nuclear transfer**, Kai Kuetemeyer, Laser Zentrum Hannover e.V. (Germany); Andrea Lucas-Hahn, Bjoern Petersen, Erika Lemme, Petra Hassel, Laser Zentrum Hannover e.V. (Germany); Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany) [7589-07]

2:00 pm: **Ultrafast laser interaction with plasmonic nanostructures in water**, Etienne Boulais, Remi Lachaine, Guillaume Poulin, Michel Meunier, Ecole Polytechnique de Montréal (Canada) [7589-08]

2:20 pm: **fs-laser cell perforation using gold nanoparticles of different shapes**, Markus Schomaker, Holger Fehlauer, Laser Zentrum Hannover e.V. (Germany); Willem Bintig, Anaclet Ngezahayo, Leibniz Univ. Hannover (Germany); Ingo Nolte, Hugo Murua Escobar, Small Animal Clinic Hannover (Germany); Holger Lubatschowski, Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany) [7589-09]

2:40 pm: **Dual-beam optical trapping of cells in an optofluidic device fabricated by femtosecond lasers**, Nicola Bellini, Politecnico di Milano (Italy); Francesca Bragheri, Univ. degli Studi di Pavia (Italy); Krishna C. Vishnubhatla, Politecnico di Milano (Italy); Lorenzo Ferrara, Paolo Minzioni, Univ. di Pavia (Italy); Giulio Cerullo, Roberta Ramponi, Politecnico di Milano (Italy); Ilaria Cristiani, Univ. di Pavia (Italy); Roberto Osellame, CNR (Italy) and Politecnico di Milano (Italy) [7589-10]

Coffee Break 3:00 to 3:30 pm

and Technology (Japan)

Sunday 24 January

Opening Remarks

Room: 300 (Esplanade Level) Sun. 8:50 to 9:00 am

Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany)

SESSION 1

Room: 300 (Esplanade Level) Sun. 9:00 to 10:30 am

Special Session: Ultrafast Lasers in Ophthalmology

Session Chair: Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany)

9:00 am: **fs-lasers in ophthalmology** (*Invited Paper*), Tibor Juhasz, Abbott Medical Optics (USA) [7589-01]

9:30 am: **New developments in ultrashort pulse surgery of the cornea and the sclera** (*Invited Paper*), Karsten Plamann, Ecole Nationale Supérieure de Techniques Avancées (France); Florent Aptel, Hôpital Édouard Herriot (France); Cord L. Arnold, Ecole Nationale Supérieure de Techniques Avancées (France); Antoine Courjaud, Amplitude Systemes (France); Caroline Crotti, Florent Deloison, Ecole Nationale Supérieure de Techniques Avancées (France); Frédéric Druon, Patrick Georges, Marc Hanna, Institut d'Optique Graduate School (France); Jean-Marc Legeais, Franck Morin, Hôpital Hôtel Dieu (France); Eric P. Mottay, Amplitude Systemes (France); Valeria Nuzzo, Donald A. Peyrot, Ecole Nationale Supérieure de Techniques Avancées (France); Michèle Savoldelli, Hôpital Hôtel Dieu (France) [7589-02]

10:00 am: **High resolution macroscopy (HRMac) of the eye using non-linear optical imaging** (*Invited Paper*), James V. Jester, Moritz Winkler, Bryan Jester, Chyong Nien-Shy, Dongyul Chai, Donald J. Brown, The Gavin Herbert Eye Institute (USA) [7589-03]

SESSION 4

Room: 300 (Esplanade Level) Sun. 3:30 to 4:50 pm

Applications of fs Lasers for Surgery and Biomedical Devices

Session Chair: Joseph Neev, Femto-Sec Tech, Inc.

3:30 pm: **Subsurface femtosecond tissue alteration: selectively photobleaching macular degeneration pigments in near retinal contact**, Zakhariya Manevitch, Aaron Lewis, Hebrew Univ. of Jerusalem (Israel); Carol Levy, Evelyne Zeira, Eyal Banin, Hadassah Hebrew Univ. Medical Ctr. (Israel); Alexandra Manevitch, Artium Khatchatourians, Hebrew Univ. of Jerusalem (Israel); Jacob Pe'er, Eithan Galun, Itzhak Hemo, Hadassah Hebrew Univ. Medical Ctr. (Israel) [7589-11]

3:50 pm: **OCT guidance for fs laser treatment of presbyopia**, Ole Massow, Heike Hoffmann, Michael Fromm, Marko Heidrich, Alexander Krueger, Tammo Ripken, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-12]

4:10 pm: **Bio-inspired titanium surfaces: formation of multi-scaled surface structures using femtosecond laser structuring for endosseous implant applications**, Alexandre Cunha, Univ. Técnica de Lisboa (Portugal); Vitor B. Oliveira, Instituto Superior de Engenharia de Lisboa (Portugal); Rui Mário Correia da Silva Vilar, Univ. Técnica de Lisboa (Portugal) [7589-13]

4:30 pm: **Fabrication and characterization of laser-micromachined polypyrrole-based artificial muscle actuated catheters**, Kenneth K. C. Lee, Univ. of Toronto (Canada); Nigel R. Munce, Sunnybrook Health Science Ctr. (Canada); Tina Shoa, The Univ. of British Columbia (Canada); Luc G. Charron, Univ. of Toronto (Canada); Beau A. Standish, Ryerson Univ. (Canada); Graham A. Wright, Univ. of Toronto (Canada) and Sunnybrook Health Science Ctr. (Canada); John D. W. Madden, The Univ. of British Columbia (Canada); Peter R. Herman, Univ. of Toronto (Canada); Xiao Dong V. Yang, Ryerson Univ. (Canada) and Sunnybrook Health Science Ctr. (Canada) and Univ. of Toronto (Canada) [7589-14]

Monday 25 January

SESSION 5

Room: 124 (Exhibit Level) Mon. 8:10 to 10:00 am

Femtosecond Lasers and Components

Session Chair: James E. Carey III, SiOnyx Inc.

8:10 am: **Applications of femtosecond laser induced Bragg gratings in silica and non-silica based optical fibers** (*Invited Paper*), Stephen J. Mihailov, Dan Grobncic, Christopher W. Smelser, Communications Research Ctr. Canada (Canada) [7589-15]

8:40 am: **Mode selective fiber Bragg gratings**, Jens U. Thomas, Christian Voigtländer, Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany); Nemanja Jovanovic, Graham D. Marshall, Michael J. Withford, Michael Steel, Macquarie Univ. (Australia) [7589-16]

9:00 am: **Compact 60-fs multigigawatt diode-pumped laser using postcompression technique**, Antoine Courjaud, Amplitude Systemes (France); Eric Mével, Eric Constant, Univ. Bordeaux 1 (France); Eric P. Mottay, Amplitude Systemes (France) [7589-17]

9:20 am: **Compression of idler pulses with an identical positive dispersive glass block to signal pulse stretcher in ultrafast optical parametric chirped-pulse amplification**, Yutaka Akahane, Kanade Ogawa, Koichi Tsuji, Makoto Aoyama, Koichi Yamakawa, Japan Atomic Energy Agency (Japan) [7589-18]

9:40 am: **Broadband Yb:CaF₂ regenerative amplifier for sub-100fs range**, Sandrine Ricaud, Martin Delaigue, Antoine Courjaud, Amplitude Systemes (France); Frédéric Druon, Univ. Paris-Sud 11 (France); Patrick Georges, Institut d'Optique Graduate School (France); Patrice Camy, Richard Moncorgé, ENSICAEN (France); Eric P. Mottay, Amplitude Systemes (France) [7589-19]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 124 (Exhibit Level) Mon. 10:30 am to 12:30 pm

Modeling and Measurement

Session Chair: Rick P. Trebino, Georgia Institute of Technology

10:30 am: **Measuring complex and visible ultrashort pulses**, Dongjoo Lee, Swamp Optics, LLC (USA); Lina Xu, Rick P. Trebino, Georgia Institute of Technology (USA) [7589-20]

10:50 am: **Modeling the propagation of ultrashort pulses through optical systems**, Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany); Christian Hellmann, René Krieg, Hagen Schimmel, LightTrans GmbH (Germany) [7589-21]

11:10 am: **Terahertz pulsed spectroscopy and imaging in the pharmaceutical environment**, Philip F. Taday, TeraView Ltd. (United Kingdom) [7589-22]

11:30 am: **Surface-enhanced Raman scattering hot spot isolation using surface-enhanced multiphoton lithography**, Eric D. Diebold, Paul Peng, Eric D. Mazur, Harvard Univ. (USA) [7589-23]

11:50 am: **Detection of counterfeit U.S. paper money using intrinsic fluorescence lifetime**, Michael J. Levene, Thomas Chia, Yale Univ. (USA) [7589-24]

12:10 pm: **Dispersive Fourier-transform spectral interferometry for ultrafast real-time axial profiling of multilayer objects**, Keisuke Goda, Ali Motafakker-Fard, Bahram Jalali, Univ. of California, Los Angeles (USA) [7589-25]

Lunch Break 12:30 to 2:00 pm

SESSION 7

Room: 124 (Exhibit Level) Mon. 2:00 to 3:20 pm

fs Laser-induced Waveguides

Session Chair: Denise M. Krol, Univ. of California, Davis

2:00 pm: **Curved-waveguide fabrication using femtosecond laser processing with glass hologram**, Jun'ichi Suzuki, Yasunori Arima, Masahiro Yamaji, Hayato Kawashima, Shuhei Tanaka, New Glass Forum (Japan)[7589-26]

2:20 pm: **Direct writing of waveguides in bulk Ti³⁺:Sapphire with a femtosecond oscillator**, Simon Gross, Alexander Fuerbach, Michael J. Withford, Macquarie Univ. (Australia) [7589-27]

2:40 pm: **Soliton formation near topological defects in waveguide arrays**, Matthias Heinrich, Robert Keil, Friedrich-Schiller-Univ. Jena (Germany); Alexander Szameit, Technion-Israel Institute of Technology (Israel); Lourdes Ramirez, Felix Dreisow, Thomas Pertsch, Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7589-28]

3:00 pm: **Waveguide and microchannel fabrication in polymers with femtosecond lasers**, Shane M. Eaton, CNR (Italy); Jose M. Pinazo, Raffaella Suriano, Nicola Bellini, Roberta Ramponi, Stefano Turri, Marinella Levi, Giulio Cerullo, Politecnico di Milano (Italy); Roberto Osellame, CNR (Italy) [7589-29]

Coffee Break 3:20 to 3:50 pm

SESSION 8

Room: 124 (Exhibit Level) Mon. 3:50 to 5:30 pm

fs Laser Modification of Glass

Session Chair: Eric Mottay, Amplitude Systemes (France)

3:50 pm: **Bonding of glass with femtosecond laser pulses at high repetition rates**, Sören Richter, Sven Döring, Friedrich-Schiller-Univ. Jena (Germany); Gerhard Kalkowski, Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7589-30]

4:10 pm: **Time dynamics of burst-train filamentation assisted femtosecond laser machining in glasses**, Dagmar Esser, Univ. of Toronto (Canada) and RWTH Aachen Univ. (Germany); Saeid Rezaei, Jianzhao Li, Peter R. Herman, Univ. of Toronto (Canada) [7589-31]

4:30 pm: **Dynamics of femtosecond laser modification in glass**, Jonathan J. Witcher, Luke B. Fletcher, Neil Troy, Denise M. Krol, Univ. of California, Davis (USA) [7589-32]

4:50 pm: **Three-dimensional silica surfaces fabricated using femtosecond laser lithography**, Hiroaki Nishiyama, Mizue Mizoshiri, Yoshinori Hirata, Osaka Univ. (Japan); Junji Nishii, Hokkaido Univ. (Japan) [7589-33]

5:10 pm: **Multimodal laser spectroscopic microscopy during ultrafast laser nanofabrication**, Jianzhao Li, Peter R. Herman, Univ. of Toronto (Canada) [7589-34]

Tuesday 26 January

SESSION 9

Room: 122 (Exhibit Level) Tues. 8:20 to 10:10 am

Ultrashort Pulse Micromachining

Joint Session with Conference 7584

Session Chair: Michel Meunier,
Ecole Polytechnique de Montréal (Canada)

8:20 am: **Holographic femtosecond laser processing** (*Invited Paper*), Yoshio Hayasaki, Utsunomiya Univ. (Japan) [7584-13]

8:50 am: **Micromachining of metal and silicon using high average power ultrafast fiber lasers**, Eric P. Mottay, Yoann Zaouter, Amplitude Systemes (France); Charlie Loumena, Marc Faucon, John Lopez, ALPhANOV (France) [7589-36]

9:10 am: **Ultrafast laser-based tools enable advanced silicon solar cell efficiency enhancement processes**, Finlay Colville, Coherent, Inc. (USA) [7589-37]

9:30 am: **Picosecond laser patterning of NiCr thin film strain gauges**, Oliver Suttman, Jan Duesing, Ulrich Klug, Rainer Kling, Laser Zentrum Hannover e.V. (Germany) [7589-38]

9:50 am: **High repetition rate femtosecond laser processing of metals**, Joerg Schille, Udo Loeschner, Robby Ebert, Univ. of Applied Sciences Mittweida (Germany); Patricia Scully, Nicholas Goddard, Univ. of Manchester (United Kingdom); Horst Exner, Univ. of Applied Sciences Mittweida (Germany) [7589-39]

Coffee Break 10:10 to 10:40 am

SESSION 10

Room: 122 (Exhibit Level) Tues. 10:40 am to 12:10 pm

Femtosecond Laser Nanoprocessing

Joint Session with Conference 7584

Session Chair: Guido Hennig, MDC Max Daetwyler AG (Switzerland)

10:40 am: **Brighter light sources from the black metal** (*Invited Paper*), Anatoliy Y. Vorobyev, Chunlei Guo, Univ. of Rochester (USA) [7589-40]

11:10 am: **Gold nanorods enhanced femtosecond laser nanoablation of silicon**, Michel Meunier, Philippe Desjeans-Gauthier, Etienne Boulais, Ecole Polytechnique de Montréal (Canada) [7584-14]

11:30 am: **Efficient femtosecond laser nanohole processing on substrate surface using high dielectric constant particles with small size parameter**, Yuto Tanaka, Go Obara, Akira Zenidaka, Minoru Obara, Keio Univ. (Japan) [7584-15]

11:50 am: **Effect of target structure on interfering femtosecond laser processing**, Yoshiki Nakata, Takuya Hiromoto, Noriaki Miyayama, Osaka Univ. (Japan) [7584-16]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 11

Room: 122 (Exhibit Level) Tues. 1:40 to 3:20 pm

Nonlinear Processing

Joint Session with Conference 7584

Session Chair: Wataru Watanabe, National Institute of Advanced Industrial Science and Technology (Japan)

1:40 pm: **Femtosecond laser processing of hybrid micro- and nano-structures in silicate glasses**, Pavel Mardilovich, Jonathan J. Witcher, Luke B. Fletcher, Subhash H. Risbud, Denise M. Krol, Univ. of California, Davis (USA) [7584-17]

2:00 pm: **Structure modification of glass-ceramics thin films and layers by ultrashort laser action**, Vadim P. Veiko, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [7584-18]

2:20 pm: **Two-photon lithography and nanoprocessing with picosecond extreme ultrashort 12 femtosecond laser pulses**, Karsten König, Michael Schug, Huijing Zhang, Sumarie Saremi, Dara Feili, Helmut Seidel, Univ. des Saarlandes (Germany) [7584-19]

2:40 pm: **Individually controlled multi-focus laser processing for two-photon polymerization**, Kotaro Obata, Jürgen Koch, Boris N. Chichkov, Laser Zentrum Hannover e.V. (Germany) [7584-20]

3:00 pm: **Up-conversion of crystal oscillator frequency in silicon package by near infrared, ultra-short laser**, Yoshiro Ito, Rie Tanabe, Fumiya Sato, Yuuki Shinoue, Nagaoka Univ. of Technology (Japan); Kozo Tada, Citizen Finetech Miyota Co., Ltd. (Japan) [7584-21]

Coffee Break 3:20 to 3:50 pm

SESSION 12

Room: 122 (Exhibit Level) Tues. 3:50 to 5:40 pm

Three-Dimensional Direct Writing

Joint Session with Conference 7584

Session Chair: Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)

3:50 pm: **A frontier in optical data storage: five-dimensional optical data storage** (*Invited Paper*), Min Gu, Swinburne Univ. of Technology (Australia) [7589-41]

4:20 pm: **The influence of glass structure on femtosecond laser waveguide writing in erbium-doped phosphate glass**, Luke B. Fletcher, Jonathan J. Witcher, Denise M. Krol, Univ. of California, Davis (USA); Richard K. Brow, Missouri Univ. of Science and Technology (USA) [7589-42]

4:40 pm: **Femtosecond laser fabrication of birefringent directional couplers in fused silica**, Luís A. Fernandes, Univ. of Toronto (Canada) and INESC Porto (Portugal); Jason R. Grenier, Peter R. Herman, J. S. Aitchison, Univ. of Toronto (Canada); Paulo V. S. Marques, INESC Porto (Portugal) [7584-22]

5:00 pm: **Birefringent elements based on femtosecond laser-induced nanogratings**, Lourdes Ramirez, Matthias Heinrich, Sören Richter, Felix Dreisow, Robert Keil, Friedrich-Schiller-Univ. Jena (Germany); Alexander V. Korovin, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Ulf Peschel, Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7589-43]

5:20 pm: **Femtosecond laser written embedded diffractive optical elements and their applications**, Jiyeon Choi, Mark Ramme, Troy P. Anderson, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7589-44]

POSTERS-TUESDAY

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Observations of the intense soft x-ray emissions from ultra thin Au films irradiated with high contrast laser pulses, Masahiko Ishino, Masataka Kado, Masaharu Nishikino, Japan Atomic Energy Agency (Japan); Kunio Shinohara, Waseda Univ. (Japan); Satoshi Tamotsu, Keiko Yasuda, Nara Women's Univ. (Japan); Noboru Hasegawa, Maki Kishimoto, Toshiyuki Ohba, Tetsuya Kawachi, Japan Atomic Energy Agency (Japan) [7589-45]

New nanohole processing by backside irradiation of femtosecond laser with enhanced localized near-field mediated with gold particles, Go Obara, Yuto Tanaka, Tomoya Miyayoshi, Minoru Obara, Keio Univ. (Japan) . . . [7589-46]

Application of high intense laser interaction with plasma in radiotherapy by using the soliton fiber medium, Parviz Zobdeh, Amirkabir Univ. of Technology (Iran, Islamic Republic of); Rasoul Sadighi-bonabi, Amir Alizadeh-Bagheri, Sharif Univ. of Technology (Iran, Islamic Republic of) [7589-47]

Nonlinear lithographic properties by femtosecond laser pulses using a low-NA lens, Mizue Mizoshiri, Hiroaki Nishiyama, Osaka Univ. (Japan); Junji Nishii, Hokkaido Univ. (Japan); Yoshinori Hirata, Osaka Univ. (Japan) [7589-48]

Ultrashort pulsed laser induced cavitation bubbles mediated by plasmonic gold nanospheres, Sigfried Haering, Daniel Eversole, Frederic Bourgeois, Adela Ben-Yakar, Univ. of Texas at Austin (USA) [7589-49]

Laser microsintering of tungsten in vacuum, Robby Ebert, Frank Ullmann, Lars Hartwig, Tino Suess, Sascha Kloetzer, Andre Streek, Joerg Schille, Peter Regenfuss, Horst Exner, Hochschule Mittweida (Germany) [7589-50]

LASE

Wednesday 27 January

Student Competition Session

Room: 130 (Exhibit Level)Wed. 8:00 to 9:00 am

Papers submitted to this conference by **graduate and undergraduate students** are eligible. In order to ensure a fair evaluation, the conference chairs and the program committee will judge the students during this special student competition session. Here the students present a brief **5-minute summary** of their original talk or poster presented at the conference. The winner and runner-up will be announced and awarded a cash prize during the Student Competition Award Ceremony.

SESSION 13

Room: 130 (Exhibit Level)Wed. 9:00 to 10:00 am

Post-Deadline Session

See room sign or online program for list of accepted talks.

Accepted submissions will be printed as submitted without further revision in the front matter of the proceedings, and authors will be encouraged to submit a full-length manuscript (8-12 pages) the week of the meeting.

Student Competition Award Ceremony

Room: 130 (Exhibit Level)Wed. 10:00 to 10:20 am

An award will be presented to the winner and runner-up of the Best Student Presentation (both poster and oral papers considered).

Award Sponsors:



LASE Plenary Session

Room: 102 (Exhibit Level) Wed. 10:20 am to 12:30 pm

10:20 am: **LASE Best Student Paper Prize**

SPIE will present awards to the best 3 student papers on the science and application of lasers.
Cash prizes of \$1500, \$1000, and \$500 will be awarded.

10:30 am: **Attosecond-Angstrom Science**, Paul B. Corkum, Univ. of Ottawa (Canada) and Lab. for Attosecond Science, National Research Council Canada (Canada) [7589-101]

11:10 am: **Ultrafast Fiber Laser Technology: Status and Prospects**, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany). [7579-102]

11:50 am: **Challenges and Prospects of Ultrafast Lasers in Ophthalmology**, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7589-103]



Schedule your week with your iPhone.

See p. 10

Symposium Chair
Thomas J. Suleski
 Univ. of Carolina at Charlotte
 (USA)



Symposium Cochair
Harald Schenk
 Fraunhofer Institute for
 Photonic Microsystems
 (Germany)



Conferences

Micro/Nanofabrication

- 7590 **Micromachining and Microfabrication Process Technology XV** (Maher/Chiao/Resnick) 183
- 7591 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics III** (Schoenfeld/Wang/Loncar/Suleski) 184
- 7584 **Laser Applications in Microelectronic and Optoelectronic Manufacturing XV** (Niino/Meunier/Gu/Hennig) 166
- 7585 **Laser-based Micro- and Nanopackaging and Assembly IV** (Pfleger/Lu/Washio) 169

Devices/Applications/Reliability

- 7592 **Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices IX** (Kullberg/Ramesham) 186
- 7593 **Microfluidics, BioMEMS, and Medical Microsystems VIII** (Becker) 188
- 7594 **MOEMS and Miniaturized Systems IX** (Schenk/Piyawattanametha) 191
- 7595 **MEMS Adaptive Optics IV** (Olivier/Bifano/Kubby) 194
- 7596 **Emerging Digital Micromirror Device Based Systems and Applications II** (Douglass/Hornbeck) 195
- MOEMS-MEMS Special Events 20–21
- MOEMS-MEMS LASE Proceedings of SPIE/CD-ROM 325
- Index of Authors, Chairs, and Committee Members 267-318

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MOEMS-MEMS Daily Conference Schedule

Saturday 23 January	Sunday 24 January	Monday 25 January	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
Micro/Nanofabrication					
			7590 Micromachining and Microfabrication Process Technology XV (Maher, Chiao, Resnick) p. 183		
		7591 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics III (Schoenfeld, Wang, Loncar, Suleski) p. 184			
		7584 Laser Applications in Microelectronic and Optoelectronic Manufacturing XV (Niino, Meunier, Gu, Hennig) p. 166			
			7585 Laser-based Micro- and Nanopackaging and Assembly IV (Pfleger, Lu, Washio) p. 169		
Devices/Applications/Reliability					
		7592 Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices IX (Kullberg, Ramesham) p. 186			
		7593 Microfluidics, BioMEMS, and Medical Microsystems VIII (Becker) p. 188			
		7594 MOEMS and Miniaturized Systems IX (Schenk, Piyawattanametha) p. 191			
				7595 MEMS Adaptive Optics IV (Olivier, Bifano, Kubby) p. 194	
				7596 Emerging Digital Micromirror Device Based Systems and Applications II (Douglass, Hornbeck) p. 195	
MOEMS-MEMS Special Events					
		MOEMS-MEMS PLENARY SESSION, 9:00 am to 12:00 noon, p.20 <ul style="list-style-type: none"> Emerging Research in Microsystems: Opportunities and Challenges in Health-Care and Environmental Sensing Applications (Gianchandani) MEMS Technologies for Artificial Retinas (Mokwa) Shaping Light: MOEMS Deformable Mirrors for Microscopes and Telescopes (Bifano) 	MOEMS-MEMS Interactive Poster Session, 6:00 to 7:30 pm, p. 21		
			PANEL DISCUSSION: Progress and Prospects in Microfluidics, 8:00 to 10.00 pm, p. 21		

SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

Photonics West maps:

Moscone Maps	pp. 2–5
Hilton Hotel Map	p. 3
Area Map	p. 322

Micromachining and Microfabrication Process Technology XV

Conference Chairs: **Mary Ann Maher**, SoftMEMS; **Jung-Chih Chiao**, The Univ. of Texas at Arlington; **Paul J. Resnick**, Sandia National Labs.

Program Committee: **Mu Chiao**, The Univ. of British Columbia (Canada); **Debabani Choudhury**, HRL Labs., LLC; **Sanjay Krishna**, The Univ. of New Mexico; **Tamal Mukherjee**, Carnegie Mellon Univ.; **Metin Ozen**, Ozen Engineering, Inc.; **Yu-Chuan Su**, National Tsing Hua Univ. (Taiwan); **T. C. Yih**, Oakland Univ.; **Nan Zhang**, General MEMS Corp.

Tuesday 26 January

SESSION 1

Room: 121 (Exhibit Level) Tues. 8:40 to 11:30 am

Lasers and Laser-based Processing

Session Chair: **Nan Zhang**, General MEMS Corp.

8:40 am: **Ultrafast pulsed laser micro-deposition printing on transparent media**, Bing Liu, Zhendong Hu, Makoto Murakami, Yong Che, IMRA America, Inc. (USA) [7590-01]

9:00 am: **Coaxial real-time metrology and gas assisted laser micromachining: process development, stochastic behavior, and feedback control**, Paul J. L. Webster, Joe X. Z. Yu, Mitchell D. Anderson, Queen's Univ. (Canada); Tony P. Hoult, IPG Photonics Corp. (USA); James M. Fraser, Queen's Univ. (Canada) [7590-02]

9:20 am: **Sub-micron machining of semiconductors**, Mark Ramme, Jiyeon Choi, Troy P. Anderson, Martin Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Townes Laser Institute (USA) [7590-03]

9:40 am: **In-volume selective laser etching of 3D microstructures in sapphire and fused silica**, Jens Gottmann, Martin Hermans, Maren Hörstmann-Jungemann, RWTH Aachen (Germany) [7590-04]

Coffee Break 10:00 to 10:30 am

10:30 am: **Polarization converted laser beams for micromachining applications**, Ulrich Klug, Jan Friedrich Düsing, Laser Zentrum Hannover e.V. (Germany); Takashi Sato, Photonic Lattice Inc. (Japan); Kunihiko Washio, Paradigm Laser Research Ltd. (Japan); Rainer Kling, Laser Zentrum Hannover e.V. (Germany) [7590-05]

10:50 am: **Enhancing laser scanner accuracy by grid correction**, Jussi Halme, Tero Kumpulainen, Reijo O. Tuokko, Tampere Univ. of Technology (Finland) [7590-06]

11:10 am: **Enhanced Si processing at 1-micron wavelength using a MOPA based Yb fiber laser**, Kun Li, William O'Neill, Univ. of Cambridge (United Kingdom) [7590-07]

Lunch/Exhibition Break 11:30 am to 1:00 pm

SESSION 2

Room: 121 (Exhibit Level) Tues. 1:00 to 3:00 pm

Device Processing

1:00 pm: **Multilayer metal micromachining for terahertz waveguide fabrication**, Adam M. Rowen, Mike C. Wanke, Christopher D. Nordquist, Sandia National Labs. (USA); Christian L. Arrington, LMATA Government Services, LLC (USA); James R. Gillen, Sandia National Labs. (USA); Andrew E. Hollowell, The Univ. of New Mexico (USA); Jonathan J. Coleman, Sandia National Labs. (USA) [7590-08]

1:20 pm: **Fabrication of a microlens array by diamond milling with spherical shaped milling tools**, Brian P. McCall, Rice Univ. (USA); Gabriel Birch, Michael R. Descour, Univ. of Arizona (USA); Tomasz Tkaczyk, Rice Univ. (USA) [7590-09]

1:40 pm: **Diamond turning of aspheric steel molds for optics replication**, Fritz Klocke, Olaf Dambon, Benjamin Bulla, Fraunhofer Institute for Production Technology (Germany) [7590-10]

2:00 pm: **Rapid mould making for replication of microstructured polymer parts**, Steffen G. Scholz, Ekaterin Minev, Emmanuel Brousseau, Christian Griffiths, Stefan S. Dimov, Cardiff Univ. (United Kingdom) [7590-11]

2:20 pm: **Alternative technology for fabrication of nano- or microstructured mould inserts used for optical components**, Markus Wissmann, Jürgen Mohr, Markus Guttman, Michael Hartmann, Forschungszentrum Karlsruhe GmbH (Germany) [7590-12]

2:40 pm: **Development of a micro-incandescent light source on silicon substrate**, Alexandre H. Gollub, Daniel O. Carvalho, Gustavo P. Rehder, Marco I. Alayo, Univ. de São Paulo (Brazil) [7590-13]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Room: 121 (Exhibit Level) Tues. 3:30 to 5:30 pm

Processing, Metrology, Coatings

Session Chair: **Mary Ann Maher**, SoftMEMS

3:30 pm: **Optimizing galvanic pulse plating parameters to improve indium bump to bump bonding**, Jonathan J. Coleman, Adam M. Rowen, Sita Mani, Graham Yelton, Sandia National Labs. (USA); Christian L. Arrington, LMATA Government Services, LLC (USA); James R. Gillen, Sandia National Labs. (USA); Andrew E. Hollowell, The Univ. of New Mexico (USA) [7590-14]

3:50 pm: **Advances in photonic MOEMS-MEMS device thinning and polishing**, James J. McAneny, Chris O'Brien, Logitech Ltd. (United Kingdom) [7590-15]

4:10 pm: **Anti-stiction and wear-resistant coatings based on self-assembled monolayers of phosphonates (SAMP) for MEMS and MOEMS**, Eric L. Bruner, Eric L. Hanson, Aculon, Inc. (USA) [7590-16]

4:30 pm: **Kinetic investigations on TiO₂ nanoparticles as photo initiators for UV-polymerization in acrylic matrix**, Carsten Becker-Willinger, Sabine Schmitz Stöwe, Dirk Bentz, Michael Veith, Leibniz - Institute for New Materials (Germany) [7590-17]

4:50 pm: **Investigation on particle generation by micro-electro discharge machining**, Muralidhara ., Sourav Mitra, Nilesh J. Vasa, Singaperumal Makaram, Indian Institute of Technology Madras (India) [7590-18]

5:10 pm: **Estimation of tool wear compensation during micro-electro-discharge machining of silicon using process simulation**, Muralidhara ., Nilesh J. Vasa, Singaperumal Makaram, Indian Institute of Technology Madras (India) [7590-19]

POSTER SESSION

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Alternative method for steam generation for thermal oxidation of silicon, Jeffrey Spiegelman, RASIRC (USA) [7590-20]

Manufacturability of zinc oxide gas sensor with nanoparticles suspension deposited by ink jet printing, Philippe Menini, Véronique Conedera, Pamela Yoboue, Fabien Mesnilgrente, Norbert Fabre, CNRS-LAAS (France) and Univ. of Toulouse (France) [7590-21]

Electrodes micropatterning by microcontact printing method to large area substrates using nickel mold, Atsushi Takakuwa, SEIKO EPSON (Japan); Takeshi Shibuya, Ricoh Software Research Ctr. (Beijing) Co., Ltd. (Japan); Kiyoshi Yase, National Institute of Advanced Industrial Science and Technology (Japan) [7590-22]

Laser microstructuring of sapphire wafer and fiber, Yu-Tang Dai, Gang Xu, Jian-Lei Cui, Wuhan Univ. of Technology (China) [7590-23]

Colossal room-temperature magnetoresistance in thin La_{1-x}Ag_yMnO₃ epitaxial films, Azamat Z. Muminov, Samarkand State Univ. (Uzbekistan) [7590-24]

Selective laser sintering of magnesium powder for fabrication of compact structures, Chi Chung Ng, The Hong Kong Polytechnic Univ. (Hong Kong, China) [7590-25]

MOEMS-MEMS

Monday-Wednesday 25-27 January 2010 • Proceedings of SPIE Vol. 7591

Advanced Fabrication Technologies for Micro/Nano Optics and Photonics III

Conference Chairs: **Winston V. Schoenfeld**, CREOL, The College of Optics and Photonics, Univ. of Central Florida; **Jian Jim Wang**, OmniPV Inc.; **Marko Loncar**, Harvard Univ.; **Thomas J. Suleski**, The Univ. of North Carolina at Charlotte

Program Committee: **John M. Ballato**, Clemson Univ.; **Gregg T. Borek**, MEMS Optical, Inc.; **Stefano Cabrini**, Lawrence Berkeley National Lab.; **Matthew A. Davies**, The Univ. of North Carolina at Charlotte; **Erez Hasman**, Technion-Israel Institute of Technology (Israel); **Aaron R. Hawkins**, Brigham Young Univ.; **Tsinghua Her**, The Univ. of North Carolina at Charlotte; **Saulius Juodkakis**, Hokkaido Univ. (Japan); **Shanalyn A. Kemme**, Sandia National Labs.; **Ernst-Bernhard Kley**, Friedrich-Schiller-Univ. Jena (Germany); **Stephen M. Kuebler**, CREOL, The College of Optics and Photonics, Univ. of Central Florida; **Dwayne L. LaBrake**, Molecular Imprints, Inc.; **Akhlesh Lakhtakia**, The Pennsylvania State Univ.; **Ki-Dong Lee**, LG Electronics Inc. (Korea, Republic of); **Uriel Levy**, The Hebrew Univ. of Jerusalem (Israel); **Patrick P. Naulleau**, Lawrence Berkeley National Lab.; **Dennis W. Prather**, Univ. of Delaware; **John A. Rogers**, Univ. of Illinois at Urbana-Champaign; **Markus Rossi**, Heptagon Oy (Switzerland); **Raymond C. Rumpf**, Prime Research, LC; **Georg von Freymann**, Forschungszentrum Karlsruhe GmbH (Germany); **Michael P. Watts**, Impattern Solutions; **Wei Wu**, Hewlett-Packard Labs.

Monday 25 January

MOEMS-MEMS PLENARY SESSION

Room 102 (Exhibit Level) Mon. 9:00 am to 12:00 pm

9:00 am: **Welcome and Opening Remarks**, **Thomas J. Suleski**, The Univ. of North Carolina at Charlotte; Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany)

9:10 am: **Emerging Research in Microsystems: Opportunities and Challenges in Health-Care and Environmental Sensing Applications**, Yogesh B. Gianchandani, Univ. of Michigan (USA) and National Science Foundation (USA) [7593-201]

Coffee Break 10:00 to 10:20 am

10:20 am: **MEMS Technologies for Artificial Retinas**, Wilfried Mokwa, RWTH Aachen Univ. (Germany) [7594-202]

11:10 am: **Shaping Light: MOEMS Deformable Mirrors for Microscopes and Telescopes**, Thomas G. Bifano, Boston Univ. Photonics Ctr. (USA) and Boston Micromachines Corp. (USA) [7595-203]

Lunch Break 12:00 to 1:30 pm

SESSION 1

Room: 112 (Exhibit Level) Mon. 1:30 to 3:20 pm

Non-Diffraction Limited 3D Laser Lithography

Session Chair: **Georg von Freymann**, Forschungszentrum Karlsruhe GmbH (Germany)

1:30 pm: **Two-color photo-initiation/inhibition lithography (Invited Paper)**, Robert R. McLeod, Benjamin A. Kowalski, Univ. of Colorado at Boulder (USA) [7591-01]

2:00 pm: **Toward diffraction-unlimited 3D laser lithography**, Joachim Fischer, Georg von Freymann, Martin Wegener, Univ. Karlsruhe (Germany) . . . [7591-02]

2:20 pm: **Pushing the limits of optical lithography with resolution augmentation through photo-induced deactivation (Invited Paper, Presentation Only)**, John T. Fourkas, Linjie Li, Rafael R. Gattass, Univ. of Maryland, College Park (USA) [7591-03]

2:50 pm: **Direct laser writing of 3D nanostructures (Invited Paper)**, Maria Farsari, Foundation for Research and Technology-Hellas (Greece) . . . [7591-04]

Coffee Break 3:20 to 3:50 pm

SESSION 2

Room: 112 (Exhibit Level) Mon. 3:50 to 5:30 pm

Nanofabrication I: Photonic Nanostructures

Session Chair: **Jian Jim Wang**, OmniPV Inc.

3:50 pm: **Fabrication of top down silicon nanowire photodetector arrays using nanoimprint lithography**, Hongkwon Kim, Arthur Zhang, Yuhwa Lo, Univ. of California, San Diego (USA) [7591-05]

4:10 pm: **Critical nanofabrication parameters for the e-beam assisted design of a subwavelength aluminum mesh**, Clarisse Mazuir, Winston V. Schoenfeld, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7591-06]

4:30 pm: **Low-cost optical microstructures fabricated by imprinting porous silicon**, Judson D. Ryckman, Vanderbilt Univ. (USA); Marco Liscidini, Univ. degli Studi di Pavia (Italy); John E. Sipe, Univ. of Toronto (Canada); Sharon M. Weiss, Vanderbilt Univ. (USA) [7591-07]

4:50 pm: **Hollow ARROW waveguides on self-aligned pedestals for high-sensitivity optical sensing**, Evan J. Lunt, Brian S. Phillips, Jared M. Keeley, Brigham Young Univ. (USA); Philip Measor, Bin Wu, Holger Schmidt, Univ. of California Santa Cruz (USA); Aaron R. Hawkins, Brigham Young Univ. (USA) [7591-08]

5:10 pm: **Inkjet printing techniques for the fabrication of polymer optical waveguides**, Nicholas A. Vacirca, Drexel Univ. (USA) [7591-09]

Tuesday 26 January

SESSION 3

Room: 112 (Exhibit Level) Tues. 8:30 to 10:00 am

Advanced Lithography

Session Chair: **Marko Loncar**, Harvard Univ.

8:30 am: **Sub-5-nanometer electron-beam lithography for nano-optics (Invited Paper)**, Lorenzo Battistella, Karl K. Berggren, Huigao Duan, Bryan Cord, Xiaolong Hu, Donald Winston, Joel K. W. Yang, Massachusetts Institute of Technology (USA) [7591-10]

9:00 am: **Fabrication and scanning control of nanoprobe for NSOM applications**, Yu-Yen Huang, YuYan Wang, Kazunori Hoshino, David Giese, Yujan Shrestha, Xiaojing Zhang, The Univ. of Texas at Austin (USA) . . . [7591-11]

9:20 am: **Fabrication techniques of high aspect ratio vertical light pipes using a dielectric photomask**, Winnie N. Ye, Kenneth B. Crozier, Harvard Univ. (USA); Peter Duane, Munib A. Wober, Zena Technologies Inc. (USA) . . [7591-12]

9:40 am: **Fabrication of photonic crystal cavity laser using a combined lithography of laser holography and focused ion beam**, Sungmo Ahn, Sihan Kim, Heonsu Jeon, Seoul National Univ. (Korea, Republic of) [7591-13]

Coffee Break 10:00 to 10:30 am

SESSION 4

Room: 112 (Exhibit Level) Tues. 10:30 to 11:40 am

New Materials

Session Chair: Winston V. Schoenfeld, CREOL, The College of Optics and Photonics, Univ. of Central Florida

10:30 am: **Silk as a new platform for nanobiophotonics** (*Invited Paper*), Fiorenzo G. Omenetto, Tufts Univ. (USA)[7591-14]

11:00 am: **Micro-patternable hybrid nanocomposites with tailor-able mechanical and thermomechanical properties**, Carsten Becker-Willinger, Pamela Kalmes, Petra Herbeck-Engel, Michael Veith, Leibniz - Institute for New Materials (Germany)[7591-15]

11:20 am: **Scalable polymer-roll metamaterials**, Nicholas Gibbons, Jeremy J. Baumberg, Chris L. Bower, Mathias Kolle, Ullrich Steiner, Univ. of Cambridge (United Kingdom)[7591-16]

Lunch/Exhibition Break11:40 am to 1:30 pm

SESSION 5

Room: 112 (Exhibit Level) Tues. 1:30 to 3:10 pm

Laser-based Fabrication

Session Chair: Saulius Juodkazis, Hokkaido Univ. (Japan)

1:30 pm: **Flexible tailoring of femtosecond laser-written Bragg grating waveguides**, Jason R. Grenier, Univ. of Toronto (Canada); Luis A. Fernandes, Univ. of Toronto (Canada) and Univ. de Porto (Portugal); Matin Esfahani, J. Stewart Aitchison, Univ. of Toronto (Canada); Paulo V. S. Marques, Univ. do Porto (Portugal); Peter R. Herman, Univ. of Toronto (Canada)[7591-17]

1:50 pm: **Fabrication of micro- and nanostructures in thin metallic films by femtosecond laser ablation**, Vyngantas Mizeikis, Shizuoka Univ. (Japan); Saulius Juodkazis, Hiroaki Misawa, Hokkaido Univ. (Japan)[7591-18]

2:10 pm: **Femtosecond laser photopolymerization of photonic and free-movable microstructures in sol-gel hybrid resist**, Quan Sun, Saulius Juodkazis, Naoki Murazawa, Hokkaido Univ. (Japan); Vyngantas Mizeikis, Shizuoka Univ. (Japan); Hiroaki Misawa, Hokkaido Univ. (Japan)[7591-19]

2:30 pm: **Waveguides written with femtosecond double pulses in the volume of glass materials**, Dagmar Esser, Judith Kumstel, Jens Gottmann, RWTH Aachen Univ. (Germany)[7591-20]

2:50 pm: **Laser direct writing of submicron lines using micro- and nanofiber pens**, Tian Feng, Guoguang Yang, Jian Bai, Xu Jianfeng, Zhou Qiaofen, Zhejiang Univ. (China)[7591-21]

Coffee Break3:10 to 3:40 pm

SESSION 6

Room: 112 (Exhibit Level) Tues. 3:40 to 5:30 pm

Nanofabrication II: Active and Passive Devices

Session Chair: Akhlesh Lakhtakia, The Pennsylvania State Univ.

3:40 pm: **Challenges and opportunities of manufacturing next generation of integrated photonics** (*Invited Paper*), Rajendra Singh, Nishant Gupta, Kelvin F. Poole, Clemson Univ. (USA)[7591-22]

4:10 pm: **Multiwavelength rolled-up InGaAs/GaAs quantum dot microtube lasers**, Feng Li, Zetian Mi, McGill Univ. (Canada)[7591-23]

4:30 pm: **Controlling thermal emissions: large and sub-millimeter surfaces and their atypical thermal emissions**, Alvaro A. Cruz-Cabrera, Michael J. Cich, Shanalyn A. Kemme, A. Robert Ellis, Joel R. Wendt, Adam M. Rowen, Sandia National Labs. (USA); Sally Samora, LMATA Government Services, LLC (USA); Marino J. Martinez, David A. Scrymgeour, David W. Peters, Sandia National Labs. (USA)[7591-24]

4:50 pm: **Experimental observation of Raman enhancement from a grating-antenna hybrid structure**, Min Hu, Jingjing Li, David A. Fattal, Zhiyong Li, Hewlett-Packard Labs. (USA)[7591-25]

5:10 pm: **Dry etching of TiO₂/SiO₂ DBR mirrors for tunable optical sensor arrays**, Onny Setyawati, Univ. Kassel (Germany) and Opsolution Nanophotonics GmbH (Germany); Markus Engenhorst, Stefan Wittzack, Florestan Köhler, Carsten Woidt, Univ. Kassel (Germany); Tatjana Woit, Univ. Kassel (Germany) and Opsolution Nanophotonics GmbH (Germany); Vadim Daneker, Martin Bartels, Hartmut Hillmer, Univ. Kassel (Germany)[7591-26]

POSTER SESSION

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Fabrication of corrugated long-period fiber gratings by wet bulk micromachining, Chia-Chin Chiang, Liren Tsai, National Kaohsiung Univ. of Applied Sciences (Taiwan); Chih-Lang Lin, Central Taiwan Univ. of Science and Technology (Taiwan); Tusng-Chieh Cheng, National Kaohsiung Univ. of Applied Sciences (Taiwan)[7591-36]

Dynamics of percolation phenomena in electroluminescent colloidal thin films for roll-to-roll printing, Michael Angelo-Anthony Daniele, Parul Rungta, Alexandra L. Foguth, Volodymyr Tsyalkovskyy, Yuriy Bandera, Stephen H. Foulger, Clemson Univ. (USA)[7591-37]

Antireflection on plastic substrates using ion etching with discontinuous metallic film, Yu-Wen Yeh, Sheng-Hui Chen, Cheng-Chung Lee, National Central Univ. (Taiwan)[7591-38]

Quantum dots(QDs) immobilization on silver nanowire end-facet for single photon source application, Jinsik Kim, Korea Univ. (Korea, Republic of) and Korea Institute of Science and Technology (Korea, Republic of); Chan-min Kang, Byung Chul Lee, Sang-Youp Lee, Korea Institute of Science and Technology (Korea, Republic of); Jung Ho Park, Korea Univ. (Korea, Republic of); Hyun-Joon Shin, Korea Institute of Science and Technology (Korea, Republic of)[7591-39]

Multi-photon-polymerization of inorganic-organic hybrid polymers using visible or IR ultra-fast laser pulses for optical or (opto-)electronic devices, Sönke Steenhusen, Thomas Stichel, Ruth Houbertz, Fraunhofer-Institut für Silicatforschung (Germany); Gerhard SEXTL, Fraunhofer-Institut für Silicatforschung (Germany) and Julius-Maximilians-Univ. Würzburg (Germany)[7591-40]

Possible integration of Ti-catalyzed silicon nanowires using APCVD method in silicon based electronics, Mohammad A. U. Usman, Mentor Graphics Corp. (USA) and Portland State Univ. (USA); Brady Smith, GE Healthcare (USA)[7591-41]

Wednesday 27 January

SESSION 7

Room: 112 (Exhibit Level) Wed. 8:30 to 10:10 am

Nanofabrication III: Growth and Deposition

Session Chair: Pradeep Srinivasan, The Univ. of North Carolina at Charlotte

8:30 am: **Atomic layer deposition (ALD) for optical nanofabrication** (*Invited Paper*), Jarmo Maula, Beneq Oy (Finland)[7591-27]

9:00 am: **Modification of conformal-evaporated-film-by-rotation technique to improve replica uniformity on nonplanar biotemplates**, Drew Patrick Pulisfer, Akhlesh Lakhtakia, The Pennsylvania State Univ. (USA) and Materials Research Institute (USA); Raúl J. Martín-Palma, Univ. Autónoma de Madrid (Spain)[7591-28]

9:20 am: **Templated growth of and optical emission from single crystal GaAs 3D photonic crystals** (*Invited Paper*), Paul V. Braun, Erik C. Nelson, Univ. of Illinois at Urbana-Champaign (USA)[7591-29]

9:50 am: **Three electrode control of the nanodeposition of gold nanoparticles with atomic force controlled capillary electrophoresis**, Hesham Taha, Talia Yeshua, Mila Palchan, Yulia Lovsky, Nanonics Imaging Ltd. (Israel); Aaron Lewis, Hebrew Univ. of Jerusalem (Israel)[7591-30]

Coffee Break10:10 to 10:40 am

SESSION 8

Room: 112 (Exhibit Level) Wed. 10:40 am to 12:00 pm

Micro- and Nano-Optics

Session Chair: Aaron R. Hawkins, Brigham Young Univ.

10:40 am: **Analysis, tolerancing, and fabrication of a two element diffractive beamshaper**, Adam Fedor, Marc D. Himel, Tessera North America (USA)[7591-31]

11:00 am: **Precision glass molding: an integrative approach for the production of high-precision micro-optics**, Martin Hüntten, Fraunhofer Institute for Production Technology (Germany)[7591-32]

11:20 am: **Ion beam figuring of strongly curved aspheres using a 3 axes trimming system**, Marcel Demmler, Frank Allenstein, Matthias Nestler, Michael Zeuner, Roth & Rau MicroSystems GmbH (Germany)[7591-33]

11:40 am: **High-efficient multilevel phase diffractive elements realized by binary effective medium patterns**, Wiebke Freese, Thomas Kämpfe, Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany)[7591-34]

Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices IX

Conference Chairs: **Richard C. Kullberg**, Vacuum Energy Inc.; **Rajeshuni Ramesham**, Jet Propulsion Lab.

Program Committee: **Enakshi Bhattacharya**, Indian Institute of Technology Madras (India); **Jason O. Clevenger**, Exponent, Inc.; **Sonia Garcia-Blanco**, Institut National d'Optique (Canada); **Christopher K. Harrison**, Schlumberger-Doll Research Ctr.; **Allyson L. Hartzell**, Boston Micromachines Corp.; **Albert K. Henning**, Nanolnk, Inc.; **Maurice S. Karpman**, Charles Stark Draper Lab., Inc.; **Kee-Keun Lee**, Ajou Univ. (Korea, Republic of); **Olivier N. Pierron**, Georgia Institute of Technology; **Jeff Pulskamp**, Army Research Lab.; **Herbert R. Shea**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Danelle M. Tanner**, Sandia National Labs.; **Yanzhu Zhao**, Medtronic, Inc.

Monday 25 January

MOEMS-MEMS PLENARY SESSION

Room 102 (Exhibit Level) Mon. 9:00 am to 12:00 pm

9:00 am: **Welcome and Opening Remarks**, **Thomas J. Suleski**, The Univ. of North Carolina at Charlotte; **Harald Schenk**, Fraunhofer Institute for Photonic Microsystems (Germany)

9:10 am: **Emerging Research in Microsystems: Opportunities and Challenges in Health-Care and Environmental Sensing Applications**, **Yogesh B. Gianchandani**, Univ. of Michigan (USA) and National Science Foundation (USA) [7593-201]

Coffee Break 10:00 to 10:20 am

10:20 am: **MEMS Technologies for Artificial Retinas**, **Wilfried Mokwa**, RWTH Aachen Univ. (Germany) [7594-202]

11:10 am: **Shaping Light: MOEMS Deformable Mirrors for Microscopes and Telescopes**, **Thomas G. Bifano**, Boston Univ. Photonics Ctr. (USA) and Boston Micromachines Corp. (USA) [7595-203]

Lunch Break 12:00 to 1:00 pm

SESSION 1

Room: 111 (Exhibit Level) Mon. 1:00 to 3:10 pm

MEMS Packaging: Hermeticity Characterization

Session Chair: **Rajeshuni Ramesham**, Jet Propulsion Lab.

1:00 pm: **Nanoengineered surfaces for microfluidic-based thermal management devices** (*Invited Paper*), **Evelyn Wang**, **Rong Xiao**, **Kuang-Han Chu**, Massachusetts Institute of Technology (USA) [7592-01]

1:30 pm: **A new method for hermeticity testing of wafer-level packaging**, **Lellouchi Djemel**, **Xavier Lafontan**, NOVA MEMS (France); **David Veyrié**, Ctr. National d'Études Spatiales (France); **Jérémie Dhennin**, **Adrien Broué**, NOVA MEMS (France); **Jean-François Le Neal**, LAAS-CNRS (France); **Francis Presseccq**, Ctr. National d'Études Spatiales (France) [7592-02]

1:50 pm: **Pressure sensing in vacuum hermetic micropackaging for MOEMS-MEMS**, **Marco Michele Sisto**, **Sonia Garcia-Blanco**, **Yan Desroches**, **Jean-Sol Caron**, **Francis Provencal**, **Patrice A. Topart**, **Francis Picard**, Institut National d'Optique (Canada) [7592-03]

2:10 pm: **Wafer-level vacuum/hermetic packaging technologies for MEMS**, **Sang-Hyun Lee**, **Jay Mitchell**, **Sang Woo Lee**, **Khalil Najafi**, Univ. of Michigan (USA) [7592-04]

2:30 pm: **Characterization of polymeric getter materials for MEMS/MOEMS and other microelectronic package service**, **Richard C. Kullberg**, **Brad Phillip**, Vacuum Energy, Inc. (USA) [7592-05]

2:50 pm: **Hermetic vacuum sealing of MEMS devices containing organic components**, **Gary B. Tepolt**, C. S. Draper Lab., Inc. (USA) [7592-06]

Coffee Break 3:10 to 3:40 pm

SESSION 2

Room: 111 (Exhibit Level) Mon. 3:40 to 5:30 pm

Reliability and RF MEMS

Session Chair: **Leslie M. Phinney**, Sandia National Labs.

3:40 pm: **Predicting reliability of silicon MEMS** (*Invited Paper*), **Alissa M. Fitzgerald**, **A.M. Fitzgerald & Associates, LLC** (USA) [7592-07]

4:10 pm: **Stability experiments on MEMS aluminum nitride RF resonators**, **Danelle M. Tanner**, **Roy H. Olsson III**, **Ted B. Parson**, **Shannon M. Crouch**, **Jeremy A. Walraven**, **James A. Ohlhausen**, Sandia National Labs. (USA) [7592-08]

4:30 pm: **Characterization of Au/Au, Au/Ru and Ru/Ru ohmic contacts in MEMS switches improved by a novel methodology**, **Adrien Broué**, NOVA MEMS (France) and Univ. de Toulouse (France); **Jérémie Dhennin**, NOVA MEMS (France); **Frédéric Courtade**, CNES (France); **Christel Dieppedale**, MINATEC (France); **Patrick Pons**, Univ. de Toulouse (France); **Xavier Lafontan**, NOVA MEMS (France); **Robert Plana**, Univ. de Toulouse (France) [7592-09]

4:50 pm: **Novel test fixture for collecting microswitch reliability data**, **Ronald A. Couto, Jr.**, **Thomas A. Edelmann**, **LaVern A. Starman**, Air Force Institute of Technology (USA) [7592-10]

5:10 pm: **Reliability study of a MEMS array under varying temperature and humidity conditions**, **Tim E. Dallas**, **Ganapathy Sivakumar**, **Ranjith Ranganathan**, **Richard Gale**, Texas Tech Univ. (USA) [7592-11]

Tuesday 26 January

SESSION 3

Room: 111 (Exhibit Level) Tues. 8:00 to 10:20 am

Packaging and MEMS Reliability

Session Chair: **Sonia Garcia-Blanco**, INO (Canada)

8:00 am: **The effects of plasma pre-treatment and storage time on silicon fusion bonding** (*Invited Paper*), **Chad B. O'Neal**, Louisiana Tech Univ. (USA) [7592-12]

8:30 am: **Lifetime estimation and reliability study of electro-thermal MEMS actuators**, **Tim E. Dallas**, **Ganapathy Sivakumar**, Texas Tech Univ. (USA); **Stephen Johns**, Baylor Univ. (USA); **Armando Nava**, Angelo State Univ. (USA) [7592-13]

8:50 am: **Reliability assessment of ceramic column grid array (CCGA) interconnect packages under extreme temperatures for space applications (-185°C to +125°C)**, **Rajeshuni Ramesham**, Jet Propulsion Lab. (USA) . [7592-14]

9:10 am: **Packaging of miniaturized EISCAP Triglyceride biosensor**, **S. V. Mohanasundaram**, **S. Mercy**, **P. V. Harikrishna**, **Enakshi Bhattacharya**, **Anju Chadha**, Indian Institute of Technology Madras (India) [7592-15]

9:30 am: **MEMS/microfluidics packaging without heating** (*Invited Paper*), **Matiar R. Howlader**, McMaster Univ. (Canada) [7592-16]

10:00 am: **Use of conductive adhesive for MEMS interconnection in military fuze applications**, **Jakob Gakkestad**, **Per Dalsjo**, Norwegian Defence Research Establishment (Norway); **Helge Kristiansen**, **Conpart AS** (Norway); **Rolf Johannessen**, **Maaike M. V. Taklo**, Sintef ICT (Norway) [7592-17]

Coffee Break 10:20 to 10:50 am

SESSION 4

Room: 111 (Exhibit Level) Tues. 10:50 am to 12:20 pm

MEMS Testing and Inspection

Session Chair: Richard C. Kullberg, Vacuum Energy, Inc.

- 10:50 am: **Modeling time-dependent dielectric breakdown with and without barriers** (*Invited Paper*), Joel L. Plawsky, William N. Gill, Ravi Achanta, Rensselaer Polytechnic Institute (USA) [7592-18]
- 11:20 am: **Remotely accessible laboratory for MEMS testing**, Tim E. Dallas, Ganapathy Sivakumar, Matthew Mulsow, Aaron Melinger, Shelby Lacouture, Texas Tech Univ. (USA) [7592-19]
- 11:40 am: **Optical inspection of MOEMS devices using a configurable and suitable for production image processing system**, Michael Scholles, Mario Grafe, Peter Miskowicz, Volker Bock, Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany) [7592-20]
- 12:00 pm: **Low-cost system for testing MEMS for research and educational applications**, Tim E. Dallas, Gabriel G. Ramirez, Ganapathy Sivakumar, Shelby Lacouture, Texas Tech Univ. (USA) [7592-21]
- Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 5

Room: 111 (Exhibit Level) Tues. 1:50 to 5:00 pm

MEMS Applications

Session Chairs: Danelle M. Tanner, Sandia National Labs.; Allyson L. Hartzell, Boston Micromachines Corp.

- 1:50 pm: **Engineered carbon nanotube and graphene for nanoelectronics, sensors, and actuator systems** (*Invited Paper*), Eui-Hyeok Yang, Stevens Institute of Technology (USA) [7592-22]
- 2:20 pm: **Optimal design of SAW-based gyroscope to improve the sensitivity**, Kee-Keun Lee, Sangsik Yang, Haekwan Oh, Ajou Univ. (Korea, Republic of) [7592-23]
- 2:40 pm: **Temperature measurement on MOEMS micromirror plates under illumination**, Ingo Wullinger, Dirk Rudloff, Klaus Lukat, Mathias Krellmann, Dettlef Kunze, Aravind Narayana Samy, Ulrike A. Dauderstädt, Michael Wagner, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [7592-24]
- 3:00 pm: **Development and testing of a multi-level chevron actuator-based positioning system**, Tim E. Dallas, Sandesh Rawool, Daniel Buscarello, Johan Hendriske, Texas Tech Univ. (USA); Immanuel Purushothaman, Arizona State Univ. (USA); Ganapathy Sivakumar, Texas Tech Univ. (USA) [7592-25]
- 3:20 pm: **Development of a microlens array (MLA) for maskless photolithography application**, Minwoo Nam, Haekwan Oh, Geunyoung Kim, Sangsik Yang, Kee-Keun Lee, Ajou Univ. (Korea, Republic of) [7592-26]
- Coffee Break 3:40 to 4:00 pm
- 4:00 pm: **A 2-DOF MEMS positioning system**, Tim E. Dallas, Ganapathy Sivakumar, Texas Tech Univ. (USA); James Mathews, Angelo State Univ. (USA) [7592-27]
- 4:20 pm: **The influence of the arrangement and spacing of CNT column array on the characteristic of field emission**, Kyusung Han, Do Han Jun, Nguyen Tuan Hong, Soonil Lee, Sangsik Yang, Ajou Univ. (Korea, Republic of) [7592-28]
- 4:40 pm: **Self-aligned mask less process for etching cavities in SOI wafers to enhance the quality factor of MEMS resonators**, Wajihuddin Mohammad, Ville Kaajakari, Louisiana Tech Univ. (USA) [7592-29]

SESSION 6

Room: 111 (Exhibit Level) Tues. 5:00 to 6:00 pm

Mechanical Properties

Session Chair: Alissa M. Fitzgerald, A.M. Fitzgerald & Associates, LLC

- 5:00 pm: **Thermal actuator performance as a function of mechanical stress**, Leslie M. Phinney, Matt M. Spletzer, Michael S. Baker, Sandia National Labs. (USA) [7592-30]
- 5:20 pm: **Mitigating the irreversible deformation with pressure in silicon / porous silicon composite membranes**, L. Sujatha, Enakshi Bhattacharya, Indian Institute of Technology Madras (India) [7592-31]
- 5:40 pm: **Experimental investigation into metamaterial structures operating at infrared wavelength**, Derrick Langley, Ronald A. Couto, Jr., LaVern A. Starman, Air Force Institute of Technology (USA) [7592-32]

POSTER SESSION

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

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Physical characterization and dissolution enhancement of Simvastatin by preparing solid dispersion with Gelucire 44/14, Natvarlal M. Patel, Shri B.M. Shah College of Pharmaceutical Education and Research (India) [7592-34]

Performance and reliability assessment of a dielectric charging guard in MEMS optical switch systems, Ping Zhang, Emily J. Carr, Doug Keebaugh, Kelvin K. Chau, Glimmerglass Networks, Inc. (USA) [7592-36]

MOEMS-MEMS



Microfluidics, BioMEMS, and Medical Microsystems VIII

Conference Chair: **Holger Becker**, microfluidic ChipShop GmbH (Germany)

Conference Co-Chair: **Wanjun Wang**, Louisiana State Univ.

Program Committee: **Eva M. Campo**, Ctr. Nacional de Microelectrónica (Spain); **Bruce K. Gale**, The Univ. of Utah; **Bonnie L. Gray**, Simon Fraser Univ. (Canada); **Yu-Cheng Lin**, National Cheng Kung Univ. (Taiwan); **Yuehe Lin**, Pacific Northwest National Lab.; **Ian Papautsky**, Univ. of Cincinnati; **Albert van den Berg**, Univ. Twente (Netherlands); **Claude M. Vauchier**, Commissariat à l'Énergie Atomique (France); **Bernhard H. Weigl**, PATH

Monday 25 January

MOEMS-MEMS PLENARY SESSION

Room 102 (Exhibit Level) Mon. 9:00 am to 12:00 pm

9:00 am: **Welcome and Opening Remarks**, **Thomas J. Suleski**, The Univ. of North Carolina at Charlotte; **Harald Schenk**, Fraunhofer Institute for Photonic Microsystems (Germany)

9:10 am: **Emerging Research in Microsystems: Opportunities and Challenges in Health-Care and Environmental Sensing Applications**, **Yogesh B. Gianchandani**, Univ. of Michigan (USA) and National Science Foundation (USA) [7593-201]

Coffee Break 10:00 to 10:20 am

10:20 am: **MEMS Technologies for Artificial Retinas**, **Wilfried Mokka**, RWTH Aachen Univ. (Germany) [7594-202]

11:10 am: **Shaping Light: MOEMS Deformable Mirrors for Microscopes and Telescopes**, **Thomas G. Bifano**, Boston Univ. Photonics Ctr. (USA) and Boston Micromachines Corp. (USA) [7595-203]

Lunch Break 12:00 to 1:00 pm

SESSION 1

Room: 125 (Exhibit Level) Mon. 1:00 to 3:30 pm

Optical Methods in Microfluidics

Session Chair: **Holger Becker**, microfluidic ChipShop GmbH (Germany)

1:00 pm: **SERS measurements in microfluidic devices: a promising way for online-monitoring of lowest agent concentrations** (*Invited Paper*), **Jürgen Popp**, IPHT Jena (Germany) and **Friedrich-Schiller-Univ. Jena** (Germany); **Anne Maerz**, **Katrin Ackermann**, **Petra Roesch**, **Friedrich-Schiller-Univ. Jena** (Germany); **Thomas Henkel**, IPHT Jena (Germany) [7593-01]

1:30 pm: **Investigating fast enzyme-DNA kinetics using multidimensional fluorescence imaging and microfluidics**, **Tom Robinson**, **Geoff Baldwin**, **Mark Neil**, **Paul M. W. French**, **Andrew J. de Mello**, Imperial College London (United Kingdom) [7593-02]

1:50 pm: **Optofluidic generation of color and shape encoded microparticle for multiplexed bioassay**, **Hyoki Kim**, Seoul National Univ. (Korea, Republic of); **Jianping Ge**, **Yadong Yin**, Univ. of California, Riverside (USA); **Sunghoon Kwon**, Seoul National Univ. (Korea, Republic of) [7593-03]

2:10 pm: **Feasibility study of micro-optical diffusion sensor based on laser-induced dielectrophoresis**, **Koichi Itani**, **Akira Ebisui**, **Yoshihiro Taguchi**, **Yuji Nagasaka**, Keio Univ. (Japan) [7593-04]

2:30 pm: **Two complementary tomographic techniques for micromixer characterization**, **Yeh-Chan Ahn**, Univ. of California, Irvine (USA); **Woonggyu Jung**, Univ. of Illinois at Urbana-Champaign (USA); **Dong Sung Kim**, Chung-Ang Univ. (Korea, Republic of); **Tae Gon Kang**, Korea Aerospace Univ. (Korea, Republic of); **Seung-Jae Lee**, Chungnam National Univ. (Korea, Republic of); **Dong-Woo Cho**, **Tai Hun Kwon**, Pohang Univ. of Science and Technology (Korea, Republic of); **Matthew Brenner**, **Zhongping Chen**, Univ. of California, Irvine (USA) [7593-05]

2:50 pm: **Capillary electrophoresis in a femtosecond laser written 3-D optofluidic microsystem**, **Stephen Ho**, **Nicole Zacharia**, **J. Stewart Aitchison**, **Peter R. Herman**, Univ. of Toronto (Canada) [7593-06]

3:10 pm: **Pressure mediated tunable elastomeric optofluidic devices**, **Wuzhou Song**, **Demetri Psaltis**, Swiss Federal Institute of Technology Lausanne (Switzerland) [7593-07]

Coffee Break 3:30 to 4:00 pm

SESSION 2

Room: 125 (Exhibit Level) Mon. 4:00 to 6:00 pm

Manufacturing Technologies

Session Chair: **Bonnie L. Gray**, Simon Fraser Univ. (Canada)

4:00 pm: **A research factory for polymer microdevices: muFac**, **Brian W. Anthony**, **David E. Hardt**, Massachusetts Institute of Technology (USA) [7593-08]

4:20 pm: **Hybrid tooling technologies for injection molded polymeric microfluidic devices**, **Holger Becker**, microfluidic ChipShop GmbH (Germany); **Erik Beckert**, Fraunhofer Institute for Applied Optics and Precision Engineering (Germany); **Claudia Gärtner**, microfluidic ChipShop GmbH (Germany) . [7593-09]

4:40 pm: **LABONFOIL: Investigations regarding microfluidic skin patches for drug detection using flexible OLEDs**, **Michael Scholles**, **Lars Kroker**, **Uwe Vogel**, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **Jan Krüger**, **Biosensia Ltd.** (Ireland); **Rafal Walczak**, Wroclaw Univ. of Technology (Poland); **Jesus Ruano**, **Ikerlan** (Spain) [7593-10]

5:00 pm: **Electrode patterning within a microfluidic channel utilizing an ion-implanted process**, **Jae-Woo Choi**, Ecole Polytechnique Federale de Lausanne (Switzerland) and **California Institute of Technology** (USA); **Samuel Rosset**, **Muhamed Niklaus**, **James R. Adleman**, **Herbert R. Shea**, **Demetri Psaltis**, Ecole Polytechnique Federale de Lausanne (Switzerland) [7593-11]

5:20 pm: **Patterning of PMMA microfluidic parts using screen printing process**, **Aminreza Ahari Kaleibar**, **Mona Rahbar**, **Ash M. Parameswaran**, **Simon Fraser Univ.** (Canada) [7593-12]

5:40 pm: **Effect of surface treatments/coatings and soft bake on surface uniformity and adhesion of SU-8 on a glass substrate**, **Samantha M. Grist**, **Moeed Haq**, **Jasbir N. Patel**, **Bonnie L. Gray**, **Bozena Kaminska**, **Simon Fraser Univ.** (Canada) [7593-13]

Tuesday 26 January

SESSION 3

Room: 125 (Exhibit Level) Tues. 8:10 to 10:00 am

Cell and Particle-based Systems

Session Chair: **Bernhard H. Weigl**, PATH

8:10 am: **From bioseparation to 'artificial micro-organs': microfluidic chip based particle manipulation techniques** (*Invited Paper*), **Martin Stelzle**, **Naturwissenschaftliches und Medizinisches Institut an der Univ. Tübingen** (Germany) [7593-14]

8:40 am: **New device for in vivo study of the tumor microenvironment**, **Waseem K. Raja**, Univ. at Albany (USA); **Bojana Gligorijevic**, **Albert Einstein College of Medicine** (USA); **Michael R. Padgen**, Univ. at Albany (USA); **Douglas Eggers**, **Binghamton Univ.** (USA); **John S. Condeelis**, **Albert Einstein College of Medicine** (USA); **James Castracane**, Univ. at Albany (USA) [7593-15]

9:00 am: **Gravity-assisted capillary flow of buffer with microbeads**, **Prashant R. Waghmare**, **Sushanta Mitra**, Univ. of Alberta (Canada) [7593-17]

9:20 am: **Mesoscale to microscale manipulation using haptic interface and MEMS microgripper**, **Tim E. Dallas**, **Ashwin P. Vijayasai**, **Texas Tech Univ.** (USA); **Alex Holness**, Univ. of Maryland (USA); **Matthew Mulsow**, **Shelby Lacouture**, **Ganapathy Sivakumar**, **Texas Tech Univ.** (USA) [7593-18]

9:40 am: **Development of an integrated microsystem for the multiplexed detection of breast cancer markers in serum using electrochemical immunosensors**, **Alex Fragoso**, **Noemi Laboria**, **Mary Luz Botero Gallego**, **Diego Bejarano**, Univ. Rovira i Virgili (Spain); **Daniel Latta**, **Thomas E. Hansen-Hagge**, Institut für Mikrotechnik Mainz GmbH (Germany); **Ioanis Katakis**, Univ. Rovira i Virgili (Spain); **Claudia Gärtner**, microfluidic ChipShop GmbH (Germany); **Klaus S. Drese**, Institut für Mikrotechnik Mainz GmbH (Germany); **Ciara K. O'Sullivan**, Univ. Rovira i Virgili (Spain) and **Institució Catalana de Recerca i Estudis Avançats** (Spain) [7593-46]

Coffee Break 10:00 to 10:30 am

SESSION 4

Room: 125 (Exhibit Level) Tues. 10:30 am to 12:00 pm

Diagnostics

Session Chair: Martin Stelzle, Naturwissenschaftliches und Medizinisches Institut an der Univ. Tübingen (Germany)

10:30 am: **Microfluidic diagnostics for low resource settings** (*Invited Paper*), Bernhard H. Weigl, PATH (USA) [7593-20]

11:00 am: **High-speed high-throughput microfluidic system for whole blood analysis**, Meggie G. Grafton, Michael D. Zordan, Han-Sheng Chuang, Pooja Rajdev, Pedro P. Irazoqui, Steven T. Wereley, Purdue Univ. (USA); Alan L. Jones, Ron Byrnes, Paul W. Todd, Techshot, Inc. (USA); James F. Leary, Purdue Univ. (USA) [7593-21]

11:20 am: **Integration of an ELISA assay for breast cancer analysis into disposable, microfluidic chips for automatic diagnostics**, Klaus S. Drese, Daniel Latta, Thomas E. Hansen-Hagge, Institut für Mikrotechnik Mainz GmbH (Germany); Alex Fragoso, Univ. Rovira i Virgili (Spain); Mattia Bertschi, Stephan Dasen, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland); Livio Cognolato, Olivetti I-Jet SpA (Italy); Claudia Gärtner, microfluidic ChipShop GmbH (Germany); Ciara K. O'Sullivan, Univ. Rovira i Virgili (Spain) [7593-22]

11:40 am: **Development of a lab-on-a-chip for detection of vitamin A and D**, Tim Hossain, Sushanta Mitra, Univ. of Alberta (Canada) [7593-23]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 5

Room: 125 (Exhibit Level) Tues. 1:30 to 3:20 pm

Microfluidic Devices and Biosensors

Session Chair: Holger Becker, microfluidic ChipShop GmbH (Germany)

1:30 pm: **Microfluidic cell separation: applications & challenges in tissue engineering** (*Invited Paper*), Shashi Murthy, Northeastern Univ. (USA) . [7593-24]

2:00 pm: **Development and fabrication of a micro-chip based multiplex immunoassay**, Guocheng Shao, Louisiana State Univ. (USA); Jun Wang, Zhiwen Tang, Laxmikant V. Saraf, Yuehe Lin, Pacific Northwest National Lab. (USA); Wanjun Wang, Louisiana State Univ. (USA) [7593-25]

2:20 pm: **Effectiveness of multiple pulses on degree of electroporation**, Bashir I. Morshed, Maitham Shams, Carleton Univ. (Canada); Tofy Mussivand, Ottawa Heart Institute (Canada) [7593-26]

2:40 pm: **Sample to answer: a fully integrated nucleic acid identification system for bacteria monitoring**, Jungkyu Kim, John Elsnab, Michael Johnson, Bruce K. Gale, The Univ. of Utah (USA) [7593-27]

3:00 pm: **A microfluidic platform for characterization of DNA-DNA interactions**, Mehdi Javanmard, Stanford Univ. (USA) [7593-28]

Coffee Break 3:20 to 3:50 pm

SESSION 6

Room: 125 (Exhibit Level) Tues. 3:50 to 5:10 pm

BioMEMS and Medical Devices

Session Chair: Shashi Murthy, Northeastern Univ.

3:50 pm: **MEMS-based sensing and algorithm development for fall detection and gait analysis**, Tim E. Dallas, Piyush Gupta, Gabriel G. Ramirez, Danielle Felty, Donald Lie, Ron Banister, Andrew Dentino, Texas Tech Univ. (USA) [7593-29]

4:10 pm: **Defect tolerance in microfluidic chambers for capacitive biosensors**, Glenn H. Chapman, Bonnie L. Gray, Simon Fraser Univ. (Canada); Vijay K. Jain, Univ. of South Florida (USA) [7593-30]

4:30 pm: **Improving electrochemical immunoassay sensitivity via electrode architecture design and focused biomolecule deposition**, Robin H. Page, Calum J. McNeil, Newcastle Univ. (United Kingdom) [7593-31]

4:50 pm: **Compact and fast read-out for wavelength-encoded biosensors**, Peter Kiesel, Konrad Bellmann, Noble M. Johnson, Palo Alto Research Center, Inc. (USA) [7593-32]

POSTER SESSION

Room: 103/104 (Exhibit Level) Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Microfluidic sorting system based on optical force switching, Siew Kit Hoi, Chammika N. Udalagama, Sow Chong Haur, Andrew Anthony Bettiol, National Univ. of Singapore (Singapore) [7593-16]

Properties of conductive micromoldable thermosetting polymer for electronic routing in highly flexible microfluidic systems, Ajit Khosla, Bonnie L. Gray, Simon Fraser Univ. (Canada) [7593-39]

Analysis on the effect of geometrical design parameters on maximum shear stresses in an electromagnetic micropump, Alaalden T. Al-Halhouli, Technische Univ. Braunschweig (Germany) [7593-40]

A microfluidics and microsensor development environment, Pallab Chatterjee, SiliconMap, LLC (USA); Randall Milanowski, L-3 Communications (USA) [7593-41]

Fabrication of integrated polymer permanent micromagnets for microfluidic systems, Ajit Khosla, Bonnie L. Gray, D. B. Leznoff, Simon Fraser Univ. (Canada); J. Herchenroeder, Magnequench International, Inc. (USA); David Miller, Magnequench International Inc. (USA) [7593-42]

PDMS surface modification in the application of waveguide claddings for evanescent field sensing, Meng Wang, Univ. of Oulu (Finland); Sanna Uusitalo, VTT Technical Research Ctr. (Finland); Risto A. Myllylä, Univ. of Oulu (Finland); Leena Hakalahti, Markku Känsäkoski, VTT Technical Research Ctr. (Finland) [7593-43]

Sample preconditioning to enable downstream electrokinetic manipulations, Tim Abram, David S. Clague, California Polytechnic State Univ., San Louis Obispo (USA) [7593-45]

PANEL DISCUSSION

Room: Hilton Hotel, Golden Gate 7 Tues. 8:00 to 10:00 pm

Progress and Prospects in Microfluidics

Moderator: Holger Becker, microfluidic ChipShop GmbH (Germany)

Panelists to be announced. See online program for updates.

In the past decade, microfluidics has rapidly emerged and become main stream in many areas of the Life Sciences. Some of the microfluidic products have becoming commercially available with many more to come in the near future. Most microfluidic devices today are made of glass and polymer materials. The main reason for this trend is that the biomedical researchers and analytical chemists have been using these materials for many years and accumulated enough know-how and knowledge. As a matter of fact, this rapid development of microfluidics has been driven by compelling applications in analytical chemistry and biomedical sciences, with enormous potential in developing new technologies and reducing costs. While these market potentials have become generally accepted, the commercial uptake of microfluidics however has been much slower than anticipated in previous years. The panel discussion will try to shed some light onto this somewhat inconsistent situation and will focus on identifying obstacles on the way to commercializing microfluidic devices, highlight successful examples and case-studies and will identify most likely areas for applications of microfluidics.

Light refreshments included.

MOEMS-MEMS

Wednesday 27 January

SESSION 7

Room: 125 (Exhibit Level), Wed. 10:00 to 11:40 am

Special Session: Dip-Pen Lithography

Session Chair: **Albert K. Henning**, Nanolnk, Inc.

10:00 am: **Multiplexed Dip Pen Nanolithography® patterning by simple desktop nanolithography platform**, Jae-Won Jang, Alexander Smetana, Paul L. Stiles, Nanolnk, Inc. (USA) [7593-33]

10:20 am: **Creating well-defined molecular and colloidal assemblies with scanning probe techniques**, James D. Batteas, Texas A&M Univ. (USA) [7593-34]

10:40 am: **Biomimetic nanolithography and its application for biosensor chip fabrication**, Hiroshi Matsui, Hunter College (USA). [7593-35]

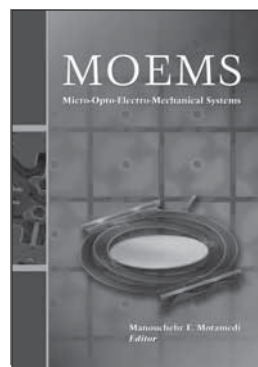
11:00 am: **Surface assembly of pyridyl-substituted porphyrins on Au(111) investigated in situ using scanning probe lithography**, Jayne C. Garno, Zorabel M. LeJeune, Matt McKenzie, Erhong Hao, M. Graca H. Vicente, Bin Chen, Louisiana State Univ. (USA) [7593-36]

11:20 am: **Self-leveling 2D DPN® probe arrays**, Jason R. Haaheim, Vadim Val, Ed Solheim, John Bussan, Joseph Fragala, Michael Nelson, Nanolnk, Inc. (USA). [7593-37]

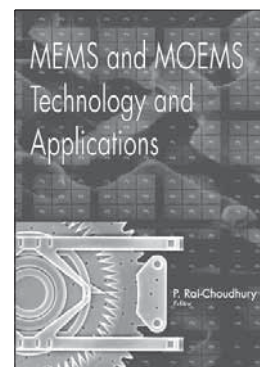
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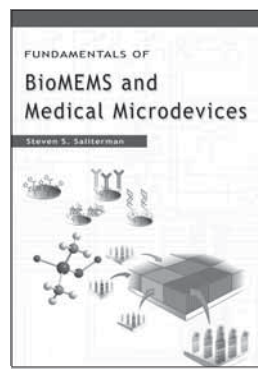
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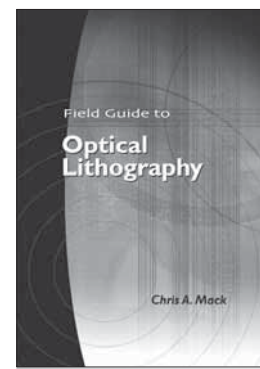
Vol. PM126



Vol. PM85



Vol. PM153



Vol. FG06

MOEMS and Miniaturized Systems IX

Conference Chairs: Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany); Wibool Piyawattanametha, NECTEC (Thailand) and Stanford Univ.

Program Committee: Susanne Arney, Alcatel-Lucent Bell Labs.; Wyatt O. Davis, Microvision, Inc.; David L. Dickensheets, Montana State Univ., Bozeman; Jean-Christophe Eloy, Yole Développement (France); Sonia Garcia-Blanco, Institut National d'Optique (Canada); Jason C. Heikenfeld, Univ. of Cincinnati; Wilfried Noell, Univ. of Neuchâtel (Switzerland); Yong-Hwa Park, Samsung Advanced Institute of Technology (Korea, Republic of)

Monday 25 January

MOEMS-MEMS PLENARY SESSION

Room 102 (Exhibit Level) Mon. 9:00 am to 12:00 pm

9:00 am: **Welcome and Opening Remarks**, Thomas J. Suleski, The Univ. of North Carolina at Charlotte; Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany)

9:10 am: **Emerging Research in Microsystems: Opportunities and Challenges in Health-Care and Environmental Sensing Applications**, Yogesh B. Gianchandani, Univ. of Michigan (USA) and National Science Foundation (USA) [7593-201]

Coffee Break 10:00 to 10:20 am

10:20 am: **MEMS Technologies for Artificial Retinas**, Wilfried Mokwa, RWTH Aachen Univ. (Germany) [7594-202]

11:10 am: **Shaping Light: MOEMS Deformable Mirrors for Microscopes and Telescopes**, Thomas G. Bifano, Boston Univ. Photonics Ctr. (USA) and Boston Micromachines Corp. (USA) [7595-203]

Lunch Break 12:00 to 1:00 pm

SESSION 1

Room: 304 (Esplanade) Mon. 1:00 to 3:30 pm

MEMS and Miniaturized Scanners for Endomicroscopy

Joint Session with Conference 7558

Session Chair: David L. Dickensheets, Montana State Univ.

1:00 pm: **In vivo brain imaging using miniaturized one- and two-photon fluorescence microscopes** (*Invited Paper*), Mark J. Schnitzer, Stanford Univ. School of Medicine (USA) [7594-01]

1:30 pm: **MEMS-devices for laser camera systems for endoscopic applications** (*Invited Paper*), Christian Drabe, Harald Schenk, Thilo Sandner, Fraunhofer Institute for Photonic Microsystems (Germany); Richard A. James, Microvision, Inc. (USA) [7594-02]

2:00 pm: **Piezoelectric MEMS mirrors for forward-looking endoscopic imaging**, Sonia Grego, Kristin H. Gilchrist, RTI International (USA); Ryan P. McNabb, Joseph A. Izatt, Duke Univ. (USA) [7558-21]

2:20 pm: **Dual-axes confocal microendoscopy of gastrointestinal tract**, Wibool Piyawattanametha, NECTEC (Thailand) and Stanford Univ. (USA); Michael Mandella, Hyejun Ra, Stanford Univ. (USA); Q. Zhen, Univ. of Michigan (USA); Kevin Loewke, Jonathan Liu, Shai Frieland, Gordon Kino, Roy Soetikno, Stanford Univ. (USA); Thomas D. Wang, Univ. of Michigan (USA); Olav Solgaard, Christopher Contag, Stanford Univ. (USA) [7558-22]

2:40 pm: **A surgical confocal microscope utilizing a MEMS scanner and a GRIN relay lens for molecular image-guided brain tumor resection**, Jonathan T. C. Liu, Michael J. Mandella, Stanford Univ. (USA); Nathan O. Loewke, Univ. of California, Los Angeles (USA); Ellis Garai, Wibool Piyawattanametha, Hyejun Ra, Henry Haeberle, Olav Solgaard, Gordon S. Kino, Christopher H. Contag, Stanford Univ. (USA) [7558-23]

3:00 pm: **In vivo 3D and Doppler OCT imaging using electrothermal MEMS scanning mirrors** (*Invited Paper*), J. Sun, Lei Wu, Huikai Xie, Univ. of Florida (USA) [7594-03]

Coffee Break 3:30 to 3:50 pm

SESSION 2

Room: 304 (Esplanade) Mon. 3:50 to 5:30 pm

Micro-optics for Endomicroscopy

Joint Session with Conference 7558

Session Chair: Wibool Piyawattanametha, NECTEC (Thailand) and Stanford Univ.

3:50 pm: **Improved chromatic performance of endomicroscope optics for broadband imaging**, Gabriel C. Birch, College of Optical Sciences, The Univ. of Arizona (USA); Brian McCall, Tomasz S. Tkaczyk, Rice Univ. (USA); Michael R. Descour, College of Optical Sciences, The Univ. of Arizona (USA) [7558-24]

4:10 pm: **Focused OCT and LIF endoscope**, R. Andrew Wall, The Univ. of Arizona (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Garret T. Bonnema, D4D Technologies, LLC (USA); Jennifer K. Barton, The Univ. of Arizona (USA) [7558-25]

4:30 pm: **High-resolution axicon based endoscopic FD OCT imaging with a large depth range**, Kye-Sung Lee, The Institute of Optics, Univ. of Rochester (USA); William Hurley, Rochester Precision Optics (USA); Jannick P. Rolland, The Institute of Optics, Univ. of Rochester (USA) [7558-26]

4:50 pm: **MEMS deformable mirrors for focus control in vital microscopy**, David L. Dickensheets, Sarah J. Lukes, Erwin Dunbar, Jeffrey Lutzenburger, Montana State Univ. (USA) [7594-04]

5:10 pm: **High-speed liquid lens with 2-ms response and 80.3-nm root-mean-square wave front error**, Hiromasa Oku, Masatoshi Ishikawa, The Univ. of Tokyo (Japan) [7594-05]

Tuesday 26 January

SESSION 3

Room: 124 (Exhibit Level) Tues. 8:40 to 10:20 am

Display and Imaging I

Session Chair: Yong-Hwa Park,

Samsung Advanced Institute of Technology (Korea, Republic of)

8:40 am: **Pixtronix digital micro shutter display technology: a MEMS display for low power mobile multimedia displays** (*Invited Paper*), Timothy J. Brosnihan, Pixtronix, Inc. (USA) [7594-06]

9:10 am: **Resonance MEMS mirrors design considerations** (*Invited Paper*), Sason Sourani, bTendo Ltd. (Israel) [7594-07]

9:40 am: **Evolution of MEMS scanning mirrors for laser projection in compact consumer electronics**, Jason Tauscher, Wyatt O. Davis, Dean Brown, Matt Ellis, Yunfei Ma, Michael E. Sherwood, David Bowman, Mark P. Helsen, Sung Lee, John Wyatt Coy, Microvision, Inc. (USA) [7594-08]

10:00 am: **Nonlinear mathematical model for a biaxial MOEMS scanning mirror**, Yunfei Ma, Wyatt O. Davis, Matt Ellis, Dean Brown, Microvision, Inc. (USA) [7594-09]

Coffee Break 10:20 to 10:50 am

MOEMS-MEMS

SESSION 4

Room: 124 (Exhibit Level), Tues. 10:50 am to 12:10 pm

Display and Imaging II

Session Chair: Wyatt O. Davis, Microvision, Inc.

10:50 am: **Synchronized micro scanner array for large aperture receiver optics of LIDAR systems**, Thilo Sandner, Michael Wildenhain, Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany) [7594-10]

11:10 am: **Large aperture MEMS scanner module for 3D distance measurement**, Thilo Sandner, Michael Wildenhain, Christian Gerwig, Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany) [7594-11]

11:30 am: **Surface micro-machined SU8-2002 membrane mirrors for focus control**, Sarah J. Lukes, Montana State Univ. (USA); David Lämmle, Albert-Ludwigs-Univ. Freiburg (Germany); David L. Dickensheets, Montana State Univ. (USA) [7594-12]

11:50 am: **Deformable silicon membrane for dynamic linear laser beam diffuser**, Jonathan Masson, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Andreas Bich, SUSS MicroOptics SA (Switzerland); Wilfried Noell, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Reinhard Voelkel, Kenneth J. Weible, SUSS MicroOptics SA (Switzerland); Nico F. de Rooij, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7594-13]

Lunch/Exhibition Break 12:10 to 2:30 pm

SESSION 5

Room: 124 (Exhibit Level), Tues. 2:30 to 3:30 pm

MOEM Components and Systems I

Session Chair: Christian Drabe, Fraunhofer Institute for Photonic Microsystems (Germany)

2:30 pm: **Diffusers for shaping light with a multichannel concept**, Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany); Christian Hellmann, LightTrans GmbH (Germany) [7594-15]

2:50 pm: **Design and testing of a rotating out-of-plane micromirror**, Tim E. Dallas, Sahil Oak, Greg Edmiston, Ganapathy Sivakumar, Texas Tech Univ. (USA) [7594-17]

3:10 pm: **CMOS Geiger-mode avalanche photodiode detectors for time and intensity resolved measurements**, William G. Lawrence, Tani Tozian, Christopher Stapels, James F. Christian, Radiation Monitoring Devices Inc. (USA); Gregory D. Derderian, Dipole Engineering (USA); Jeffrey P. Derderian, Consultant (USA); Gyula Varadi, Radiation Monitoring Devices Inc. (USA) [7594-18]

Coffee Break 3:30 to 4:00 pm

SESSION 6

Room: 124 (Exhibit Level), Tues. 4:00 to 5:30 pm

MOEM Components and Systems II

Session Chair: Jean-Christophe Eloy, Yole Développement (France)

4:00 pm: **High aspect ratio micromirror array with two degrees of freedom for femtosecond pulse shaping (Invited Paper)**, Stefan M. Weber, Wilfried Noell, Ecole Polytechnique Federale de Lausanne (Switzerland); Denis Kiselev, Jérôme Extermann, Univ. de Genève (Switzerland); Severin Waldis, Ecole Polytechnique Federale de Lausanne (Switzerland); Luigi Bonacina, Jean-Pierre Wolf, Univ. de Genève (Switzerland); Nico F. de Rooij, Ecole Polytechnique Federale de Lausanne (Switzerland) [7594-19]

4:30 pm: **Optical position feedback and phase control of MOEMS-scanner mirrors**, Andreas Tortschanoff, Albert Frank, Martin Lenzhofer, Carinthian Tech Research AG (Austria); Michael Wildenhain, Thilo Sandner, Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany); Andreas Kenda, Carinthian Tech Research AG (Austria) [7594-20]

4:50 pm: **Development of miniaturized optical viscosity sensor with optical surface tracking system**, Hiroshi Abe, Ryuusuke Nagamachi, Yoshihiro Taguchi, Yuji Nagasaka, Keio Univ. (Japan) [7594-21]

5:10 pm: **Tunable optofluidic dye laser with novel cavity**, Wuzhou Song, Andreas E. Vasdekis, Demetri Psaltis, Swiss Federal Institute of Technology Lausanne (Switzerland) [7594-22]

POSTER SESSION

Room: 103/104 (Exhibit Level), Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Design and experimental results for a compact laser printer optical system with MEMS scanning mirror (Invited Paper), Takatoshi Suzuki, Daisuke Seki, Shuichi Fujii, Yukihiko Mukai, Nalux Co., Ltd. (Japan) [7594-14]

Design and characterization of MEMS interferometric sensing, Azad Siahmakoun, Ryan M. Snyder, Rose-Hulman Institute of Technology (USA) [7594-35]

A novel free-space MEMS-based variable optical delay line, Mohamed A. Basha, Univ. of Waterloo (Canada); Nikolai Dechev, Univ. of Victoria (Canada); Saffiedin Safavi-Naeini, Sujeet Chaudhuri, Univ. of Waterloo (Canada) . [7594-36]

Design of spectrophotometers and ended-ended systems, Armando G. Rojas, Alicia Vera Marquina, Univ. de Sonora (Mexico) [7594-37]

MEMS temperature scanner: principles, advances, and applications, Thomas Otto, Ray Saupe, Fraunhofer Research Institution for Electronic Nano Systems (Germany); Volker Stock, COLOUR CONTROL Farbmesstechnik GmbH (Germany); Thomas Gessner, Fraunhofer Research Institution for Electronic Nano Systems (Germany) [7594-38]

Wednesday 27 January

SESSION 7

Room: 124 (Exhibit Level), Wed. 9:00 to 10:10 am

Space Applications I

Session Chair: Sonia Garcia-Blanco, INO (Canada)

9:00 am: **JWST microshutter array system and beyond (Invited Paper)**, Mary J. Li, Ari-David Brown, Alexander S. Kutyrev, Vilem Mikula, Harvey S. Moseley, Jr., NASA Goddard Space Flight Ctr. (USA) [7594-24]

9:30 am: **Development of a tilt actuated micromirror for applications in laser interferometry**, Wolfgang Kronast, Ulrich Mescheder, Bernhard Müller, Antwi Nimo, Hochschule Furtwangen Univ. (Germany); Claus Braxmaier, Thilo Schuldt, Univ. of Applied Sciences Konstanz (Germany) [7594-25]

9:50 am: **Realization and characterization of MEMS-based programmable slit mask for multi-object spectroscopy**, Michael D. Canonica, Ecole Polytechnique Federale de Lausanne (Switzerland); Severin Waldis, Univ. of Neuchâtel (Switzerland); Frederic Zamkotsian, Patrick Lanzoni, Lab. d'Astrophysique de Marseille (France); Wilfried Noell, Nico F. de Rooij, Ecole Polytechnique Federale de Lausanne (Switzerland) [7594-26]

Coffee Break 10:10 to 10:40 am

SESSION 8

Room: 124 (Exhibit Level), Wed. 10:40 am to 12:00 pm

Space Applications II

Session Chair: Sonia Garcia-Blanco, INO (Canada)

10:40 am: **Carbon nanotube-based digital vacuum electronics and miniature instrumentation for space exploration (Invited Paper)**, Harish M. Manohara, Mohammad Mojarradi, Risaku Toda, Robert H. Lin, Anna Liao, Lee J. Hall, Jet Propulsion Lab. (USA) [7594-27]

11:10 am: **Development of slab waveguide spatial heterodyne spectrometer for remote sensing**, Miroslaw Florjanczyk, York Univ. (Canada); Pavel Cheben, Siegfried Janz, Boris Lamontagne, Jean Lapointe, National Research Council Canada (Canada); Alan D. Scott, COM DEV Ltd. (Canada); Brian H. Solheim, York Univ. (Canada); Dan-Xia Xu, National Research Council Canada (Canada) [7594-28]

11:30 am: **MOEMS for space application: The European Space Agency strategy for photonics components (Invited Paper)**, Mustapha Zahir, Laurent Marchand, Benedikt Guldemann, European Space Research and Technology Ctr. (Netherlands) [7594-39]

Lunch/Exhibition Break 12:00 to 1:20 pm

SESSION 9

Room: 124 (Exhibit Level) Wed. 1:20 to 3:10 pm

Micro Spectrometers and Optical Filter

Session Chair: Wilfried Noell, Univ. of Neuchâtel (Switzerland)

1:20 pm: Miniaturized tunable integrated Mach-Zehnder MEMS interferometer for spectrometer applications (Invited Paper), Daa A. M. Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt); Haitham Omran, Ain Shams Univ. (Egypt); Mostafa Medhat, Bassam Saadany, Si-Ware Systems (Egypt) [7594-30]

1:50 pm: Miniaturized MEMS-based spectrometric sensor for process control and analysis of carbonated beverages, Andreas Kenda, Andreas Tortschanoff, Martin Kraft, Carinthian Tech Research AG (Austria); Christoph Wagner, Bernhard Lendl, Technische Univ. Wien (Austria); Thilo Sandner, Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany) . . . [7594-31]

2:10 pm: Recent advances in expanding the spectral range of MEMS Fabry-Pérot filters, Martin Ebermann, Norbert Neumann, Infratec GmbH (Germany); Karla Hiller, Technische Univ. Chemnitz (Germany); Elvira Gittler, JENOPTIK Laser, Optik, Systeme GmbH (Germany); Steffen Kurth, Fraunhofer ENAS (Germany) [7594-32]

2:30 pm: Prototyping of SWIR MEMS-based optical filter combined with HgCdTe detector, Dmitry A. Kozak, Univ. of California, Santa Cruz (USA); Silviu Velicu, EPIR Technologies (USA); Joel A. Kubby, Univ. of California, Santa Cruz (USA) [7594-33]

2:50 pm: Design and fabrication of a micro-mirror for spectroscopy, K. Ajay Giri Prakash, Sanjay Dhabai, Enakshi Bhattacharya, Shanti Bhattacharya, Indian Institute of Technology Madras (India) [7594-34]

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MOEMS-MEMS

MEMS Adaptive Optics IV

Conference Chairs: **Scot S. Olivier**, Lawrence Livermore National Lab.; **Thomas G. Bifano**, Boston Univ.; **Joel A. Kubby**, Univ. of California, Santa Cruz

Program Committee: **William D. Cowan**, Sandia National Labs.; **Christopher J. Dainty**, National Univ. of Ireland, Galway (Ireland); **Donald T. Gavel**, Univ. of California Observatories; **Andreas Gehner**, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **Wen-Han Jiang**, Institute of Optics and Electronics (China); **Alexis V. Kudryashov**, Moscow State Open Univ. (Russian Federation); **Sergio R. Restaino**, Naval Research Lab.; **Ulrich Wittrock**, Fachhochschule Münster (Germany)

Wednesday 27 January

SESSION 1

Room: 111 (Exhibit Level). Wed. 10:30 am to 12:40 pm

MEMS AO for Lasers and Communication

Session Chair: **Thomas G. Bifano**, Boston Univ.

10:30 am: **Interferometric adaptive optics testbed for laser pointing, wave-front control, and phasing** (*Invited Paper*), Kevin L. Baker, Doug C. Homoele, Everett J. Utterback, Steven M. Jones, Lawrence Livermore National Lab. (USA) [7595-01]

11:00 am: **Phasing rectangular apertures** (*Invited Paper*), Kevin L. Baker, Lawrence Livermore National Lab. (USA) [7595-02]

11:30 am: **Low power MEMS retroreflectors for optical communication** (*Invited Paper*), Jason B. Stewart, Steven A. Cornelissen, Boston Micromachines Corp. (USA); David Freedman, Mark N. Horenstein, Boston Univ. (USA); Peter Woskov, Boston Micromachines Corp. (USA); Jonathan Tang, Boston Univ. (USA) [7595-03]

12:00 pm: **High-power visible-laser effect on a 37-segment Iris AO deformable mirror**, Andrew P. Norton, Univ. of California, Santa Cruz (USA); Donald T. Gavel, Daren Dillon, Univ. of California Observatories (USA) . [7595-04]

12:20 pm: **Fast autonomous holographic adaptive optics**, Geoff P. Andersen, U.S. Air Force Academy (USA) [7595-05]

Lunch/Exhibition Break 12:40 to 2:00 pm

SESSION 2

Room: 111 (Exhibit Level). Wed. 2:00 to 5:30 pm

MEMS AO for Astronomy

Session Chair: **Scot S. Olivier**, Lawrence Livermore National Lab.

2:00 pm: **Progress report for visible light laser guidestar experiments at Lick Observatory** (*Invited Paper*), Donald T. Gavel, Univ. of California Observatories (USA) [7595-06]

2:30 pm: **The MEMS adaptive optics program at the Naval Research Laboratory** (*Invited Paper*), Sergio R. Restaino, Jonathan R. Andrews, Ty Martinez, Freddie Santiago, Christopher C. Wilcox, U.S. Naval Research Lab. (USA); Scott W. Teare, New Mexico Institute of Mining and Technology (USA) [7595-07]

3:00 pm: **Using two MEMS deformable mirrors in an adaptive optics testbed for multi-conjugate correction** (*Invited Paper*), Jonathan R. Andrews, Ty Martinez, U.S. Naval Research Lab. (USA); Scott W. Teare, New Mexico Institute of Mining and Technology (USA); Sergio R. Restaino, Christopher C. Wilcox, Freddie Santiago, U.S. Naval Research Lab. (USA); Don M. Payne, Narrascope, Inc. (USA) [7595-08]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Reliability of MEMS deformable mirror technology used in adaptive optics imaging systems** (*Invited Paper*), Allyson L. Hartzell, Steven A. Cornelissen, Paul A. Bierden, Charlie V. Lam, Daniel Davis, Boston Micromachines Corp. (USA) [7595-09]

4:30 pm: **Preliminary results of large-actuator-count MEMS DM development**, Michael A. Helmbrecht, Min He, Patrick Rhodes, Carl J. Kempf, Iris AO, Inc. (USA) [7595-10]

4:50 pm: **Open loop control on large stroke MEMS deformable mirrors**, Alioune Diouf, Thomas G. Bifano, Andrew Legendre, Yang Lu, Boston Univ. (USA); Jason B. Stewart, Boston Micromachines Corp. (USA) [7595-11]

5:10 pm: **Modeling, parameter estimation, and open-loop control for MEMS deformable mirrors**, Curtis R. Vogel, Montana State Univ. (USA) [7595-12]

Thursday 28 January

SESSION 3

Room: 111 (Exhibit Level). Thurs. 10:00 am to 12:00 pm

MEMS AO for Bio-Imaging

Session Chair: **Joel A. Kubby**, Univ. of California, Santa Cruz

10:00 am: **Adaptive optics for microscopy and photonic fabrication** (*Invited Paper*), Martin J. Booth, Alexander Jesacher, Anisha Thayil, Tony Wilson, Univ. of Oxford (United Kingdom) [7595-13]

10:30 am: **Adaptive optics multiphoton microscopy** (*Invited Paper*), Emilio Gualda, Juan M. Bueno, Pablo Artal, Univ. de Murcia (Spain) [7595-14]

11:00 am: **Femtosecond NIR pulse shaping with push pull deformable mirror**, Stefano Bonora, Daniele Brida, Cristian Manzoni, Sandro De Silvestri, Giulio Cerullo, CNR-INFN ULTRAS (Italy); Paolo Villaresi, Univ. degli Studi di Padova (Italy) [7595-15]

11:20 am: **Implementation of an adaptive optics wide field microscope using a Shack-Hartmann wavefront sensor and a MEMS deformable mirror**, Oscar A. Azucena, Jr., Joel A. Kubby, Univ. of California, Santa Cruz (USA) [7595-16]

11:40 am: **New results of unimorph laser mirrors with screen printed actuator**, Claudia Bruchmann, Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) and Friedrich Schiller Univ. of Jena (Germany); Ramona Eberhardt, Erik Beckert, Fraunhofer Institute for Applied Optics and Precision Engineering (Germany); Andreas Tünnermann, Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) and Friedrich Schiller Univ. of Jena (Germany) [7595-17]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 4

Room: 111 (Exhibit Level). Thurs. 1:30 to 4:00 pm

MEMS AO Devices

Session Chair: **Joel A. Kubby**, Univ. of California, Santa Cruz

1:30 pm: **Bimorph mirrors and other correctors: What is the best?** (*Invited Paper*), Alexis V. Kudryashov, Vadim V. Samarkin, Alexey L. Rukosuev, Moscow State Open Univ. (Russian Federation) [7595-18]

2:00 pm: **Results, images, and strategy control of the mirao™ 52e, large stroke electromagnetic deformable mirror for nonlinear microscopy**, Jérôme Ballesta, Imagine Optic Inc. (USA) [7595-19]

2:20 pm: **Adaptive optics control system for segmented MEMS deformable mirrors**, Carl J. Kempf, Iris AO, Inc. (USA) [7595-20]

2:40 pm: **Development of through wafer interconnect assembly process for MEMS DMs**, Alioune Diouf, Thomas G. Bifano, Boston Univ. (USA); Jason B. Stewart, Steven A. Cornelissen, Boston Micromachines Corp. (USA) . . [7595-21]

3:00 pm: **Study on dual movement of microdeformable mirror**, Jun Yao, Fangrong Hu, Hao Ren, Lixin Huang, Institute of Optics and Electronics (China) [7595-22]

3:20 pm: **Pseudo-analog electrostatic piston micromirror**, Tim E. Dallas, Hao Gu, Ganapathy Sivakumar, Texas Tech Univ. (USA) [7595-23]

3:40 pm: **Hi-speed compact and large stroke deformable mirror: status, applications and perspectives**, Frédéric Rooms, Sebastien Camet, Jean-Francois Curis, ALPAO (France) [7595-24]

Emerging Digital Micromirror Device Based Systems and Applications II

Conference Chairs: **Michael R. Douglass**, Texas Instruments Inc.; **Larry J. Hornbeck**, Texas Instruments Inc.

Program Committee: **Michael F. Becker**, The Univ. of Texas at Austin; **Leigh A. Files**, Texas Instruments Inc.; **Patrick I. Oden**, Texas Instruments Inc.; **Paul L. Rancuret**, Texas Instruments Inc.; **Joseph P. Rice**, National Institute of Standards and Technology; **Karel J. Zuzak**, The Univ. of Texas at Arlington



Wednesday 27 January

Introduction and Welcome

Room: 110 (Exhibit Level) Wed. 8:20 to 8:30 am

Michael R. Douglass, Texas Instruments Inc.;
Larry J. Hornbeck, Texas Instruments Inc.

SESSION 1

Room: 110 (Exhibit Level) Wed. 8:30 to 10:10 am

Biochemical Visualization for Clinical Applications

Session Chairs: **Leigh A. Files**, Texas Instruments Inc.;
Michael R. Douglass, Texas Instruments Inc.

8:30 am: **Surgical and clinical needs for DLP® hyperspectral imaging** (*Invited Paper*), Edward Livingston, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) [7596-01]

9:00 am: **DLP® technology's pivotal role in O2view's versatile medical projection / illumination device**, Rene G. M. van Melick, O2view BV (Netherlands) [7596-02]

9:20 am: **The robustness of DLP® hyperspectral imaging for clinical and surgical utility**, Karel J. Zuzak, The Univ. of Texas at Arlington (USA); Maritoni Litorja, National Institute of Standards and Technology (USA); Rafael Ufret-Vincenty, Jeffrey A. Cadeddu, Edward Livingston, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) [7596-03]

9:40 am: **Application of novel hyperspectral imaging technologies in combat casualty care** (*Invited Paper*), Leopoldo C. Cancio, U.S. Army Institute of Surgical Research (USA) [7596-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 110 (Exhibit Level) Wed. 10:40 am to 12:10 pm

Photo-Medical Applications for Advanced Research

Session Chairs: **Karel J. Zuzak**, The Univ. of Texas at Arlington;
Michael F. Becker, The Univ. of Texas at Austin

10:40 am: **Spatial mapping of oxygen levels in the brain using a digital micromirror device** (*Invited Paper*), Andrew K. Dunn, Adrien Ponticorvo, The Univ. of Texas at Austin (USA) [7596-05]

11:10 am: **Use of a spectrally-tunable source to explore improvement in chromatic contrast for illumination of tissues**, Maritoni Litorja, Ben Ecker, National Institute of Standards and Technology (USA) [7596-06]

11:30 am: **Confocal fluorescence detection of cell-based assays using a digital micromirror device**, Jong-Ryul Choi, Yonsei Univ. (Korea, Republic of); Jong Hwan Sung, Michael L. Shuler, Cornell Univ. (USA); Donghyun Kim, Yonsei Univ. (Korea, Republic of) [7596-07]

11:50 am: **Quantifying heat transfer in DMD-based optoelectronic tweezers using infrared thermography**, Peter J. Pauzaskie, Lawrence Livermore National Lab. (USA); Hsan-Yin Hsu, Arash Jamshidi, Justin K. Valley, Shao Ning Pei, Ming C. Wu, Univ. of California, Berkeley (USA) [7596-08]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 3

Room: 110 (Exhibit Level) Wed. 1:30 to 3:40 pm

Light Manipulation and Beam Shaping

Session Chairs: **Larry J. Hornbeck**, Texas Instruments Inc.;
Paul L. Rancuret, Texas Instruments Inc.

1:30 pm: **High-precision laser beam shaping using binary-amplitude DLP® spatial light modulators** (*Invited Paper*), Michael F. Becker, Jinyang Liang, Rudolph N. Kohn, Daniel J. Heinzen, The Univ. of Texas at Austin (USA) [7596-09]

2:00 pm: **DMD-based multi-target laser tracking for motion capturing**, Florent Souvestre, HLP Technologies (France) and CEA LIST (France); Moustapha Hafez, CEA LIST (France); Stéphane Regnier, ISIR-Institut des Systèmes Intelligents et Robotique (France) [7596-10]

2:20 pm: **Enabling technology for next-generation data storage of high-fidelity recordings in volumetric crystal media**, Glenn A. Gladney, Marvin Hutt, Gardy Cadet, Access Optical Networks, Inc. (USA) [7596-11]

2:40 pm: **A single-pixel optical sectioning programmable-array microscope**, Yuehao Wu, Peng Ye, Gonzalo R. Arce, Dennis W. Prather, Univ. of Delaware (USA) [7596-12]

3:00 pm: **Evaluation of the DMD chip in a space environment for the ESA EUCLID mission**, Frederic Zamkotsian, Emmanuel Grassi, Patrick Lanzoni, Rudy Barette, Christophe Fabron, Lab. d'Astrophysique de Marseille (France); Kyrre Tangen, Visitech AS (Norway); Laurent Marchand, Ludovic Duvet, European Space Agency (Netherlands) [7596-13]

3:20 pm: **Time-resolved confocal microscopy using a digital micromirror device**, Walter Neu, Angela Hellwig, Markus Schellenberg, Fachhochschule Emden/Leer (Germany) [7596-18]

Coffee Break 3:40 to 4:00 pm

SESSION 4

Room: 110 (Exhibit Level) Wed. 4:00 to 5:30 pm

Rapid Prototyping and Optical Characterization

Session Chairs: **Patrick I. Oden**, Texas Instruments Inc.;
Joseph P. Rice, National Institute of Standards and Technology

4:00 pm: **The use of DMD technology in rapid manufacturing equipment for mass customization applications** (*Invited Paper*), A. El-Siblani, EnvisionTEC (USA) [7596-14]

4:30 pm: **DMD-based 3D micro-manufacturing**, Jae-Won Choi, Ryan B. Wicker, The Univ. of Texas at El Paso (USA) [7596-15]

4:50 pm: **Application of DLP® technology to the spectral-response characterization of detectors**, Alexandre Y. Fong, Optronic Labs., LLC (USA) [7596-16]

5:10 pm: **Subpixel scatter in digital micromirror devices**, Kenneth D. Fourspring, Zoran Ninkov, Rochester Institute of Technology (USA) . . . [7596-17]

MOEMS-MEMS

Conferences

Symposium Chair
E. Fred Schubert,
 Rensselaer Polytechnic
 Institute (USA)



Symposium Cochair
Liang-Chy Chien,
 Kent State Univ. (USA)



Symposium Cochair
James G. Grote,
 Air Force Research Lab.
 (USA)



Optoelectronic Materials and Devices

Program Chair: **James G. Grote**, Air Force Research Lab. (USA)

- 7597 **Physics and Simulation of Optoelectronic Devices XVIII** (*Witzigmann/Henneberger/Arakawa/Osiriński*)200
- 7598 **Optical Components and Materials VII** (*Jiang/Digonnet/Glesener/Dries*)204
- 7599 **Organic Photonic Materials and Devices XII** (*Nelson/Kajzar/Kaino*)207
- 7600 **Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIV** (*Song/Tsen*)210
- 7601 **Terahertz Technology and Applications III** (*Sadwick/O'Sullivan*)214
- 7602 **Gallium Nitride Materials and Devices V** (*Chyi/Nanishi/Morkoç*) 215
- 7603 **Oxide-based Materials and Devices** (*Teherani/Look/Litton/Rogers*)219

Photonic Integration

Program Chair: **Yakov Sidorin**, Quarles Brady LLP (USA)

- 7604 **Integrated Optics: Devices, Materials, and Technologies XIV** (*Broquin/Greiner*)222
- 7605 **Optoelectronic Integrated Circuits XII** (*Eldada/Lee*)225
- 7606 **Silicon Photonics V** (*Kubby/Reed*)227
- 7607 **Optoelectronic Interconnects and Component Integration X** (*Glebov/Chen*)230

Nanotechnologies in Photonics

Program Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

- 7608 **Quantum Sensing and Nanophotonic Devices VII** (*Razeghi*)233
- 7609 **Photonic and Phononic Crystal Materials and Devices IX** (*Adibi/Lin/Scherer*)238
- 7610 **Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling VII** (*Eyink/Szmulowicz/Huffaker*)241
- 7591 **Advanced Fabrication Technologies for Micro/Nano Optics, and Photonics III** (*Schoenfeld/Wang/Loncar/Suleski*)184

Advanced Quantum and Optoelectronic Applications

Program Chair: **Zameer U. Hasan**, Temple Univ. (USA)

- 7611 **Advances in Photonics of Quantum Computing, Memory, and Communication III** (*Hasan/Craig/Hemmer/Santori*)243
- 7612 **Advances in Slow and Fast Light III** (*Shahriar/Hemmer*)245
- 7613 **Complex Light and Optical Forces IV** (*Galvez*)247
- 7614 **Laser Refrigeration of Solids III** (*Epstein/Sheik-Bahae*)249
- 7608 **Quantum Sensing and Nanophotonic Devices VII** (*Razeghi*)233
- 7610 **Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling VII** (*Eyink/Szmulowicz/Huffaker*)241



Photonics West maps:

Moscone Maps	pp. 2–5
Hilton Hotel Map	p. 3
Area Map	p. 322

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM Opto Semiconductors GmbH (Germany)

7615	Vertical-Cavity Surface-Emitting Lasers XIV (<i>Guenter/Choquette</i>) .250
7616	Novel In-Plane Semiconductor Lasers IX (<i>Belyanin/Smowton</i>) . . .252
7617	Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIV (<i>Streubel/Jeon/Tu</i>) .256
7597	Physics and Simulation of Optoelectronic Devices XVIII (<i>Witzigmann/Henneberger/Arakawa/Osiriński</i>)200
7602	Gallium Nitride Materials and Devices V (<i>Chyi/Nanishi/Morkoç</i>) . 215
7583	High-Power Diode Laser Technology and Applications VIII (<i>Zediker</i>)164

Displays and Holography

Program Chair: **Liang-Chy Chien**, Kent State Univ. (USA)

7618	Emerging Liquid Crystal Technologies V (<i>Chien</i>)259
7619	Practical Holography XXIV: Materials and Applications (<i>Bjelkhagen/Kostuk</i>)262

Optical Communications: Systems and Sub-systems

Program Chair: **Benjamin Dingel**, Nasfine Photonics, Inc. (USA)

7620	Broadband Access Communication Technologies IV (<i>Dingel/Jain/Tsukamoto</i>)264
7621	Optical Metro Networks and Short-Haul Systems II (<i>Weiershausen/Dingel/Dutta/Srivastava</i>)265
7607	Optoelectronic Interconnects and Component Integration X (<i>Glebov/Chen</i>)230
7587	Free-Space Laser Communication Technologies XXII (<i>Hemmati</i>) . . . 173

OPTO Special Events	22–23
OPTO Proceedings of SPIE/CD-ROM	325
Index of Authors, Chairs, and Committee Members	267–318

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E. Fred Schubert , Rensselaer Polytechnic Institute (USA)	

OPTO Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
23 January	24 January	25 January	26 January	27 January	28 January

Optoelectronic Materials and Devices

Program Chair: **James G. Grote**, Air Force Research Lab. (USA)

7603	Oxide-based Materials and Devices (<i>Teherani, Look, Litton, Rogers</i>) p. 219
7600	Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIV (<i>Song, Tsen</i>) p. 210
7602	Gallium Nitride Materials and Devices V (<i>Chyi, Nanishi, Morkoç</i>) p. 215
7597	Physics and Simulation of Optoelectronic Devices XVIII (<i>Witzigmann, Henneberger, Arakawa, Osiriski</i>) p. 200
7598	Optical Components and Materials VII (<i>Jiang, Digonnet, Glesener, Dries</i>) p. 204
7599	Organic Photonic Materials and Devices XII (<i>Nelson, Kajzar, Kaino</i>) p. 207
7601	Terahertz Technology and Applications III (<i>Sadwick, O'Sullivan</i>) p. 214

Photonic Integration

Program Chair: **Yakov Sidorin**, Quarles Brady LLP (USA)

7606	Silicon Photonics V (<i>Kubby, Reed</i>) p. 227
7604	Integrated Optics: Devices, Materials, and Technologies XIV (<i>Broquin, Greiner</i>) p. 222
7607	Optoelectronic Interconnects and Component Integration X (<i>Glebov, Chen</i>) p. 230
7605	Optoelectronic Integrated Circuits XII (<i>Eldada, Lee</i>) p. 225

Nanotechnologies in Photonics

Program Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

7591	Advanced Fabrication Technologies for Micro/Nano Optics and Photonics III (<i>Schoenfeld/Wang/Loncar/Suleski</i>) p. 184
7610	Quantum Dots and Nanostructures: Synthesis, Characterization and Modeling VII (<i>Eyink, Szmulowicz, Huffaker</i>) p. 241
7608	Quantum Sensing and Nanophotonic Devices VII (<i>Razeghi</i>) p. 233
7609	Photonic and Phononic Crystal Materials and Devices IX (<i>Adibi, Lin, Scherer</i>) p. 238

Advanced Quantum and Optoelectronic Applications

Program Chair: **Zameer U. Hasan**, Temple Univ. (USA)

7610	Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling VII (<i>Eyink, Szmulowicz, Huffaker</i>) p. 241
7608	Quantum Sensing and Nanophotonic Devices VII (<i>Razeghi</i>) p. 233
7612	Advances in Slow and Fast Light III (<i>Shahriar, Hemmer</i>) p. 245
7611	Advances in Photonics of Quantum Computing, Memory, and Communication III (<i>Hasan, Craig, Hemmer, Santori</i>) p. 243
7613	Complex Light and Optical Forces IV (<i>Galvez</i>) p. 247
7614	Laser Refrigeration of Solids III (<i>Epstein, Sheik-Bahae</i>) p. 249

Saturday 23 January	Sunday 24 January	Monday 25 January	Tuesday 26 January	Wednesday 27 January	Thursday 28 January
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Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM Opto Semiconductors GmbH (Germany)

7583	High-Power Diode Laser Technology and Applications VIII (<i>Zediker</i>) p. 164
7602	Gallium Nitride Materials and Devices V (<i>Chyi, Nanishi, Morkoc</i>) p. 215
7616	Novel In-Plane Semiconductor Lasers IX (<i>Belyanin, Smowton</i>) p. 252
7597	Physics and Simulation of Optoelectronic Devices XVIII (<i>Witzigmann, Henneberger, Arakawa, Osiriski</i>) p. 200
7617	Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIV (<i>Streubel, Jeon, Tu</i>) p. 256
7615	Vertical-Cavity Surface-Emitting Lasers XIV (<i>Guenter, Choquette</i>) p. 250

Displays and Holography

Program Chair: **Liang-Chy Chien**, Kent State Univ. (USA)

7619	Practical Holography XXIV: Materials and Applications (<i>Bjelkhagen, Kostuk</i>) p. 262
7618	Emerging Liquid Crystal Technologies V (<i>Chien</i>) p. 259

Optical Communications: Systems and Sub-systems

Program Chair: **Benjamin Dingel**, Nasfine Photonics, Inc. (USA)

7587	Free-Space Laser Communication Technologies XXII (<i>Hemmati</i>) p. 173
7607	Optoelectronic Interconnects and Component Integration X (<i>Glebov, Chen</i>) p. 230
7620	Broadband Access Communication Technologies IV (<i>Dingel, Jain, Tsukamoto</i>) p. 264
7621	Optical Metro Networks and Short-Haul Systems II (<i>Weiershausen, Dingel, Dutta, Srivastava</i>) p. 265

Photonics West maps:

Moscone Maps	pp. 2–5
Hilton Hotel Map	p. 3
Area Map	p. 322

SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

OPTO Special Events

<p>OPTO PLENARY SESSION, 8:30 to 10:00 am, p. 22</p> <ul style="list-style-type: none"> GaN-based Nonpolar/Semipolar LEDs, Laser diodes and Bulk Crystal Growth (<i>Nakamura</i>) Solid-State Lighting: Science, Technology and Economic Perspectives (<i>Tsao</i>) 	<p>OPTO Interactive Poster Session, 6:00 to 7:30 pm, p. 23</p>
<p>TECHNICAL EVENT: Workshop on The Nature of Light: What Are Photons? (<i>Roychoudhuri, Prasad</i>), 7:30 to 9:30 pm, p. 3</p>	
<p>TECHNICAL EVENT: Holography (<i>Bjelkhagen</i>), 7:30 to 9:00 pm, p. 23</p>	



Physics and Simulation of Optoelectronic Devices XVIII

Conference Chairs: **Bernd Witzigmann**, Univ. Kassel (Germany); **Fritz Henneberger**, Humboldt-Univ. zu Berlin (Germany); **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan); **Marek Osirski**, The Univ. of New Mexico

Program Committee: **Hiroshi Amano**, Meijo Univ. (Japan); **Toshihiko Baba**, Yokohama National Univ. (Japan); **Weng W. Chow**, Sandia National Labs.; **Shun Lien Chuang**, Univ. of Illinois at Urbana-Champaign; **Aldo Di Carlo**, Univ. degli Studi di Roma Tor Vergata (Italy); **Silvano Donati**, Univ. degli Studi di Pavia (Italy); **Keiichi Edamatsu**, Tohoku Univ. (Japan); **Nicholas J. Ekins-Daukes**, Imperial College London (United Kingdom); **Shanhui Fan**, Stanford Univ.; **Alexandre Freundlich**, Univ. of Houston; **Stephan W. Koch**, Philipps Univ. Marburg (Germany); **Vassilios I. Kovanis**, Air Force Research Lab.; **Nikolay N. Ledentsov**, VI Systems GmbH (Germany); **Norbert Linder**, OSRAM Opto Semiconductors GmbH (Germany); **Cun-Zheng Ning**, Arizona State Univ.; **Joachim Piprek**, NUSOD Institute LLC; **Ikuo Suemune**, Hokkaido Univ. (Japan)

Monday 25 January

SESSION 1

Room: 302 (Esplanade) Mon. 8:00 to 10:00 am

Photovoltaic Devices I

Session Chair: **Marek Osirski**, The Univ. of New Mexico

8:00 am: **Microscopic theory and numerical simulation of quantum well solar cells** (*Invited Paper*), Urs Aeberhard, Forschungszentrum Jülich GmbH (Germany) [7597-01]

8:30 am: **Modelling and performance of quantum well solar cells** (*Invited Paper*), Peter Kailuweit, R. Kellenbenz, Frank Dimroth, Fraunhofer-Institut für Solare Energiesysteme (Germany) [7597-02]

9:00 am: **Zonal efficiency limit calculation for nanostructured solar cells**, Jan Kupec, ETH Zürich (Switzerland); Shuqing Yu, Bernd Witzigmann, Univ. Kassel (Germany) [7597-03]

9:20 am: **Higher limiting efficiencies for nanostructured solar cells**, Jessica Adams, Imperial College London (United Kingdom); Geoff Hill, John S. Roberts, The Univ. of Sheffield (United Kingdom); Keith W. Barnham, Nicholas J. Ekins-Daukes, Imperial College London (United Kingdom) [7597-04]

9:40 am: **FDTD simulation of metallic gratings for enhancement of electromagnetic field by surface plasmon resonance**, Hari P. Paudel, South Dakota State Univ. (USA); Khadijeh Bayat, Univ. of Waterloo (Canada); Mahdi F. Baroughi, South Dakota State Univ. (USA); Stanley May, Univ. of South Dakota (USA); David W. Galipeau, South Dakota State Univ. (USA) [7597-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 302 (Esplanade) Mon. 10:30 am to 12:10 pm

Photovoltaic Devices II

Session Chair: **Bernd Witzigmann**, Univ. Kassel (Germany)

10:30 am: **Multi-exciton generation in solar cells** (*Keynote Presentation*), Alex Zunger, National Renewable Energy Lab. (USA) [7597-06]

11:10 am: **Vitual single-crystalline GaAs photovoltaics on flexible metal substrates**, Alexandre Freundlich, Venkat Selvamannickam, Univ. of Houston (USA) [7597-07]

11:30 am: **A practical guide to photovoltaic solar cell design**, Ding Ding, Shane R. Johnson, Song-Nan Wu, Arizona State Univ. (USA); Shui-Qing Yu, Univ. of Arkansas (USA); Yong-Hang Zhang, Arizona State Univ. (USA) [7597-08]

11:50 am: **Modelling of dye sensitized solar cells using a finite element method**, Alessio Gagliardi, Matthias Auf der Maur, Desiree Gentilini, Aldo Di Carlo, Univ. degli Studi di Roma Tor Vergata (Italy) [7597-09]

Lunch Break 12:10 to 1:40 pm

SESSION 3

Room: 302 (Esplanade) Mon. 1:40 to 3:00 pm

Light Emitting Diodes

Session Chair: **Norbert Linder**, OSRAM Opto Semiconductors GmbH (Germany)

1:40 pm: **Simulation and design of core-shell GaN nanowire LEDs**, Benjamin J. Connors, Michael Povolotskiy, Robert Hicks, Benjamin Klein, Georgia Institute of Technology (USA) [7597-10]

2:00 pm: **Modelling of AlN/GaN superlattices for integration in near-UV distributed Bragg reflectors**, Alexandru Zorila, Joël Jacquet, Supélec LMOPS (France); Abdallah Ougazzaden, Georgia Institute of Technology (France); Frédéric Genty, Supélec LMOPS (France) [7597-11]

2:20 pm: **Optoelectronic and transport properties of nanocolumnar InGaN/GaN quantum disk LEDs**, Fabio Sacconi, Gabriele Penazzi, Matthias Auf der Maur, Alessandro Pecchia, Aldo Di Carlo, Univ. degli Studi di Roma Tor Vergata (Italy) [7597-12]

2:40 pm: **Numerical optimization of light-emitting diodes for high-efficiency operation**, Oskari Heikkilä, Jukka Tulkki, Helsinki Univ. of Technology (Finland) [7597-13]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 302 (Esplanade) Mon. 3:30 to 5:20 pm

Heterostructures and Novel Materials

Session Chair: **Vassilios I. Kovanis**, Air Force Research Lab.

3:30 pm: **Superconducting optoelectronics** (*Invited Paper*), Ikuo Suemune, Hokkaido Univ. (Japan) [7597-15]

4:00 pm: **Properties of n-InAsSbP/n-InAs interface**, Boris A. Matveev, Aleksandr Ankundinov, Nonna Zotova, Karandashev Sergey, Tatiana L'vova, Maxim Remenny, Andrey Rybal'chenko, Nicolay Stus', Ioffe Physico-Technical Institute (Russian Federation) [7597-16]

4:20 pm: **Band structure calculation of dilute-As GaNAs by first principle**, Xiao-Hang Li, Hua Tong, Hongping Zhao, Nelson Tansu, Lehigh Univ. (USA) [7597-17]

4:40 pm: **Lasing and gain characteristics in Ga(NAsP) heterostructures on Si**, Christoph Lange, Sangam Chatterjee, Wolfgang W. Rühle, Philipps-Univ. Marburg (Germany); Nektarios Koukourakis, Nils Gerhardt, Martin Hofmann, Ruhr-Univ. Bochum (Germany); Sven Liebich, Martin Zimprich, Rafael Fritz, Bernardette Kunert, Kerstin Volz, Wolfgang Stolz, Philipps-Univ. Marburg (Germany) [7597-18]

5:00 pm: **Influence of disorder on photoluminescence dynamics of Ga(AsBi)**, Alexey Chernikov, Sangam Chatterjee, Christina Bückers, Stephan W. Koch, Philipps-Univ. Marburg (Germany); Sebastian Imhoff, Angela Thränhardt, Technische Univ. Chemnitz (Germany); Xianfeng Lu, The Univ. of British Columbia (Canada); Thomas Tiedje, Univ. of Victoria (Canada); Shane Johnson, Arizona State Univ. (USA) [7597-19]

Tuesday 26 January

OPTO Plenary Session
Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am
Session Chairs: E. Fred Schubert, Rensselaer Polytechnic Institute; Liang-Chy Chien, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 302 (Esplanade). Tues. 10:30 to 11:50 am

Dynamics and Nonlinearities I

Session Chair: Andreas Knorr, Technische Univ. Berlin (Germany)

10:30 am: **Carrier dynamics in ZnMgO studied by time-resolved photoluminescence**, Alexey Chernikov, Martin Koch, Sangam Chatterjee, Kerstin Volz, Bernhardt Pasenow, Stephan W. Koch, Philipps-Univ. Marburg (Germany); Peter J. Klar, Martin Eickhoff, Bruno K. Meyer, Justus-Liebig-Univ. Giessen (Germany); Bernhardt Laumer, Thomas A. Wassner, Martin Stutzmann, Technische Univ. München (Germany) [7597-20]

10:50 am: **Frequency modulation response of two-section quantum cascade lasers**, Edward Luzhansky, Fow-Sen Choa, Univ. of Maryland Baltimore County (USA) [7597-21]

11:10 am: **Physical-random number generation using laser diodes' inherent noises**, Hiroki Nishimura, Kohei Doi, Teturo Ushiki, Takashi Sato, Masashi Ohkawa, Yasuo Odaira, Niigata Univ. (Japan) [7597-22]

11:30 am: **Complex low energy gain switching pulse processing using a highly nonlinear optical loop mirror**, Cristina de Dios Fernandez, Horacio R. Lamela, Univ. Carlos III de Madrid (Spain) [7597-23]

Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 6

Room: 302 (Esplanade). Tues. 1:30 to 3:00 pm

Surface Emitting Lasers

Session Chair: Joachim Piprek, NUSOD Institute LLC

1:30 pm: **Quantum design and experimental realization of high-power VECSELs (Invited Paper)**, Stephan W. Koch, Philipps Univ. Marburg (Germany) [7597-24]

2:00 pm: **Cavity design and heat management in vertical-external-cavity surface-emitting lasers (VECSELs)**, Tsuei-Lian Lu, Yushi Kaneda, Michael J. Yarborough, College of Optical Sciences, The Univ. of Arizona (USA); Jorg Hader, Nonlinear Control Strategies, Inc. (USA); Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA) and Nonlinear Control Strategies (USA); Alexey Chernikov, Martin Koch, Bernardette Kunert, Wolfgang Stolz, Sangam Chatterjee, Christina Bückers, Stephan W. Koch, Philipps-Univ. Marburg (Germany) [7597-25]

2:20 pm: **Ultrafast circular polarization oscillations in spin-polarized vertical-cavity surface-emitting laser devices**, Nils C. Gerhardt, Mingyuan Li, Hendrik Jaehme, Henning Soldat, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany); Thorsten Ackemann, Univ. of Strathclyde (United Kingdom) [7597-26]

2:40 pm: **Electro-optically modulated VCSELs and RCLEDs**, J. A. Lott, V. A. Shchukin, N. N. Ledentsov, VI Systems GmbH (Germany); T. D. Germann, A. Strittmatter, A. Mutig, D. Bimberg, Technische Univ. Berlin (Germany) [7597-27]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: 302 (Esplanade). Tues. 3:30 to 5:10 pm

Passive Optics Modeling

Session Chair: Aldo Di Carlo, Univ. degli Studi di Roma Tor Vergata (Italy)

3:30 pm: **Micro-diffraction lenses with subwavelength structures designed by the genetic algorithm**, Tatsuya Shirakawa, Univ. of Tokyo (Japan); Kenichi L. Ishikawa, RIKEN (Japan); Shuichi Suzuki, Yasufumi Yamada, Ricoh Co., Ltd. (Japan); Hiroyuki Takahashi, Univ. of Tokyo (Japan) [7597-28]

3:50 pm: **LED integrated optical encoder**, Luis Acevedo, Marc P. Y. Desmulliez, Heriot-Watt Univ. (United Kingdom) [7597-29]

4:10 pm: **Study of propagation modes of bent waveguides and micro-ring resonators by means of the aperiodic Fourier modal method**, Davide Bucci, Bruno Martin, Alain Morand, Institut de Microélectronique Electromagnétisme et Photonique (France) [7597-30]

4:30 pm: **Three-dimensional meshfree numerical method for optical structures**, Fahhad Alharbi, King Abdulaziz City for Science and Technology (Saudi Arabia) and IBM Almaden Research Ctr. (USA); J. Campbell Scott, IBM Almaden Research Ctr. (USA) [7597-31]

4:50 pm: **Synthesis of titanium indiffused LiNbO₃ waveguides with desired modal fields**, Enakshi Khular Sharma, Univ. of Delhi (India); Geetika Jain Saxena, Univ. of Delhi (India) [7597-33]

Wednesday 27 January

SESSION 8

Room: 302 (Esplanade). Wed. 8:20 to 10:10 am

Detectors, Modulators and Amplifiers

Session Chair: Luke F. Lester, The Univ. of New Mexico

8:20 am: **InAs quantum dot-based devices for ultrafast photonic signal processing (Invited Paper)**, Osamu Wada, Kobe Univ. (Japan) [7597-34]

8:50 am: **Thermal crosstalk reduction in IR thermo-electric photodetectors by lock-in method: 4D numerical simulations and experimental verification**, Werner Vandermeiren, Johan Stiens, Cathleen De Tandt, Vrije Univ. Brussel (Belgium); Gennady Shkerdin, Vladimir Kotov, Institute of Radio Engineering and Electronics (Russian Federation); Gustaaf Borghs, IMEC (Belgium); Peter Muys, Lambda Research Optics Europe (Belgium); Roger Vounckx, Vrije Univ. Brussel (Belgium) [7597-35]

9:10 am: **Finite difference time domain analysis of ultra-broadband enhanced absorption of silicon surface with nanostructures**, Hsiang-Chen Wang, Chin-Ming Chen, Jian-Sheng Wu, National Chung Cheng Univ. (Taiwan); Shih-Wei Feng, National Univ. of Kaohsiung (Taiwan); Sean Liu, National Chung Cheng Univ. (Taiwan) [7597-76]

9:30 am: **Ultrafast compact silicon-based ring resonator modulators using metal-insulator switching of vanadium dioxide**, Joyeeta Nag, Judson D. Ryckman, Richard F. Haglund, Jr., Sharon M. Weiss, Vanderbilt Univ. (USA) [7597-37]

9:50 am: **Evanescence wave modulator for medium infrared wavelengths (8-12 μm)**, Johan Stiens, Werner Vandermeiren, Vrije Univ. Brussel (Belgium); Gennady Shkerdin, Vladimir Kotov, Institute of Radio Engineering and Electronics (Russian Federation); Cathleen De Tandt, Willy Ranson, Vrije Univ. Brussel (Belgium); Gustaaf Borghs, IMEC (Belgium); Roger Vounckx, Vrije Univ. Brussel (Belgium) [7597-38]

Coffee Break 10:10 to 10:40 am

OPTO

SESSION 9

Room: 302 (Esplanade).Wed. 10:40 am to 12:00 pm

Random Semiconductor Lasers

Session Chair: Bernd Witzigmann, Univ. Kassel (Germany)

10:40 am: **Random lasing in nanocrystalline ZnO powders** (*Invited Paper*), Heinz Kalt, J. Fallert, R. Dietz, J. Sartor, D. Schneider, Claus F. Klingshirn, Univ. Karlsruhe (Germany)[7597-40]

11:10 am: **Control random laser modes by local pumping** (*Invited Paper*), Hui Cao, Yale Univ. (USA)[7597-41]

11:40 am: **Visible-wavelength random lasing of (Zn,Cd,Mg)O quantum well structures**, Sascha Kalusniak, Sergey Sadofev, Joachim Puls, Hans-Juergen Wuensche, Fritz Henneberger, Humboldt-Univ. zu Berlin (Germany)[7597-42]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 10

Room: 302 (Esplanade).Wed. 1:30 to 3:30 pm

Quantum Dot Lasers

Session Chair: Stephan W. Koch, Philipps-Univ. Marburg (Germany)

1:30 pm: **Lasing oscillation in a single quantum dot nanocavity system under strong/weak coupling regime** (*Invited Paper*), Yasuhiko Arakawa, Masahiro Nomura, Satoshi Iwamoto, Yasutomo Ota, Naoto Kumagai, The Univ. of Tokyo (Japan)[7597-43]

2:00 pm: **Radiative efficiency of MOCVD grown quantum dot lasers** (*Invited Paper*), Luke J. Mawst, Gene Tsvid, Peter Dudley, Jeremy Kirch, Joo Hyung Park, Univ. of Wisconsin-Madison (USA)[7597-44]

2:30 pm: **Inhomogeneous quantum dot gain medium for improved spatial coherence in wide-aperture semiconductor lasers**, Jayanta Mukherjee, Tyndall National Institute (Ireland); John G. McInerney, Univ. College Cork (Ireland)[7597-45]

2:50 pm: **Bipolar self-consistent optoelectronic model for quantum dot lasers**, Alfredo Martín-Mínguez, Helena Odriozola, Ignacio Esquivias, José Manuel G. Tijero, Univ. Politécnica de Madrid (Spain); Emil-Mihai Pavelescu, Johann Peter Reithmaier, Univ. Kassel (Germany)[7597-46]

3:10 pm: **Bandwidth improvement by manipulating the high-frequency roll-off of an injection-locked QD laser operating at 1310 nm**, Nader A. Naderi, Michael C. Pochet, The Univ. of New Mexico (USA); Vassilios Kovanis, Air Force Research Lab. (USA); Luke F. Lester, The Univ. of New Mexico (USA) .[7597-47]

Coffee Break3:30 to 4:00 pm

SESSION 11

Room: 302 (Esplanade).Wed. 4:00 to 5:50 pm

Laser Mode Stabilization and Noise

Session Chair: Heinz Kalt, Univ. Karlsruhe (Germany)

4:00 pm: **Modeling of photonic-crystal-based high-power high-brightness semiconductor lasers** (*Invited Paper*), Vitaly Shchukin, PBC Lasers GmbH (Germany); Vladimir Kalosha, Nikolai Ledentsov, Dieter Bimberg, Technical University of Berlin (Germany)[7597-48]

4:30 pm: **Applying the joint Wigner time-frequency distribution to characterization of ultra-short optical pulses in the actively mode-locked semiconductor laser with an external single-mode fiber cavity**, Alexandre S. Shcherbakov, Pedro Moreno Zarate, National Institute for Astrophysics, Optics and Electronics (Mexico); Joaquin Campos Acosta, Consejo Superior de Investigaciones Científicas (Spain); Yuriy V. Il'n Il'n, Il'ya S. Tarasov, A.F. Ioffe Physical-Technical Institute (Russian Federation)[7597-49]

4:50 pm: **Stability analysis of (Al,In)GaN laser diodes in an external cavity**, Ulrich T. Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Harald Braun, Regensburg Univ. (Germany); Christoph Raab, Andreas Able, Frank Lison, Toptica Photonics AG[7597-50]

5:10 pm: **Semiconductor laser oscillation-frequency stabilization using the Faraday effect**, Hideaki Arai, Akira Sato, Ayumi Sato, Kenji Nakano, Takashi Sato, Masashi Ohkawa, Niigata Univ. (Japan)[7597-51]

5:30 pm: **Accurate source simulation in modern optical modeling and analysis software**, David A. Jacobsen, Edward R. Freniere, Michael Gauvin, Lambda Research Corp. (USA)[7597-52]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level)Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Blue-emitting ZnSe random laser, Toru Takahashi, Toshihiro Nakamura, Sadao Adachi, Gunma University (Japan)[7597-67]

All optical logic gates using active plasmonic device block, Geum-Yoon Oh, Chung-Ang Univ. (Korea, Republic of); Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Hong-Seung Kim, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of)[7597-68]

Formulation of differential transfer matrix method in cylindrical geometry, Mohsen Jiani, Mohammad Vesal, Sina Khorasani, Bizhan Rashidian, Sharif Univ. of Technology (Iran, Islamic Republic of)[7597-69]

Passive fiber rings as a basic part of fiber optic sensors, Jan Látal, Petr Koudelka, Petr Šiška, František Hanáček, Jan Skapa, Vladimír Vašínek, Technical Univ. of Ostrava (Czech Republic)[7597-70]

A ridge waveguide quantum well AlGaAs/GaAs laser design, Marziyeh Nazari, Sharif Univ. of Technology (Iran, Islamic Republic of)[7597-71]

Optical cloak based on Schwarzschild geometry, Sina Khorasani, Sharif Univ. of Technology (Iran, Islamic Republic of)[7597-72]

Modelling of magnetoconcentration effect in thin-layer p-n structure, Bogdan S. Sokolovsky, Ivan Franko National Univ. of L'viv (Ukraine) . .[7597-73]

Role of electron blocking layer in III-nitride laser diodes and light-emitting diodes, Yen-Kuang Kuo, Jih-Yuan Chang, Mei-Ling Chen, National Changhua Univ. of Education (Taiwan)[7597-74]

Numerical simulation on high-efficiency GaInP/GaAs/InGaAs triple-junction solar cells, Shu-Hsuan Chang, Miao-Chan Tsai, Sheng-Hong Yen, Shu-Jeng Chang, Yen-Kuang Kuo, National Changhua Univ. of Education (Taiwan)[7597-75]

Study on temperature characteristic of green photodetector on Si substrate, Xiansong Fu, Tianjin Polytechnic Univ. (China)[7597-77]

Modeling and simulation of AlGaAs/GaAs QW-DBR dual junction photovoltaic devices, Hamid Fardi, Univ. of Colorado Denver (USA); Bart Van Zeghbroeck, Univ. of Colorado at Boulder (USA)[7597-78]

Precise frequency stabilization technique for 850-nm vertical cavity surface emitting lasers by controlling their optical beat frequency, Wakao Sasaki, Takao Ohhara, Tomoaki Yoshimi, Doshisha Univ. (Japan)[7597-79]

Linewidth reduction of a 30mW-405nm GaN violet laser diode by optical-electrical double feedback method, Kouki Mizutani, Toshiaki Kuromori, Wakao Sasaki, Doshisha Univ. (Japan)[7597-80]

Calibrating procedures for LED simulation: tolerance, S/N ratio, and detector, Chung-Jen Ou, Hsiuping Institute of Technology (Taiwan) . .[7597-81]

Celestial calculation for the ground solar energy device, Chung-Jen Ou, Hsiuping Institute of Technology (Taiwan)[7597-82]

Study of beam propagation in finite photonic crystals, Amin Khavasi, Khashayar Mehrany, Mehdi Miri, Ali Kazemi, Sina Khorasani, Sharif Univ. of Technology (Iran, Islamic Republic of)[7597-83]

Plasma phase separation in superconduct crystal, Nadezhda P. Netesova, Lomonosov Moscow State Univ. (Russian Federation)[7597-84]

VCSEL's frequency stabilization of an external cavity diode laser: countermeasures against atmospheric-temperature variations, Mutsuki Motojima, Kohei Doi, Takashi Sato, Masashi Ohkawa, Takamasa Suzuki, Niigata Univ. (Japan)[7597-85]

Analysis and characterization of the small-signal modulation of a vertical external cavity surface emitting laser, Nathan B. Terry, Matthew Walton, Robert G. Bedford, Air Force Research Lab. (USA)[7597-86]

Thursday 28 January

SESSION 12

Room: 302 (Esplanade).Thurs. 8:00 to 10:10 am

Edge Emitting Light Sources

Session Chair: Benjamin Klein, Georgia Institute of Technology

- 8:00 am: **Optical components for very short reach applications at 40 Gb/s and beyond** (*Invited Paper*), Nikolay N. Ledentsov, James A. Lott, Vitaly A. Shchukin, VI Systems GmbH (Germany); Alexander Mutig, T. D. Germann, Sergey A. Blokhin, A. M. Nadtochiy, Leonid Y. Karachinsky, Dieter Bimberg, Technische Univ. Berlin (Germany)[7597-53]
- 8:30 am: **Simulation of facet heating in high-power red lasers**, Jose-Manuel G. Tijero, Ignacio Esquivias, Helena Odriozola, Alfredo Martin-Minguez, Luis Borrue, Univ. Polit cnica de Madrid (Spain); Alvaro Gomez-Iglesias, Martin Reufer, Marwan Bou-Sanayeh, Peter Brick, Norbert Linder, OSRAM Opto Semiconductors GmbH (Germany); Mathias Ziegler, Jens Tomm, Max-Born-Institut f r Nichtlineare Optik und Kurzzeitspektroskopie (Germany)[7597-54]
- 8:50 am: **3D modeling of superluminescent light-emitting diodes**, Zhiqiang Li, Simon Li, Crosslight Software Inc. (Canada)[7597-55]
- 9:10 am: **Investigation of the saturation characteristics of InGaAsP-InP bulk SOA**, Amita Kapoor, Univ. of Delhi (India) and Institute of Photonics and Quantum Electronics (Germany); Enakshi K. Sharma, Univ. of Delhi (India); Wolfgang Freude, Juerg Leuthold, Univ. Karlsruhe (Germany)[7597-56]
- 9:30 am: **Vertically-stacked InAs quantum dots for polarization-independent semiconductor optical amplifiers**, Tomoya Inoue, Masaki Asada, Osamu Kojima, Takashi Kita, Osamu Wada, Kobe Univ. (Japan)[7597-57]
- 9:50 am: **Electron-phonon and electron-photon intersubband scattering rates in asymmetric AlN/GaN coupled quantum wells**, Guangyu Liu, Hongping Zhao, Nelson Tansu, Lehigh Univ. (USA)[7597-58]
- Coffee Break10:10 to 10:40 am

SESSION 13

Room: 302 (Esplanade).Thurs. 10:40 am to 12:00 pm

Dynamics and Nonlinearities II

Session Chair: Urs Aeberhard, Forschungszentrum J lich GmbH (Germany)

- 10:40 am: **Experimental stability maps of a 1550nm-VCSEL subject to polarized optical injection**, Antonio Hurtado, Kevin Schires, Nadir Khan, Ian D. Henning, Michael J. Adams, Univ. of Essex (United Kingdom)[7597-59]
- 11:00 am: **Experimental observation of the locking regimes and chaotic dynamics in laterally coupled diode lasers**, Horacio R. Lamela, Rui Santos, Univ. Carlos III de Madrid (Spain)[7597-60]
- 11:20 am: **Frequency stabilization of a laser diode using Rb saturated absorption lines**, Ayumi Sato, Kenji Nakano, Hideaki Arai, Takashi Sato, Masashi Ohkawa, Niigata Univ. (Japan)[7597-61]
- 11:40 am: **Locking of three coupled lasers**, Hartmut Erzgr ber, Sebastian Wieczorek, The Univ. of Exeter (United Kingdom); Bernd Krauskopf, Univ. of Bristol (United Kingdom)[7597-62]
- Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 14

Room: 302 (Esplanade).Thurs. 1:30 to 3:00 pm

Quantum Dots and Microcavities

Session Chair: Luke J. Mawst, Univ. of Wisconsin-Madison

- 1:30 pm: **Theory of electron and few photon dynamics in light emitting quantum dot devices** (*Invited Paper*), Andreas Knorr, Alexander Carmele, Matthias-Rene Dachner, Janik Wolters, Marten Richter, Technische Univ. Berlin (Germany)[7597-63]
- 2:00 pm: **Scaling of plasmonic nanoring and nanopillar lasers**, Min W. Kim, Pei-Cheng Ku, Univ. of Michigan (USA)[7597-64]
- 2:20 pm: **Polarization conservation and dephasing in InAs quantum dot ensembles**, Alexey Chernikov, Swantje Horst, Stephan W. Koch, Sangam Chatterjee, Wolfgang W. R hle, Philipps-Univ. Marburg (Germany); Julian Sweet, Benjamin Richards, Joshua Hendrickson, Galina Khitrova, Hyatt M. Gibbs, College of Optical Sciences, The Univ. of Arizona (USA); Dimitri Litvinov, Dagmar Gerthsen, Martin Wegener, Univ. Karlsruhe (Germany)[7597-65]
- 2:40 pm: **Multiscale thermal modeling of AlGaIn/GaN quantum dot LEDs**, Giuseppe Romano, Univ. of Rome Tor Vergata (Italy); Gabriele Penazzi, Aldo Di Carlo, Univ. of Rome Tor Vergata (Italy)[7597-66]



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Optical Components and Materials VII

Conference Chairs: **Shibin Jiang**, AdValue Photonics, Inc.; **Michel J. F. Digonnet**, Stanford Univ.; **John W. Glesener**, L-3 Electro-Optical Systems; **J. Christopher Dries**, DOLCE Technologies, LLC

Program Committee: **Jean-Luc Adam**, Univ. de Rennes 1 (France); **Robert P. Dahlgren**, Univ. of California, Santa Cruz and Silicon Valley Photonics, Ltd; **Leonid B. Glebov**, CREOL, The College of Optics and Photonics, Univ. of Central Florida; **Min Gu**, Swinburne Univ. of Technology (Australia); **Seppo K. Honkanen**, Helsinki Univ. of Technology (Finland); **Jacques Lucas**, Univ. de Rennes 1 (France); **John R. Marciante**, Univ. of Rochester; **Yasutake Ohishi**, Toyota Technological Institute (Japan); **Aydogan Ozcan**, Univ. of California, Los Angeles; **Barrett G. Potter, Jr.**, The Univ. of Arizona; **Giancarlo Cesare Righini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Stan M. Smith**, U.S. Army Space and Missile Defense Command; **Feng Song**, Nankai Univ. (China); **Setsumisa Tanabe**, Kyoto Univ. (Japan); **Ji Wang**, Corning Inc.; **John M. Zavada**, U.S. Army Research Office

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Liang-Chy Chien**, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 1

Room: 224 (Mezzanine) Tues. 10:30 am to 12:30 pm

Gain Materials I

10:30 am: **New chalco-halide glasses and glass-ceramics with broaden transmission from the visible to the far infrared for passive and active applications** (*Invited Paper*), Laurent Calvez, Mathieu Rozé, Ledemi Yannick, Changgui Lin, Erwan Guillevic, Bruno Bureau, Xiang-Hua Zhang, Univ. de Rennes 1 (France) [7598-01]

11:00 am: **The influence of photonic mode density on the luminescence of erbium doped optical materials** (*Invited Paper*), Feng Song, Nankai Univ. (China); Qingru Wang, Nankai Univ. (China) and City Univ. of Hong Kong (Hong Kong, China); Chengguo Ming, Jianguo Tian, Jingjun Xu, Nankai Univ. (China); Shangxin Lin, Edwin Y. Pun, City Univ. of Hong Kong (Hong Kong, China) [7598-02]

11:30 am: **Two-photon pumped random lasing in a dye-doped silica gel powder**, Sara Garcia-Revilla, Univ. del País Vasco (Spain); Iñigo J. Sola, Univ. de Salamanca (Spain); Rolindes Balda, Univ. del País Vasco (Spain); Luis Roso, Univ. de Salamanca (Spain); David Levy, Marcos Zayat, Instituto de Ciencia de Materiales de Madrid (Spain); Joaquín M. Fernández, Univ. del País Vasco (Spain) [7598-03]

11:50 am: **Spectral-luminescence properties of Bi-doped bulk glasses and factors acting on them**, Boris I. Denker, Boris I. Galagan, Ilya L. Shulman, Sergey E. Sverchkov, Eugeny M. Dianov, A. M. Prokhorov General Physics Institute (Russian Federation) [7598-04]

12:10 pm: **Generation of wide color gamut visible light in NIR-excited thulium-holmium-ytterbium codoped tantalum oxide nanopowders**, Artur S. Gouveia-Neto, Luciano Avallone Bueno, Ermende Barbosa Costa, Univ. Federal Rural de Pernambuco (Brazil); Jefferson L. Ferrari, Karmel O. Lima, Rogéria Rocha Gonçalves, Univ. de São Paulo (Brazil) [7598-48]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 2

Room: 224 (Mezzanine) Tues. 1:30 to 3:30 pm

Gain Materials II

1:30 pm: **Application of ceramic phosphors for bio- and medical-imaging technologies** (*Invited Paper*), Kohei Soga, Tokyo Univ. of Science (Japan) [7598-05]

2:00 pm: **White LED phosphors: the next step** (*Invited Paper*), Hajime Yamamoto, Tokyo Univ. of Technology (Japan) [7598-06]

2:30 pm: **Construction of photoconductivity measurement system as functions of excited wavelength and temperature: application to Eu²⁺-activated phosphors**, Takayuki Nakanishi, Setsumisa Tanabe, Kyoto Univ. (Japan) [7598-07]

2:50 pm: **The efficiencies of energy transfer from Cr to Nd ions in silicate glasses**, Shintaro Mizuno, Toyota Central Research and Development Labs., Inc. (Japan); Hiroyuki Nasu, Mark Hughes, Takenobu Suzuki, Toyota Technological Institute (Japan); Hiroshi Ito, Kazuo Hasegawa, Toyota Central Research and Development Labs., Inc. (Japan); Yasutake Ohishi, Toyota Technological Institute (Japan) [7598-08]

3:10 pm: **The influence of Yb²⁺ ions on optical properties and power stability of ytterbium-doped laser fibers**, Johannes Kirchhof, Sonja Unger, Anka Schwuchow, Sylvia Jetschke, Volker Reichel, Martin Leich, Andy Scheffel, IPHT Jena (Germany) [7598-09]

Coffee Break 3:30 to 4:00 pm

SESSION 3

Room: 224 (Mezzanine) Tues. 4:00 to 5:30 pm

Silicon Technology

4:00 pm: **Silicon photonic parametric optical processing for ultra-high bandwidth on-chip signal grooming** (*Invited Paper*), Keren Bergman, Columbia Univ. (USA) [7598-10]

4:30 pm: **Optical properties of atomic layer deposited materials and their application in silicon waveguides**, Tapani Alasaarela, Helsinki Univ. of Technology (Finland); Jussi Hiltunen, VTT Elektronikka (Finland); Amit Khanna, Antti Säynätjoki, Ari Tervonen, Seppo Honkanen, Helsinki Univ. of Technology (Finland) [7598-11]

4:50 pm: **Mode properties in silicon based 2-dimensional slot waveguides for polarization-independent operation**, Amit Khanna, Tapani Alasaarela, Antti Säynätjoki, Ari Tervonen, Seppo Honkanen, Helsinki Univ. of Technology (Finland) [7598-12]

5:10 pm: **Optical microresonator based on silicon technology for applications to an optoelectronic oscillator**, Yu-Mei Wu, Laurent Vivien, Eric Cassan, Univ. Paris-Sud/IEF (France); Vu Hai Nam Luong, Lam Duy Nguyen, Bernard A. Journet, École Normale Supérieure de Cachan (France) . . . [7598-13]

Wednesday 27 January

SESSION 4

Room: 224 (Mezzanine) Wed. 8:30 to 10:10 am

Optical Fibers and Devices I

8:30 am: **Recent developments in bend-insensitive and ultra-bend-insensitive fibers**, David E. Boivin, Louis-Anne de Montmorillon, Lionel Provost, Nelly Montaigne, Draka Comteq France (France); Frans Gooijer, Draka Comteq Fibre B.V. (Netherlands); Eugen Aldea, Draka Holding N.V. (Netherlands); Jaap Jensma, Draka Comteq Fibre B.V. (Netherlands); Pierre Sillard, Draka Comteq France (France) [7598-14]

8:50 am: **Innovative fiber coating systems based on organic modified ceramics**, Kay Schuster, Jens Kobelke, IPHT Jena (Germany); Klaus Rose, Fraunhofer-Institut für Silicatforschung (Germany); Manfred Helbig, SurA Chemicals GmbH (Germany); Mohamad Zoheidi, Alexander Heinze, FiberTech GmbH (Germany) [7598-15]

9:10 am: **Novel shape memory alloy optical fibre connection method**, Geraldine Trouillard, Phasoptx Inc. (Canada); Patrick Zivojinovic, Phasoptx Inc (Canada); Robin Cerutti, Eric Weynant, Phasoptx Inc. (Canada) [7598-16]

9:30 am: **Tunable birefringent phase shift induced in fiber Bragg gratings by a shape memory alloy phase modulator**, Alex Fraser, PhasOptx (Canada) and Université Laval (Canada); Martin Bernier, Univ. Laval (Canada); Eric Weynant, PhasOptx Inc. (Canada); Réal Vallée, Univ. Laval (Canada) [7598-17]

9:50 am: **Novel fiber bottle microresonator add-drop filters**, Ganapathy Senthil Murugan, James S. Wilkinson, Michalis N. Zervas, Univ. of Southampton (United Kingdom) [7598-18]

Coffee Break 10:10 to 10:40 am

SESSION 5

Room: 224 (Mezzanine) Wed. 10:40 am to 12:00 pm

Optical Fibers and Devices II

10:40 am: **Ultra-wideband integrated 2x2 optical router using novel MMI design**, Mohamed A. Swillam, Mohamed H. Bakr, Xun Li, McMaster Univ. (Canada) [7598-19]

11:00 am: **Polarization-dependent mode coupling in mechanically induced long-period fiber gratings based on polarization-maintaining fibers**, Hyun-Joo Kim, Oh-Jang Kwon, Suho Chu, Min-Seok Yoon, Hanyang Univ. (Korea, Republic of); Sang Bae Lee, Korea Institute of Science and Technology (Korea, Republic of); Young-Geon Han, Hanyang Univ. (Korea, Republic of) . . . [7598-20]

11:20 am: **Active attenuation control of long-period fiber grating written in erbium-doped fiber**, Rashmi Singh, Enakshi Khular Sharma, Univ. of Delhi (India) [7598-21]

11:40 am: **Fabrication of low-loss chalcogenide photonic-crystal fibers by a moulding process**, Quentin Coulombier, Laurent Brilland, Patrick Houizot, Univ. de Rennes 1 (France); Thanh Nam Nguyen, Thierry Chartier, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Gilles Renversez, Univ. Paul Cézanne (France); Julien Fatome, Frederic Smehtala, Univ. de Bourgogne (France); Jean-Christophe Sangleboeuf, Thierry Pain, Johann Troles, Univ. de Rennes 1 (France) [7598-22]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 6

Room: 224 (Mezzanine) Wed. 1:30 to 3:10 pm

Photonic Devices I

1:30 pm: **Fabrication and characterization of colloidal crystals infiltrated with metallic nanoparticles**, Andrea Chiappini, Univ. degli Studi di Trento (Italy); Sriram Guddala, Univ. degli Studi di Trento (Italy) and Univ. of Hyderabad (India); Cristina Armellini, Univ. degli Studi di Trento (Italy); Simone Berneschi, Iaria Cacciari, Istituto di Fisica Applicata Nello Carrara (Italy); Claire Duverger-Arfulso, Univ. du Maine (France); Maurizio Ferrari, Univ. degli Studi di Trento (Italy); Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy) [7598-23]

1:50 pm: **Planar long-period gratings for photonic applications**, Jia Jiang, Claire L. Callender, Julian P. Noad, Chris Ledderhof, Communications Research Ctr. Canada (Canada); Jianfu Ding, National Research Council Canada (Canada) [7598-24]

2:10 pm: **Time evolution of an electro-optic modulator by detection of its nonlinear behavior**, Dang Thanh Bui, Lam Duy Nguyen, Bernard A. Journet, Isabelle N. Ledoux-Rak, Ecole Normale Supérieure de Cachan (France) [7598-25]

2:30 pm: **Ultra-narrowband notch filter for Raman applications**, Christophe Moser, Frank Havermeier, Ondax, Inc. (USA) [7598-26]

2:50 pm: **A new class of polarization filters for laser applications**, Turan Erdogan, Ligang Wang, Craig Hodgson, Semrock, Inc. (USA) [7598-27]

Coffee Break 3:10 to 3:40 pm

SESSION 7

Room: 224 (Mezzanine) Wed. 3:40 to 4:20 pm

Photonic Devices II

3:40 pm: **High-aperture narrowband filter based on Moiré Principle**, Sergiy Mokhov, Julien Lumeau, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim Smirnov, OptiGrate Corp (USA); Boris Zeldovich, Leonid Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7598-28]

4:00 pm: **High-speed simplified analog-to-digital converter using non-sequential counting methods for use in focal plane pixels**, Eric D. Larson, National Security Technologies, LLC (USA) [7598-30]

SESSION 8

Room: 224 (Mezzanine) Wed. 4:20 to 5:40 pm

Detector Technologies I

4:20 pm: **Metallic nanoparticles for molecular electronics and photovoltaics**, Dmitri S. Kilin, Univ. of Florida (USA) [7598-31]

4:40 pm: **Simulation based design for backside illuminated ultrahigh-speed CCDs**, Toshiki Arai, Tetsuya Hayashida, Kazuya Kitamura, Jun Yonai, Hirotaka Maruyama, Japan Broadcasting Corp. (Japan); Takeharu G. Etoh, Kinki Univ. (Japan); Harry van Kuijk, DALSA Corp. (Netherlands) [7598-32]

5:00 pm: **Modified uni-traveling-carrier photodiode-based V-band optoelectronic mixers with high up-converted power and high responsivity**, Huapu Pan, Zhi Li, Joe Campbell, Univ. of Virginia (USA) [7598-33]

5:20 pm: **On dark counts in single photon avalanche Si detectors**, Roberto Pagano, Univ. of Catania (Italy); Salvatore A. Lombardo, Sebania Libertino, Istituto per la Microelettronica e Microsistemi (Italy); Giuseppina Valvo, Giovanni Condorelli, Angelo Piana, Massimo C. Mazzillo, Delfo N. Sanfilippo, STMicroelectronics (Italy) [7598-34]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Novel design of AOTF using film-loaded SAW waveguides, Xu Hehua, Hebei Univ. of Engineering (China) [7598-52]

Direct surface relief formation in As-S(Se) layers, Mihail Trunov, The Univ. of Debrecen (Ukraine); Peter M. Lytvyn, Institute of Semiconductor Physics (Ukraine); Peter Nagy, Institute of Surface Chemistry (Hungary); Csaba Cserhati, Stepan Charnovich, Sandor J. Kokenyesi, The Univ. of Debrecen (Hungary) [7598-53]

Thermally controllable multiguide coupler of liquid crystal, Shuan-Yu Huang, Chung Shan Medical Univ. (Taiwan) [7598-54]

Potentials of the acousto-optical spectral data processing on a basis of a novel algorithm of the collinear wave heterodyning in a large-aperture KRS-5 crystalline cell, Alexandre S. Shcherbakov, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Jewgenij Maximov, Molecular Technology GmbH (Germany); Daniel Sanchez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7598-55]

Some peculiarities of designing the optical scheme of tellurium dioxide crystalline cell based acousto-optical spectrometer for the Mexican large millimeter telescope, Alexandre S. Shcherbakov, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Daniel Sanchez, Abraham Luna, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7598-56]

Excitation wavelength dependence of quantum efficiencies of Nd-doped glasses for solar pumped fiber lasers, Takenobu Suzuki, Hiroyuki Nasu, Mark A. Hughes, Toyota Technological Institute (Japan); Shintaro Mizuno, Kazuo

OPTO

Hasegawa, Toyota Central Research and Development Labs., Inc. (Japan); Yasutake Ohishi, Toyota Technological Institute (Japan); Hiroshi Ito, Toyota Central Research and Development Labs., Inc. (Japan) [7598-57]

Ultraflat supercontinuum generation in an As₂S₃-based chalcogenide core microstructure fiber, Xin Yan, Chitrarekha B. Chaudhari, Guanshi Qin, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [7598-58]

Optical parametric amplification in composite tellurite: fluorophosphate fiber, Chitrarekha B. Chaudhari, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [7598-59]

Design and fabrication of high-performance photodiodes, Hua Yang, Chris L. L. M. Daunt, Frank H. Peters, Tyndall National Institute (Ireland) [7598-60]

Electronic polarizability and optical parameters of Er³⁺/Yb³⁺ co-doped phosphate glasses, Feng Song, Chengguo Ming, Wentao Wang, Nankai Univ. (China) [7598-61]

The fluorescent properties of rare-earth ions-doped bismuth glasses, Lili Hu, Huiyan Fan, Guojun Gao, Shanghai Institute of Optics and Fine Mechanics (China) [7598-62]

Polymer microlens array with tunable focal intensity by the polarization control of the incident light, San-Yi Huang, National Cheng Kung Univ. (Taiwan) [7598-63]

Fabrication of one-dimensional SWS on bismuth borate glass by glass-imprinting method, Naoto Yamashita, Tatsuya Suetsugu, Toshihiko Einishi, Isuzu Glass Co., Ltd. (Japan); Kohei Fukumi, Naoyuki Kitamura, National Institute of Advanced Industrial Science and Technology (Japan); Junji Nishii, Hokkaido Univ. (Japan) [7598-64]

A small and fast SCPEM-based ellipsometer, Ferdinand Bammer, Technische Univ. Wien (Austria); Rok Petkovsek, Janez Možina, Univ. of Ljubljana (Slovenia) [7598-65]

Enhanced switching characteristic of a Ti:LiNbO₃ 1x2 digital optical switch using optimized electrode regions, Ghanshyam Singh, R. P. Yadav, Vijay Janyani, Malaviya National Institute of Technology (India) [7598-66]

Performance improvement of HgCdTe photoconductors by means of band-gap grading, Bogdan S. Sokolovsky, Ivan Franko National Univ. of L'viv (Ukraine) [7598-67]

Birefringence control of pigtailed fiber optic devices, Diana Tentori-Santa Cruz, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); Cesar Ayala-Diaz, Univ. Autónoma de Baja California (Mexico); Fernando Treviño-Martinez, Univ. Autónoma de Nuevo Leon (Mexico) . [7598-68]

AIN antiresonant layer ARROW waveguides, Marcus V. Pelegrini, Daniel O. Carvalho, Marco I. Alayo Chavez, Inés Pereyra, Univ. de São Paulo (Brazil) [7598-69]

Steep and flat optical bandpass filter using linearly chirped and apodized fiber Bragg gratings, Xunqi Wu, Supélec (France); Guanghua Duan, Alcatel-Thales III-V Lab. (France); Joel Jacquet, Supélec (France) [7598-70]

Characteristics of modulation for the near-infrared diode laser basing on the quantum well structure, Li Li, Yiding Wang, Jilin Univ. (China) [7598-71]

Spectroscopy of Yb:Tm doped tellurite glasses for efficient infrared fiber laser, Stefano Taccheo, Masud Taher, Swansea Univ. (United Kingdom); Joris Lousteau, Hrvoje Gebavi, Daniel Milanese, Politecnico di Torino (Italy); Axel Schulzgen, College of Optical Sciences, The Univ. of Arizona (USA) [7598-72]

NIR to visible upconversion in rare-earth ion-doped NaYF₄ crystals, Darayas N. Patel, Oakwood Univ. (USA); Sergey Sarkisov, SSS Optical Technologies (USA); Calvin Vance III, Malcolm Jessup, Jr., Lekara Green, Newton King, Oakwood Univ. (USA) [7598-73]

Detector development for X-ray imaging, Mark A. Mentzer, Doug Herr, U.S. Army Aberdeen Test Ctr. (USA) [7598-76]

9:00 am: **Integrated amplification and passivation nanolayers for ultra-high-sensitivity photodetector arrays**, Jie Yao, Sean Wang, Jack Zhou, Ken Li, Irina Mokina, Mike Lange, B&W Tek, Inc. (USA); Jeffrey H. Hunt, Leora Peltz, Robert Frampton, The Boeing Co. (USA); Patrick Gardner, Weiguang Yang, Western Carolina Univ. (USA); Jill Becker, Cambridge Nanotech Inc. (USA) [7598-37]

9:20 am: **Backthinned CMOS sensor optimization**, Paul Jerram, Neil Guyatt, e2v technologies plc (United Kingdom); Vincent Hibon, Joel Vaillant, e2v semiconductors SAS (France) [7598-75]

9:40 am: **Two micron pore size MCP-based image intensifiers**, John W. Glesener, L-3 Electro-Optical Systems (USA); Amir M. Dabiran, SVT Associates, Inc. (USA); Joseph P. Estrera, L-3 Electro-Optical Systems (USA) [7598-38]

Coffee Break 10:00 to 10:30 am

SESSION 10

Room: 224 (Mezzanine)Thurs. 10:30 am to 12:30 pm

Semiconductor Lasers and Amplifiers

10:30 am: **Progress in crystalline semiconductor core optical fibers (Invited Paper)**, John M. Ballato, Thomas W. Hawkins, Paul R. Foy, Colin D. McMillen, R. Stolen, Clemson Univ. (USA); Robert R. Rice, Northrop Grumman Aerospace Systems (USA) [7598-40]

11:00 am: **Microfiber-coupled photonic crystal resonators (Invited Paper)**, Myung-Ki Kim, Min-Kyo Seo, Ju-Young Kim, Ju-Hyung Kang, Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7598-41]

11:30 am: **Pulse amplification in semiconductor optical amplifiers with ultrafast gain-recovery times**, Prashant P. Baveja, Aaron M. Kaplan, Univ. of Rochester (USA); Drew N. Maywar, Rochester Institute of Technology (USA); Govind P. Agrawal, Univ. of Rochester (USA) [7598-42]

11:50 am: **High-temperature stability of lasing wavelength in GaAsSb/GaAs double quantum wells lasers**, Hsin-Chieh Yu, Cheng-Tien Wan, Yan-Kuin Su, Ricky W. Chuang, Wei-Cheng Chen, Chun-Yuan Huang, Wei-Hung Lin, Manfred H. Pilkuhn, National Cheng Kung Univ. (Taiwan) [7598-43]

12:10 pm: **1.54 μm emitters and amplifiers based on Er-doped III-nitrides**, Rajendra P. Dahal, Hongxing Jiang, Jingyu Lin, Texas Tech Univ. (USA); John Zavada, North Carolina State Univ. (USA) [7598-44]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 11

Room: 224 (Mezzanine)Thurs. 2:00 to 3:20 pm

Laser and Amplifiers I

2:00 pm: **Near- and medium-infrared optical fiber lasers and emerging applications (Invited Paper)**, Francesco Prudeniano, Luciano Mescia, Luca A. Allegretti, Marco De Sario, Antonella D'Orazio, Annalisa Di Tommaso, Tommaso Palmisano, Vincenzo Petruzzelli, Politecnico di Bari (Italy) [7598-45]

2:30 pm: **Chromium-doped zinc selenide gain media: from synthesis to pulsed mid-infrared laser operation (Invited Paper)**, Alphan Sennaroglu, Koç Univ. (Turkey); Umit Demirbas, Koç Univ. (Turkey) and Massachusetts Institute of Technology (USA); Huseyin Cankaya, Natali Cizmeciyan, Adnan Kurt, Mehmet Somer, Koç Univ. (Turkey) [7598-46]

3:00 pm: **Pulsed cladding-pumped large mode area Raman fiber amplifier**, Junhua Ji, Christophe A. Codemard, Jayanta K. Sahu, Johan Nilsson, Univ. of Southampton (United Kingdom) [7598-47]

Coffee Break 3:20 to 3:50 pm

SESSION 12

Room: 224 (Mezzanine)Thurs. 3:50 to 4:50 pm

Laser and Amplifiers II

3:50 pm: **Rogue waves in femtosecond supercontinuum generation**, Miro Erkintalo, Goëry Guyot, Tampere Univ. of Technology (Finland); John M. Dudley, Univ. de Franche-Comté (France) [7598-49]

4:10 pm: **Terrace-microsphere lasers: spherical cavity lasers for multiwavelength emission**, Hiyori Uehara, Tetsuji Yano, Shuichi Shibata, Tokyo Institute of Technology (Japan) [7598-50]

4:30 pm: **From multicolor to white light by upconversion in Tm³⁺-Ho³⁺-Yb³⁺ co-doped tellurite glasses**, Haggeo Desirena Enriquez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Elder De la Rosa, Centro de Investigaciones en Óptica (Mexico) [7598-51]

Thursday 28 January

SESSION 9

Room: 224 (Mezzanine)Thurs. 8:20 to 10:00 am

Detector Technologies II

8:20 am: **First test results of a cross-delay-line imaging photon counter**, Paul L. Hink, PHOTONIS (USA); Peter Betten, Arnaud Boer, Philip Delger, Rene Glazenborg, PHOTONIS Netherlands B.V. (Netherlands); Emile Schyns, Photonis France S.A.S. (France) [7598-35]

8:40 am: **DC and AC performance of leaky mode MSM polysilicon photodetectors**, Robert Pownall, Charles Thangaraj, Thomas W. Chen, Kevin L. Lear, Colorado State Univ. (USA) [7598-36]

Organic Photonic Materials and Devices XII

Conference Chairs: **Robert L. Nelson**, Air Force Research Lab.; **François Kajzar**, Univ. d'Angers (France); **Toshikuni Kaino**, Tohoku Univ. (Japan)

Program Committee: **Chantal Andraud**, École Normale Supérieure de Lyon (France); **Werner J. Blau**, Trinity College Dublin (Ireland); **Christoph Bubeck**, Max-Planck-Institut für Polymerforschung (Germany); **Darnell E. Diggs**, Air Force Research Lab.; **Alain F. Fort**, Institut de Physique et Chimie des Matériaux de Strasbourg (France); **James G. Grote**, Air Force Research Lab.; **F. Kenneth Hopkins**, Air Force Research Lab.; **Alex K. -Y. Jen**, Univ. of Washington; **Michael H. C. Jin**, The Univ. of Texas at Arlington; **Eunyoung Kim**, Yonsei Univ. (Korea, Republic of); **Jang-Joo Kim**, Seoul National Univ. (Korea, Republic of); **Nakjoong Kim**, Hanyang Univ. (Korea, Republic of); **Junya Kobayashi**, NTT Photonics Labs. (Japan); **Isabelle N. Ledoux-Rak**, École Normale Supérieure de Cachan (France); **Charles Y. C. Lee**, Air Force Office of Scientific Research; **Kwang-Sup Lee**, Hannam Univ. (Korea, Republic of); **Emisoon Mah**, Air Force Research Lab.; **Seth R. Marder**, Georgia Institute of Technology; **Antoni Cz. Mitus**, Wrocław Univ. of Technology (Poland); **Robert A. Norwood**, College of Optical Sciences, The Univ. of Arizona; **Jean-Michel Nunzi**, Queen's Univ. (Canada); **Susanna Orlic**, Technische Univ. Berlin (Germany); **Ileana Rau**, Polytechnical Univ. of Bucharest (Romania); **Niyazi Serdar Sariciftci**, Johannes Kepler Univ. Linz (Austria); **Kenneth D. Singer**, Case Western Reserve Univ.; **Don J. Smith**, U.S. Air Force (United Kingdom); **Rebecca E. Taylor**, Lockheed Martin Space Systems Co.; **Toshiyuki Watanabe**, Tokyo Univ. of Agriculture and Technology (Japan)

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Liang-Chy Chien**, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 1

Room: 212 (Mezzanine) Tues. 10:30 am to 12:10 pm

Photonic Technologies

Session Chair: **Robert L. Nelson**, Air Force Research Lab.

10:30 am: **Status of photonics polymer and face-to-face communication (Keynote Presentation)**, Yasuhiro Koike, Keio Univ. (Japan) [7599-01]

11:10 am: **Control of the birefringence dispersion of polymer film by a birefringent crystal**, Kota Shikama, Keio Univ. (Japan); Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan) and Japan Science and Technology Agency (Japan) [7599-02]

11:30 am: **Fluorescent block copolymers prepared by atomic transfer radical polymerization**, Jungmok You, Yonsei Univ. (Korea, Republic of); Jeong-Ae Yoon, Carnegie Mellon Univ. (USA); Jeonghun Kim, Yonsei Univ. (Korea, Republic of); Chih-Feng Juang, Krzysztof Matyjaszewski, Carnegie Mellon Univ. (USA); Eunyoung Kim, Yonsei Univ. (Korea, Republic of) [7599-03]

11:50 am: **Complementary grating dynamics in photorefractive polymers with Alq₃**, Cory Christenson, Jayan Thomas, Pierre-Alexandre Blanche, Robert A. Norwood, Nasser N. Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) [7599-04]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 2

Room: 212 (Mezzanine) Tues. 1:40 to 3:40 pm

Organic Nanophotonics

Session Chair: **Kwang-Sup Lee**, Hannam Univ. (Korea, Republic of)

1:40 pm: **Optical polymer nanocomposites: designer materials for nanophotonics (Invited Paper)**, Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA) [7599-05]

2:10 pm: **Refractive engineering via super-hybrid technology for polymer optical waveguide applications (Invited Paper)**, Toshikuni Kaino, Okihito Sugihara, Tohoku Univ. (Japan) [7599-06]

2:40 pm: **Solar absorbance and thermal emittance characterization of nanostructured materials**, Jin Ho Kang, National Institute of Aerospace (USA) [7599-07]

3:00 pm: **Nanoparticle electroluminescence: controlling emission color through Förster resonance energy transfer in hybrid particles**, Christopher Huebner, Stephen H. Foulger, Clemson Univ. (USA) [7599-08]

3:20 pm: **Piecewise fabrication of click functionalized core-shell particles**, Ryan D. Roeder, Clemson Univ. (USA); David D. Evanoff, Jr., Western Carolina Univ. (USA); Volodymyr Tsyalkovskyy, Parul Rungta, Stephen H. Foulger, Clemson Univ. (USA) [7599-09]

Coffee Break 3:40 to 4:00 pm

SESSION 3

Room: 212 (Mezzanine) Tues. 4:00 to 5:40 pm

NLO Materials and Devices I

Session Chair: **Yasuhiro Koike**, Keio Univ. (Japan)

4:00 pm: **Non-classical properties of phase conjugate light in bacteriorhodopsin (Invited Paper)**, Yoshiko Okada-Shudo, Yun Zhang, Masayoshi Watanabe, The Univ. of Electro-Communications (Japan) . . [7599-10]

4:30 pm: **Organic nonlinear optical crystals for electro-optics and THz generation**, Blanca Ruiz, Zhou Yang, Seong-Ji Kwon, O-Pil Kwon, Marcel B. Stillhart, Fabian Brunner, Arno Schneider, Carolina Medrano, Mojca Jazbinsek, Peter P. Günter, ETH Zürich (Switzerland) [7599-11]

4:50 pm: **Polarization/depolarization processes in NLO side-chain polymers doped with push-pull chromophores**, Hicham Ibn El Ahrach, Alberto Barsella, Jean-Pierre Vola, Loic Mager, Alain F. Fort, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Wissam Bentoumi, Yann Bretonniere, Chantal Andraud, Ecole Normale Supérieure de Lyon (France) [7599-12]

5:10 pm: **Characterization of the nonlinear optical response of collagen (Invited Paper)**, Ariane Deniset-Besseau, Ecole Polytechnique (France); Julien Duboisset, Univ. Claude Bernard Lyon 1 (France) and CNRS (France); Paulo De Sa Peixoto, Univ. Pierre et Marie Curie (France); Mathias Strupler, Ecole Polytechnique (France); Emmanuel Benichou, Claire Loison, Univ. Claude Bernard Lyon 1 (France); François Hache, Ecole Polytechnique (France); Gervaise Mosser, Univ. Pierre et Marie Curie (France); Pierre-François Brevet, Univ. Claude Bernard Lyon 1 (France); Marie-Claire Schanne-Klein, Ecole Polytechnique (France) [7599-13]

Wednesday 27 January

SESSION 4

Room: 212 (Mezzanine) Wed. 8:00 to 10:00 am

Electro-Optics I

Session Chair: **Toshikuni Kaino**, Tohoku Univ. (Japan)

8:00 am: **New frontiers of organic electro-optic materials and devices: from molecular engineering to technological innovation** (*Keynote Presentation*), Alex K. -Y. Jen, Univ. of Washington (USA) [7599-14]

8:40 am: **Hyperbranched polymers for electro-optic (EO) and photonic crystal applications** (*Invited Paper*), Shiyoshi Yokoyama, Xianqing Piao, Azusa Inoue, Xianmin Zhang, Shin-ichiro Inoue, Kyushu Univ. (Japan) [7599-15]

9:10 am: **EO polymer modulators reliability data**, Raluca Dinu, GigOptix Corp. (USA) [7599-16]

9:30 am: **High-performance electro-optic modulators realized with commercial side-chain electro-optic copolymer DR1-PMMA** (*Invited Paper*), Sébastien Michel, Joseph Zyss, Ecole Normale Supérieure de Cachan (France); Isabelle Ledoux-Rak, Chi Thanh Nguyen, École Normale Supérieure de Cachan (France) [7599-17]

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 212 (Mezzanine) Wed. 10:30 am to 12:10 pm

Electro-Optics II

Session Chair: **Robert L. Nelson**, Air Force Research Lab.

10:30 am: **Electro-optic modulator with exceptional power-size performance enabled by transparent conducting electrodes** (*Invited Paper*), Seng-Tiong Ho, Fei Yi, Fang Ou, Boyang Liu, Yingyan Huang, Tobin J. Marks, Jun Liu, Yiliang Wang, Northwestern Univ. (USA); Alex K. Y. Jen, Su Huang, Jingdong Luo, Univ. of Washington (USA); Raluca Dinu, Danliang Jin, GigOptix Inc. (USA) [7599-18]

11:00 am: **Hybrid organic crystal/silicon-on-insulator integrated electro-optic modulators** (*Invited Paper*), Mojca Jazbinsek, Christoph Hunziker, Seong-Ji Kwon, Harry Figi, O-Pil Kwon, Peter P. Günter, ETH Zürich (Switzerland) [7599-19]

11:30 am: **Organically enabled silicon-based photonic/RF-photonic applications**, Ahmed S. Sharkawy, Ozgenc Ebil, Peng Yao, EM Photonics, Inc. (USA); Matthew Zablocki, Univ. of Delaware (USA); Eric J. Kelmelis, EM Photonics, Inc. (USA); Dennis Prather, Univ. of Delaware (USA) [7599-20]

11:50 am: **Numerical model of multilayer organic emitting light devices**, Yue Hu, Haibo Rao, Jianjun Ju, Yuan He, Univ. of Electronic Science and Technology of China (China) [7599-51]

Lunch/Exhibition Break 12:10 to 1:10 pm

SESSION 6

Room: 212 (Mezzanine) Wed. 1:10 to 3:10 pm

Active Materials

Session Chair: **Alex K. Y. Jen**, Univ. of Washington

1:10 pm: **Degradation of biopolymer-based thin films** (*Invited Paper*), Ileana Rau, Roxana Popescu, Mirela Moldoveanu, Aurelia Meghea, Polytechnical Univ. of Bucharest (Romania); James G. Grote, U.S. Air Force Research Lab. (USA); François Kajzar, Univ. d'Angers (France) [7599-21]

1:40 pm: **Full-color sensitive photorefractive polymers and compositions** (*Invited Paper*), Mohanalingam Kathaperumal, Tao Gu, Bogumila Rachwal, Joshua Tillema, Wan-Yun Hsieh, Zongcheng Jiang, Ozair Siddiqui, Donald Flores, Dinesh Padiyar, Weiping Lin, Peng Wang, Michiharu Yamamoto, Nitto Denko Technical Corp. (USA); Robert Norwood, Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) [7599-22]

2:10 pm: **Enhancement of electroluminescent property of ITOLEDs with transparent WO₃/Ag/WO₃ multilayer anode**, Kihyon Hong, Sungjun Kim, Kisoo Kim, Jong-Lam Lee, Pohang Univ. of Science and Technology (Korea, Republic of) [7599-23]

2:30 pm: **Electro-optic modulation in optical waveguides written by quasi-solitonic propagation in functionalized photopolymers**, Hicham Ibn El Ahrach, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Saber Kamoun, Ecole Nationale Supérieure de Chimie de Paris (Tunisia); Abdelmonem Jemal, Faculté des sciences de Sfax (Tunisia); Jean-Pierre Vola, Loic Mager, Alain Fort, Institut de Physique et Chimie des Matériaux de Strasbourg (France) [7599-24]

2:50 pm: **Optical, photoluminescent, and photoconductive properties of functionalized anthradithiophene and benzothiophene derivatives**, Whitney E. B. Shepherd, Andrew D. Platt, Garrett Banton, Oregon State Univ. (USA); Marsha A. Loth, John E. Anthony, Univ. of Kentucky (USA); Oksana Ostroverkhova, Oregon State Univ. (USA) [7599-25]

Coffee Break 3:10 to 3:40 pm

SESSION 7

Room: 212 (Mezzanine) Wed. 3:40 to 4:50 pm

Waveguide Devices

Session Chair: **Shiyoshi Yokoyama**, Kyushu Univ. (Japan)

3:40 pm: **Polymer nanofibers and nanowires for VLSI photonic circuit application** (*Invited Paper*), El-Hang Lee, OPERA (Korea, Republic of) and Inha Univ. (Korea, Republic of) [7599-26]

4:10 pm: **Development print-like-fabrication techniques for distributed feedback solid state dye lasers with multiple-layered structure**, Soichiro Omi, Kyushu Univ. (Japan) [7599-27]

4:30 pm: **The effect of trans-stilbene unit in the compensation of birefringence of poly(methyl methacrylate) in the random copolymerization method and anisotropic molecule dopant method**, Houran Shafiee, Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan) [7599-28]

SESSION 8

Room: 212 (Mezzanine) Wed. 4:50 to 5:50 pm

Nonlinear Absorption I

Session Chair: **Ileana Rau**,

Polytechnical Univ. of Bucharest (Romania)

4:50 pm: **Synthesis of donor-acceptor-donor two-photon absorbing fluorene derivatives**, Sheng Yao, Hyo-Yang Ahn, Kevin D. Belfield, Univ. of Central Florida (USA) [7599-29]

5:10 pm: **Maximizing two-photon absorption cross section within few essential state models**, Aleksander K. Rebane, Mikhail Drobizhev, Nikolay Makarov, Erich Beuerman, Montana State Univ. (USA) [7599-30]

5:30 pm: **Justification of two-level approximation for description of two-photon absorption in oxazine dyes**, Erich B. Beuerman, Nikolay S. Makarov, Mikhail Drobizhev, Aleksander Rebane II, Montana State Univ. (USA) [7599-31]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Synthesis and photovoltaic properties of a low band-gap polymer based on soluble dithienothiophenes, Kye-Young Kim, Kwang-Sup Lee, Hannam Univ. (Korea, Republic of) [7599-49]

Molecular orientation of discotic molecules controlled via self-assembly monolayer films, Cheng-Yan Chiang, Ya-Ting Hu, Wenjun Zheng, Chi Wi Ong, National Sun Yat-Sen Univ. (Taiwan) [7599-50]

Luminance and heat uniformities of large-area OLED light sources, Jongwoon Park, Jurmsu Jang, Chulyoung Park, Jongho Lee, Gwangyoung Kim, Korea Institute of Industrial Technology (Korea, Republic of) [7599-52]

Synthesis and electroluminescent characteristics of carbazole-based copolymers, Sanghun Nam, Pusan National Univ. (Korea, Democratic Peoples Republic of); In Hwan Jung, Korea Advanced Institute of Science and Technology (Korea, Democratic Peoples Republic of); Eunjae Jeong, Wonho Lee, Sukyung Choi, Han Young Woo, Pusan National Univ. (Korea, Democratic Peoples Republic of) [7599-53]

Triplet energy transfer and exciton dissociation in phosphorescent dye blended polymer photovoltaic devices, Lee Chang-Lyool, Byeon Clare Chisu, Suh Duk-II, Gwangju Institute of Science and Technology (Korea, Republic of); Song-Hee Han, Mokpo National Maritime Univ. (Korea, Republic of); Neil C. Greenham, Yang Xudong, Univ. of Cambridge (United Kingdom) [7599-54]

Molecular weight dependence on bandgap tuning of PS-P2VP photonic, Sung-eui Shin, Su-young Kim, Dong Myung Shin, Hongik Univ. (Korea, Republic of)[7599-55]

The study of photosensitive polyimide containing cinnamate derivatives on photo-alignment of liquid crystal, Suyoung Kim, Sungeui Shin, DongMyung Shin, Hongik Univ. (Korea, Republic of)[7599-56]

Improvement in life time of green-organic light-emitting device, HyunChul Ki, Seon H. Kim, Doo Gun Kim, Hyun Jin Kim, Myung-Soo Han, Hwe-Jong Kim, Korea Photonics Technology Institute (Korea, Republic of); Kyung Jin Hong, Gwangju Univ. (Korea, Republic of)[7599-57]

Integrated electro-optic devices of melt-processable single-crystalline organic films, Harry Figi, Mojca Jazbinsek, Christoph Hunziker, Manuel P. Koechlin, Peter P. Gunter, ETH Zürich (Switzerland)[7599-58]

Picosecond and nanosecond third order nonlinear optical characterization of Cu and Ni phthalocyanines using Z-scan technique, Venugopal R. Soma, Univ. of Hyderabad (India); Amit Kumar Prasad, Cochin Univ. of Science & Technology (India); Tewari Surya Prakash, Univ. of Hyderabad (India); Giribabu Lingamallu, Indian Institute of Commerce and Trade (India)[7599-59]

Pump-probe experiments with 40 femtosecond pulses for characterizing the excited state dynamics of phthalocyanine thin films, Venugopal R. Soma, Debasis Swain, Tewari Surya Prakash, Univ. of Hyderabad (India)[7599-60]

Improvement of two-photon absorptivities of diarylethene derivatives for two-photon 3D data storage, Gheorghe Luchita, Sheng Yao, Hyo-Yang Ahn, Kevin D. Belfield, Univ. of Central Florida (USA)[7599-61]

Comparative study on the effect of thermal annealing on polymer/small molecule blend and copolymer light-emitting devices, Parul Rungta, Volodymyr Tsyalkovskyy, Yuriy P. Bandera, Michael Angelo A. Daniele, Stephen H. Foulger, Clemson Univ. (USA)[7599-62]

Synthesis and characterization of two-photon absorbing organic materials for bio-imaging applications, Ji Ae Park, Tae-Dong Kim, Kwang-Sup Lee, Hannam Univ. (Korea, Republic of)[7599-63]

Thursday 28 January

SESSION 9

Room: 212 (Mezzanine)Thurs. 8:00 to 10:20 am

New Materials and Methods

Session Chair: Chantal Andraud,
Ecole Normale Supérieure de Lyon (France)

8:00 am: **Photonic nanostructures: combined molecular and plasmonic effects** (*Keynote Presentation*), Fabrice Charra, Commissariat à l'Énergie Atomique (France)[7599-32]

8:40 am: **Symmetry breaking in metamaterials and its optical implications** (*Invited Paper*), Jeong-Weon Wu, Boyoung Kang, J. H. Woo, E. Y. Choi, Hyun-Hee Lee, Ewha Womans Univ. (Korea, Republic of); Tae-Jong Hwang, Young-Soon Park, Dohoon Kim, Yeungnam Univ. (Korea, Republic of)[7599-33]

9:10 am: **Photonic crystals in photosensitive polymers: fabrication techniques and optical transfer function,** Alexander Schlösser, Christian Müller, Florian Büchau, Soner Emec, Susanna Orlic-Elschner, Technische Univ. Berlin (Germany)[7599-34]

9:30 am: **Rational design of molecular self-assemblies on surfaces: towards applications in nanophotonics** (*Invited Paper*), Andre-Jean Attias, David Bléger, Fabrice Mathevet, David Kreher, Univ. Pierre et Marie Curie (France); Germain Metgé, Ludovic Douillard, Céline Fiorini-Debuisschert, Fabrice Charra, Commissariat à l'Énergie Atomique (France)[7599-35]

10:00 am: **Novel cyanoporphyrazine ytterbium and vanadium complexes for photonic and biophotonic applications,** Larisa G. Klapshina, Razuvaev Institute of Organometallic Chemistry (Russian Federation); William E. Douglas, Univ. Montpellier II (France); Ilya S. Grigoryev, Elena Yu. Ladilina, Razuvaev Institute of Organometallic Chemistry (Russian Federation); Marina V. Shirmanova, Nizhny Novgorod State Medical Academy (Russian Federation); Alexey Ivanovich Korytin, Institute of Applied Physics (Russian Federation)[7599-36]

Coffee Break10:20 to 10:40 am

SESSION 10

Room: 212 (Mezzanine)Thurs. 10:40 am to 12:10 pm

NLO Materials and Devices II

Session Chair: Fabrice Charra,
Commissariat à l'Énergie Atomique (France)

10:40 am: **Femtosecond two-photon absorption measurements based on accumulative photo-thermal thermal effect and the Rayleigh interferometry** (*Invited Paper*), Luis Rodriguez, Hyo-Yang Ahn, Kevin D. Belfield, Univ. of Central Florida (USA)[7599-37]

11:10 am: **Photostability enhancement studies on zwitterionic chromophores for nonlinear optics,** Sebastiampillai G. Raymond, Stefaan Janssens, My Do, Grant V. M. Williams, Delower Bhuiyan, Andrew J. Kay, Industrial Research Ltd. (New Zealand)[7599-38]

11:30 am: **Nonlinear transmission using highly nonlinear Bragg mirrors,** Xiushan Zhu, College of Optical Sciences, The Univ. of Arizona (USA); Jia-fu Wang, College of Optical Sciences, The Univ. of Arizona (USA) and TIPD LLC (USA); Pickchung Lau, Dan Nguyen, College of Optical Sciences, The Univ. of Arizona (USA); Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA) and TIPD LLC (USA); Diane Steeves, Brian R. Kimball, U.S. Army Soldier Systems Ctr. (USA); Nasser N. Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) and TIPD LLC (USA)[7599-39]

11:50 am: **Symmetry controlled resonance in terahertz anisotropic planar metamaterials,** Boyoung Kang, J. H. Woo, E. Y. Choi, Hyun-Hee Lee, Ewha Womans Univ. (Korea, Republic of); Tae Y. Hong, J. H. Kim, Yonsei Univ. (Korea, Republic of); Jeong-Weon Wu, Ewha Womans Univ. (Korea, Republic of)[7599-40]

Lunch/Exhibition Break12:10 to 1:30 pm

SESSION 11

Room: 212 (Mezzanine)Thurs. 1:30 to 3:00 pm

Nonlinear Absorption II

Session Chair: Kwang-Sup Lee, Hannam Univ. (Korea, Republic of)

1:30 pm: **Novel probes for biphotonic bio-imaging** (*Invited Paper*), Chantal Andraud, Yann Bretonnière, Olivier Maury, Ecole Normale Supérieure de Lyon (France)[7599-41]

2:00 pm: **Novel nonlinear transmission of porphyrin complexes containing rhenium selenide clusters,** Jiafu Wang, Xiushan Zhu, College of Optical Sciences, The Univ. of Arizona (USA); Xiaoyan Tu, Zhiping Zheng, The Univ. of Arizona (USA); Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA); Diane M. Steeves, Brian R. Kimball, U.S. Army Soldier Systems Ctr. (USA); Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA)[7599-42]

2:20 pm: **Numerical modeling of non-Lorentzian two-photon absorption line shape in dipolar chromophore,** Aleksander Rebane II, Mikhail Drobizhev, Nikolay S. Makarov, Erich Beuerman, Montana State Univ. (USA); Christoph Nacke, Juri Pahapill, National Institute of Chemical Physics and Biophysics (Estonia)[7599-43]

2:40 pm: **Third-order optical nonlinearities and optical limiting properties of triarylmethane dye in liquid and solid media,** G. Vinitha, B.S. Abdur Rahman Univ. (India); Alkondan Ramalingam, Anna Univ. (India)[7599-44]

Coffee Break3:00 to 3:30 pm

SESSION 12

Room: 212 (Mezzanine)Thurs. 3:30 to 5:00 pm

Applications

Session Chair: François Kajzar, Univ. d'Angers (France)

3:30 pm: **Organic-inorganic hybrid materials for photovoltaics** (*Invited Paper*), Kwang-Sup Lee, Kyung Kook Jang, Prabhakaran Prem, Sung Hyung Lee, Hannam Univ. (Korea, Republic of); Won Jin Kim, Jangwon Seo, Alexander N. Cartwright, Paras N. Prasad, Univ. at Buffalo (USA)[7599-45]

4:00 pm: **Red organic light-emitting devices with low-efficiency roll-off behavior by employing fluorescent-interlayer-phosphorescence emission structure,** Wallace C. Choy, TianHang Zheng, The Univ. of Hong Kong (Hong Kong, China)[7599-46]

4:20 pm: **Wavelength resolution improvement on organic photodiodes made by ink-jet technique,** Yu Yang, Tokuma Nakamichi, Soichiro Oomi, Ryo Goto, Hirofumi Watanabe, Kyushu Univ. (Japan); Masanao Era, Saga Univ. (Japan); Yuji Oki, Kyushu Univ. (Japan)[7599-47]

4:40 pm: **Optofluidic distributed feedback dye laser via evanescent gain,** Wuzhou Song, Andreas E. Vasdekis, Demetri Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7599-48]

Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIV

Conference Chairs: **Jin-Joo Song**, Univ. of California, San Diego; **Kong-Thon Tsen**, Arizona State Univ.

Conference Co-Chairs: **Markus Betz**, Technische Univ. München (Germany); **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada)

Program Committee: **Mischa Bonn**, FOM Institute for Atomic and Molecular Physics (Netherlands); **Yujie J. Ding**, Lehigh Univ.; **Jan A. Gaj**, Univ. of Warsaw (Poland); **Rupert Huber**, Univ. Konstanz (Germany); **Robert A. Kaindl**, Lawrence Berkeley National Lab.; **Jacek Kasprzak**, Cardiff Univ. (United Kingdom); **Daisik Kim**, Seoul National Univ. (Korea, Republic of); **Torsten Meier**, Univ. Paderborn (Germany); **Walter Pfeiffer**, Univ. Bielefeld (Germany); **Chi-Kuang Sun**, National Taiwan Univ. (Taiwan); **Fabrice Vallee**, Univ. Claude Bernard Lyon 1 (France); **Hailin Wang**, Univ. of Oregon; **Klaas Wynne**, Univ. of Strathclyde (United Kingdom); **Chih-Chung Yang**, National Taiwan Univ. (Taiwan)

Conference Cosponsor

PolarOnyx

Sunday 24 January

SESSION 1

Room: 250 (Mezzanine) Sun. 9:00 to 10:30 am

Nanostructures and Nanophotonics I

Session Chair: **Jin-Joo Song**, Univ. of California, San Diego;
Dai-Sik Kim, Seoul National Univ. (Korea, Republic of)

Note the upcoming special Keynote Session
on Tuesday at 10:30 am

9:00 am: **Ultrafast spectroscopy of ensembles and single metal nanoparticles** (*Invited Paper*), Natalia Del Fatti, Vincent Juvé, Hatim Baida, Dimitris Christofilos, Paolo Maioli, Aurélien Crut, Fabrice Vallée, Univ. Claude Bernard Lyon 1 (France)[7600-02]

9:25 am: **Ultrafast spectroscopy of phonon dynamics in single-walled carbon nanotubes** (*Invited Paper*), Junichiro Kono, Rice Univ. (USA). [7600-03]

9:50 am: **Ultrafast carrier-induced change of refractive index in bulk ZnO**, Marijn A. Versteegh, Tim Kuis, Jaap I. Dijkhuis, Utrecht Univ. (Netherlands)[7600-04]

10:05 am: **Optical properties and carrier dynamics of ZnO thin films and quantum structures** (*Invited Paper*), Yong-Hoon Cho, Korea Advanced Institute of Science and Technology (Korea, Republic of)[7600-05]

Coffee Break 10:30 to 10:55 am

SESSION 2

Room: 250 (Mezzanine) Sun. 10:55 am to 12:25 pm

Excitons and Phonons

Session Chair: **Yujie J. Ding**, Lehigh Univ.

10:55 am: **Role of electron-phonon scattering in reducing the LO phonon lifetimes in GaN** (*Invited Paper*), Jacob B. Khurgin, The Johns Hopkins Univ. (USA)[7600-06]

11:20 am: **Two-photon absorption and multi-exciton generation in lead salt quantum dots**, Lazaro A. Padilha, Gero Nootz, Scott Webster, David J. Hagan, Eric W. Van Stryland, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Larissa Levina, Vladimir N. Sukhovatkin, Edward H. Sargent, Univ. of Toronto (Canada)[7600-07]

11:35 am: **Ultrafast dynamics of exciton-polariton condensates in II-VI semiconductor microcavities** (*Invited Paper*), Konstantinos G. Lagoudakis, Barbara Pietka, Michiel Wouters, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Maxime Richard, Institut NÉEL (France); Augustin Baas, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Regis Andre, Daniel Le Si Dang, Institut NÉEL (France); Benoit Deveaud-Pledran, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7600-08]

12:00 pm: **A quantum phase gate via coherent optoelectronic control of an exciton qubit** (*Invited Paper*), Steffen J. Michaelis de Vasconcellos, Simon Gordon, Dirk Mantei, Univ. Paderborn (Germany); Dirk Reuter, Andreas D. Wieck, Ruhr-Univ. Bochum (Germany); Artur Zrenner, Univ. Paderborn (Germany)[7600-09]

Lunch Break 12:25 to 1:45 pm

SESSION 3

Room: 250 (Mezzanine) Sun. 1:45 to 3:25 pm

Carrier Dynamics

Session Chair: **Torsten Meier**, Univ. Paderborn (Germany)

1:45 pm: **Transient optical gain and carrier dynamics in Ge/SiGe quantum wells** (*Invited Paper*), Sangam Chatterjee, Christoph Lange, Niko S. Köster, Philipps-Univ. Marburg (Germany); Hans C. Sigg, Paul Scherrer Institut (Switzerland); Giovanni Isella, Daniel Chrastina, Politecnico di Milano (USA); Hans von Känel, EpiSpeed AG (Switzerland); Martin Schäfer, Mackillo Kira, Stephan W. Koch, Philipps-Univ. Marburg (Germany)[7600-10]

2:10 pm: **Localization of photo-excited carriers in semiconductor nanoparticles investigated by time-resolved THz spectroscopy** (*Invited Paper*), Petr Kuzel, Hynek Nemeč, Zoltan Mics, Institute of Physics of the ASCR, v.v.i. (Czech Republic)[7600-11]

2:35 pm: **Ultrafast transient absorption studies of single metal and semiconductor nanowires** (*Invited Paper*), Gregory V. Hartland, Christopher R. Carey, Hristina Staleva, Univ. of Notre Dame (USA)[7600-12]

3:00 pm: **Fast carrier dynamics in new GaAs deep-center laser for 1.3µm-1.5µm fiber optics** (*Invited Paper*), Janet L. Pan, Manisha Gupta, Yale Univ. (USA)[7600-13]

Coffee Break 3:25 to 3:50 pm

SESSION 4

Room: 250 (Mezzanine) Sun. 3:50 to 5:55 pm

THz Spectroscopy and Applications I

Session Chair: **Mischa Bonn**,
FOM Institute for Atomic and Molecular Physics (Netherlands)

3:50 pm: **Ultrafast terahertz response of optically excited semiconductor heterostructures** (*Invited Paper*), Stephan W. Koch, Mackillo Kira, Philipps-Univ. Marburg (Germany)[7600-14]

4:15 pm: **Recent progress on parametric generation and amplification of monochromatic and broadband THz pulses** (*Invited Paper*), Yujie J. Ding, Lehigh Univ. (USA)[7600-15]

4:40 pm: **Time-resolved terahertz spectroscopy of hybrid conjugated polymer/CdSe nanorod films** (*Invited Paper*), David G. Cooke, Technical Univ. of Denmark (Denmark); Jun Yan Lek, Yeng Ming Lam, Nanyang Technological Univ. (Singapore); Frederik C. Krebs, Peter U. Jepsen, Technical Univ. of Denmark (Denmark)[7600-16]

5:05 pm: **Terahertz and mid-infrared ultrafast spectroscopies for measuring carrier dynamics in nanophotonic materials and molecular switches** (*Invited Paper*), Edwin J. Heilweil, Okan Esenturk, Tung T. To, National Institute of Standards and Technology (USA); Joseph S. Melinger, Paul A. Lane, U.S. Naval Research Lab. (USA); Karen Mosley, Charles B. Duke III, Theodore J. Burkey, The Univ. of Memphis (USA)[7600-17]

5:30 pm: **THz spectroscopy as a new tool to probe hydration dynamics** (*Invited Paper*), Martina Havenith, Ruhr-Univ. Bochum (Germany)[7600-18]

Monday 25 January

SESSION 5

Room: 250 (Mezzanine) Mon. 8:00 to 10:30 am

Plasmonics I

Session Chairs: **Stephan W. Koch**, Philipps-Univ. Marburg (Germany); **Sangam Chatterjee**, Philipps-Univ. Marburg (Germany)

Note the upcoming special Keynote Session on Tuesday at 10:30 am

8:00 am: **Ultrafast hybrid plasmonics** (*Invited Paper*), Gary P. Wiederrecht, Argonne National Lab. (USA) [7600-19]

8:25 am: **Ultrafast coherent control of hybridized plasmon polaritons in metallic nanostructures** (*Invited Paper*), Tobias Utikal, Univ. Stuttgart (Germany); Mark I. Stockman, Georgia State Univ. (USA); Albert P. Heberle, Univ. Stuttgart (Germany); Markus Lippitz, Max-Planck-Institut für Festkörperforschung (Germany); Harald W. Giessen, Univ. Stuttgart (Germany) [7600-20]

8:50 am: **Evidence of terahertz emission from a particle plasmon Schottky barrier** (*Invited Paper*), Abdulhakem Y. Elezzabi, Corey Baron, Cameron J. Straatsma, Mehmet Egilmez, Jan A. Jung, Univ. of Alberta (Canada) . . [7600-21]

9:15 am: **Terahertz plasmonics: from surface plasmon polaritons to metamaterials** (*Invited Paper*), Oliver Paul, Benjamin Reinhard, Peter Weis, Marco Rahm, Technische Univ. Kaiserslautern (Germany); René Beigang, Fraunhofer-Institut für Physikalische Messtechnik (Germany) [7600-22]

9:40 am: **Metatronics: a new paradigm for optical nanocircuitry** (*Invited Paper*), Nader Engheta, Univ. of Pennsylvania (USA) [7600-23]

10:05 am: **Determination of the polarity of InN by terahertz radiation** (*Invited Paper*), Jenn-Shyong Hwang, Kuang-I Lin, National Cheng Kung Univ. (Taiwan); Chung-Chih Chang, Chinese Military Academy (Taiwan) . . . [7600-24]

Coffee Break 10:30 to 10:55 am

SESSION 6

Room: 250 (Mezzanine) Mon. 10:55 am to 12:25 pm

Spins and Spintronics I

Session Chair: **René Beigang**, Fraunhofer-Institut für Physikalische Messtechnik (Germany)

10:55 am: **Imaging the spin hall effect of light in a semiconductor** (*Invited Paper*), Henry M. van Driel, Univ. of Toronto (Canada) [7600-25]

11:20 am: **Ultrafast dynamics and optical spin-control in single magnetic quantum dots** (*Invited Paper*), Vollrath M. Axt, Univ. Bayreuth (Germany) [7600-26]

11:45 am: **Microscopic analysis of injection currents in semiconductor quantum wells**, Torsten Meier, Jens Förstner, Huynh Thanh Duc, Univ. Paderborn (Germany) [7600-27]

12:00 pm: **Spin dynamics and manipulation in (Ga,Mn)As alloys** (*Invited Paper*), Xinyu Liu, Univ. of Notre Dame (USA) [7600-28]

Lunch Break 12:25 to 1:45 pm

SESSION 7

Room: 250 (Mezzanine) Mon. 1:45 to 3:25 pm

Nonlinear Optical Phenomena I

Session Chair: **Henry M. van Driel**, Univ. of Toronto (Canada)

1:45 pm: **Interplay between disorder and Coulomb interactions in semiconductors** (*Invited Paper*), Xiaoqin Li, Zheng Sun, Thomas Jarvis, The Univ. of Texas at Austin (USA); Mikhail Erementschouk, Michael Leuenberger, Univ. of Central Florida (USA) [7600-29]

2:10 pm: **Multimode instabilities and modelocking phenomena in quantum cascade lasers** (*Invited Paper*), Federico Capasso, Harvard Univ. (USA) [7600-30]

2:35 pm: **Subfemtosecond and attosecond pulse generation** (*Invited Paper*), Andy H. Kung, Institute of Atomic and Molecular Sciences (Taiwan) . . [7600-31]

3:00 pm: **Temporal femtosecond pulse tailoring for nanoscale laser processing of wide-bandgap materials** (*Invited Paper*), Matthias Wollenhaupt, Lars Englert, Cristian Sarpe-Tudoran, Alexander Horn, Univ. Kassel (Germany); Thomas Baumert, Univ.Kassel (Germany) [7600-32]

Coffee Break 3:25 to 3:50 pm

SESSION 8

Room: 250 (Mezzanine) Mon. 3:50 to 5:30 pm

Nanostructures and Nanophotonics II

Session Chair: **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada)

3:50 pm: **Ultrafast optical control of electron spins in quantum wells and quantum dots** (*Invited Paper*), Samuel G. Carter, Sophia E. Economou, Thomas A. Kennedy, Allan S. Bracker, Thomas L. Reinecke, Naval Research Lab. (USA); Andrew Shabaev, George Mason Univ. (USA); Zhigang Chen, National Institute of Standards and Technology (USA) and JILA, Univ. of Colorado (USA); Steven T. Cundiff, JILA, Univ. of Colorado (USA) and National Institute of Standards and Technology (USA) [7600-33]

4:15 pm: **Ultrafast optical nonlinearities in hybrid metal-J-aggregate nanostructures** (*Invited Paper*), Christoph Lienau, Carl von Ossietzky Univ. Oldenburg (Germany) [7600-34]

4:40 pm: **Enhancement of optical emission and absorption by metal nanoparticles** (*Invited Paper*), Greg Sun, Univ. of Massachusetts Boston (USA) [7600-35]

5:05 pm: **Multiple exciton generation and carrier dynamics in electronically coupled PbSe quantum dots** (*Invited Paper*), Matthew C. Beard, Aaron G. Midgett, Barbara Hughes, Joseph Luther, National Renewable Energy Lab. (USA); Hugh W. Hillhouse, Purdue Univ. (USA); Arthur J. Nozik, National Renewable Energy Lab. (USA) [7600-36]

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Liang-Chy Chien**, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

Keynote Session

Room: 250 (Mezzanine) Tues. 10:30 to 11:10 am

Session Chair: **Jin-Joo Song**, Univ. of California, San Diego

10:30 am: **Femtosecond quantum optics with semiconductor nanostructures: single cycles of light, electrons and photons**, Alfred Leitenstorfer, Rudolf Bratschitsch, Rupert Huber, Univ. Konstanz (Germany) [7600-01]

SESSION 9

Room: 250 (Mezzanine) Tues. 11:10 am to 12:15 pm

Plasmonics II

Session Chair: **Markus Betz**, Technische Univ. München (Germany)

11:10 am: **Coherently coupled plasmonic and magnetic array antennas** (*Invited Paper*), A. Femius Koenderink, Ivana Sersic, Martin Frimmer, FOM Institute for Atomic and Molecular Physics (Netherlands) [7600-37]

11:35 am: **Ultrafast silicon-plasmonic modulators**, Matthew S. Sederberg, Zhanghua Han, Van Vien, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [7600-38]

11:50 am: **Ultrafast electron emission from metals: the role of surface plasmons** (*Invited Paper*), Péter Dombi, Péter Rácz, Miklós Lenner, Research Institute for Solid-State Physics and Optics (Hungary); Scott E. Irvine, Abdul Y. Elezzabi, Univ. of Alberta (Canada) [7600-39]

Lunch/Exhibition Break 12:15 to 1:30 pm

SESSION 10

Room: 250 (Mezzanine) Tues. 1:30 to 3:35 pm

Special Topics

Session Chair: Kong-Thon Tsen, Arizona State Univ.

1:30 pm: **Up on the Jaynes-Cummings ladder of a quantum dot-microcavity system** (*Invited Paper*), Jacek Kasprzak, Cardiff Univ. (United Kingdom); Stephan Reitzenstein, Caroline Kistner, Christian Schneider, Micha Strauß, Sven Höfling, Alfred W. B. Forchel, Univ. Würzburg (Germany); Wolfgang W. Langbein, Cardiff Univ. (United Kingdom) [7600-44]

1:55 pm: **Correlated ultrafast electron and proton translocation processes in bacteriorhodopsin monitored by time-resolved terahertz radiation** (*Invited Paper*), Eberhard Riedle, Ludwig-Maximilians-Univ. München (Germany); János Hebling, Univ. of Pécs (Hungary); Géza I. Groma, Biological Research Ctr. (Hungary); Jürgen Hauer, Univ. Wien (Austria); György Váró, Biological Research Ctr. (Hungary) [7600-40]

2:20 pm: **New phenomena in interaction of intense ultrashort light pulses with transparent materials: from 3D self-assembled nanostructures to quill writing and nonreciprocal photosensitivity** (*Invited Paper*), Peter G. Kazansky, Martynas Beresna, Univ. of Southampton (United Kingdom); Yasuhiko Shimotsuma, Kazuyuki Hirao, Kyoto Univ. (Japan); Yuri P. Svirko, Univ. of Joensuu (Finland) [7600-41]

2:45 pm: **Probing H₂O molecular layering structures at solid-water interfaces by femtosecond acoustic pulses** (*Invited Paper*), Yu-Chieh Wen, National Taiwan Univ. (Taiwan); Vitaliy Gusev, Univ. du Maine (France); Yu-Ru Huang, National Taiwan Univ. (Taiwan); Shu-Cheng Chin, Chia-Seng Chang, Yuan-Chih Chang, Academia Sinica (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) [7600-42]

3:10 pm: **Development and application of plasma-waveguide based soft x-ray lasers** (*Invited Paper*), Jyhpyng Wang, Academia Sinica (Taiwan); Szu-Yuan Chen, Institute of Atomic and Molecular Sciences (Taiwan); Jiunn-Yuan Lin, National Chung Cheng Univ. (Taiwan); Hsu-Hsin Chu, National Central Univ. (Taiwan); Ming-Chang Chou, Ping-Hsun Lin, Institute of Atomic and Molecular Sciences (Taiwan) [7600-43]

Coffee Break 3:35 to 4:00 pm

SESSION 11

Room: 250 (Mezzanine) Tues. 4:00 to 5:30 pm

Spins and Spintronics II

Session Chair: Vollrath Martin Axt, Univ. Bayreuth (Germany)

4:00 pm: **Ultrafast optical manipulation of electron spins in quantum dots** (*Invited Paper*), Alex Greilich, Technische Univ. Dortmund (Germany) . . [7600-45]

4:25 pm: **Spin manipulation and generation with spin orbit interaction in semiconductor heterostructures**, Makoto Kohda, Junsaku Nitta, Tohoku Univ. (Japan) [7600-46]

4:40 pm: **Electron-spin beat susceptibility of excitons in semiconductor quantum wells** (*Invited Paper*), Nai-Hang Kwong, College of Optical Sciences, The Univ. of Arizona (USA); Stefan Schumacher, Heriot-Watt Univ. (United Kingdom); Rolf H. Binder, College of Optical Sciences, The Univ. of Arizona (USA) [7600-47]

5:05 pm: **Theory of ultrafast spin dynamics in bulk semiconductors: a microscopic picture** (*Invited Paper*), Hans Christian Schneider, Technische Univ. Kaiserslautern (Germany) [7600-48]

Wednesday 27 January

SESSION 12

Room: 250 (Mezzanine) Wed. 8:00 to 9:55 am

Nonlinear Optical Phenomena II

Session Chair: Abdulkhem Y. Elezzabi, Univ. of Alberta (Canada)

8:00 am: **Advances in optical two-dimensional spectroscopy applied to the study of semiconductor and atomic systems** (*Invited Paper*), Alan D. Bristow, Denis Karaiskaj, Xingcan Dai, Galan A. Moody, Steven T. Cundiff, JILA, Univ. of Colorado at Boulder (USA) [7600-49]

8:25 am: **Exciton dephasing dynamics and disorder in semiconducting single-walled carbon nanotubes** (*Invited Paper*), Matthew W. Graham, Ying-Zhong Ma, Univ. of California, Berkeley (USA); Alex A. Green, Mark C. Hersam, Northwestern Univ. (USA); Graham R. Fleming, Univ. of California, Berkeley (USA) [7600-50]

8:50 am: **Probing many particle correlation in semiconductor quantum wells using double-quantum coherence signal** (*Invited Paper*), Lijun Yang, Shaul Mukamel, Univ. of California, Irvine (USA) [7600-51]

9:15 am: **Dynamics of shaping ultra-short optical pulses in the actively mode-locked semiconductor laser with an external long-haul single-mode fiber cavity**, Alexandre S. Shcherbakov, Pedro Pem Moreno Zarate, National Institute for Astrophysics, Optics, and Electronics (Mexico) [7600-52]

9:30 am: **Confined electron emission with femtosecond timing: nonlinearity, localization, enhancement** (*Invited Paper*), Claus Ropers, Georg-August-Univ. Göttingen (Germany) [7600-53]

Coffee Break 9:55 to 10:20 am

SESSION 13

Room: 250 (Mezzanine) Wed. 10:20 to 11:50 am

Nonlinear Optical Phenomena III

Session Chair: Alan D. Bristow, JILA

10:20 am: **Multiple-quantum 2D spectroscopy of many-body correlations in GaAs quantum wells** (*Invited Paper*), Keith A. Nelson, Massachusetts Institute of Technology (USA) [7600-54]

10:45 am: **Ultrafast coherent control of electric currents at metal surfaces** (*Invited Paper*), Ulrich Höfer, Jens Gütde, Marcus Rohleder, Philipps-Univ. Marburg (Germany); Torsten Meier, Univ. Paderborn (Germany); Stephan W. Koch, Philipps-Univ. Marburg (Germany) [7600-55]

11:10 am: **Two-dimensional mode-locking in planar waveguide arrays**, Matthew O. Williams, J. Nathan Kutz, Univ. of Washington (USA) [7600-56]

11:25 am: **Toward nonlinear magneto optics** (*Invited Paper*), Roberto Morandotti, Yoav Linzon, Katarzyna Rutkowska, Institut National de la Recherche Scientifique (Canada); Boris A. Malomed, Tel Aviv Univ. (Israel) [7600-57]

Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 14

Room: 250 (Mezzanine) Wed. 1:20 to 2:50 pm

Nanostructures and Nanophotonics III

Session Chair: Ulrich Höfer, Philipps-Univ. Marburg (Germany)

1:20 pm: **Manipulation of a single Mn spin using excitation transfer between two coupled CdTe/ZnTe quantum dots** (*Invited Paper*), Mateusz Goryca, Univ. of Warsaw (Poland) [7600-58]

1:45 pm: **Measurement of $\chi^{(3)}$ in CdS nano-particles prepared by thermochemical method under a low power CW He-Ne laser irradiation**, Zahra Dehghani, Esmail Saievar Iranizad, Tarbiat Modares Univ. (Iran, Islamic Republic of); Mohammad Hossein Majles Ara, Tarbiat Moallem Univ. (Iran, Islamic Republic of); Mehdi Molaei, Tarbiat Modares Univ. (Iran, Islamic Republic of) [7600-59]

2:00 pm: **Ultrafast coherent spectroscopy with strain pulses in semiconductor nanostructures** (*Invited Paper*), Dmitri R. Yakovlev, Technische Univ. Dortmund (Germany) [7600-60]

2:25 pm: **Low-dimensional plasmons in metallic atom sheets, atom chains, and nano-sheets** (*Invited Paper*), Tadaaki Nagao, National Institute for Materials Science (Japan) [7600-61]

Coffee Break 2:50 to 3:15 pm

BOOKS of Related Interest

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SESSION 15

Room: 250 (Mezzanine) Wed. 3:15 to 5:20 pm

THz Spectroscopy and Applications II

Session Chair: **Markus Betz**, Technische Univ. München (Germany)

3:15 pm: **Carrier multiplication is more efficient in bulk PbS and PbSe than in quantum dots** (*Invited Paper*), Mischa Bonn, FOM Institute for Atomic and Molecular Physics (Netherlands) [7600-62]

3:40 pm: **Extreme THz nonlinearities in bulk and nanostructured semiconductors** (*Invited Paper*), Alexander Sell, Aji A. Anappara, Univ. of Konstanz (Germany); Tobias Kampfrath, Konrad von Volkman, Martin Wolf, Freie Univ. Berlin (Germany); Giorgio Biasiol, Lab. Nazionale TASC/INFM (Italy); Lucia Sorba, Lab. Nazionale TASC/INFM (Italy) and Scuola Normale Superiore (Italy); Alessandro Tredicucci, Scuola Normale Superiore di Pisa (Italy); Alfred Leitenstorfer, Rupert Huber, Univ. of Konstanz (Germany) [7600-63]

4:05 pm: **Nonlinear terahertz spectroscopy** (*Invited Paper*), Michael Woerner, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7600-64]

4:30 pm: **Nonlinear transient absorption bleaching of intense THz pulses in semiconductors** (*Invited Paper*), Fuhai Su, Univ. of Alberta (Canada); Francois Blanchard, Gargi Sharma, Luca Razzari, Institut National de la Recherche Scientifique (Canada); Ayesheshim K. Ayesheshim, Tyler L. Cocker, Lyubov V. Titova, Univ. of Alberta (Canada); Tsuneyuki Ozaki, Jean-Claude Kieffer, Roberto A. Morandotti, Institut National de la Recherche Scientifique (Canada); Matthew E. Reid, Univ. of Northern British Columbia (Canada); Frank A. Hegmann, Univ. of Alberta (Canada) [7600-65]

4:55 pm: **Terahertz radiation emission from silicon and magnesium-doped indium nitride** (*Invited Paper*), Ingrid Wilke, Rensselaer Polytechnic Institute (USA) [7600-66]

POSTERS—Wednesday

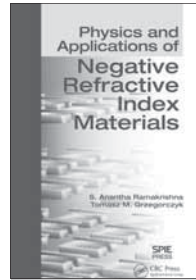
Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Ultrafast conductivity dynamics in optically excited InGaN/GaN multiple quantum wells, observed by transient THz spectroscopy, Dmitry Turchinovich, Henrik Porte, David G. Cooke, Peter Uhd Jepsen, Technical Univ. of Denmark (Denmark) [7600-67]

Increased-bandwidth in multiphoton intrapulse interference phase scan(MIIPS) using angle-dithered nonlinear-optical crystal, Chao-Kuei Lee, Shin-Cheng Liu, National Sun Yat-Sen Univ. (Taiwan) [7600-68]

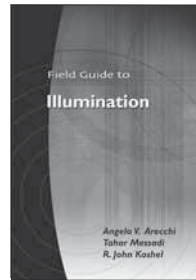
Terahertz plasmonic imaging, Pouya Maraghechi, Cameron J. Straatsma, Zhaorui Liu, Hong Zhao, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [7600-69]



Vol. PM186



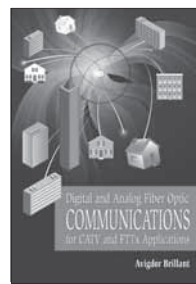
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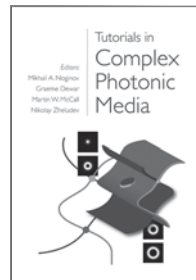
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Vol. PM174



Vol. PM151



Vol. PM194

OPTO

Terahertz Technology and Applications III

Conference Chairs: **Laurence P. Sadwick**, InnoSys, Inc.; **Credhe M. M. O'Sullivan**, National Univ. of Ireland, Maynooth (Ireland)

Program Committee: **Antao Chen**, Univ. of Washington; **Robert H. Giles**, Univ. of Massachusetts Lowell; **R. Jennifer Hwu**, InnoSys, Inc.; **John Anthony Murphy**, National Univ. of Ireland, Maynooth (Ireland); **Konstantin L. Vodopyanov**, Stanford Univ.; **Michael C. Wanke**, Sandia National Labs.

Wednesday 27 January

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Theoretical optimization of InGaAs-based photomixers for broadband continuous-wave terahertz emission, Jae-Heon Shin, Namje Kim, Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of) [7601-21]

Thursday 28 January

SESSION 1

Room: 222 (Mezzanine) Thurs. 8:00 to 10:00 am

THz Imaging, Spectroscopy and Instrumentation

Session Chairs: **Antao Chen**, Univ. of Washington; **Michael C. Wanke**, Sandia National Labs.

8:00 am: **Using terahertz pulsed imaging in quality control: from nondestructive film coating quality analysis to dissolution prediction to on-line measurements**, Philip F. Taday, TeraView Ltd. (United Kingdom) . [7601-01]

8:20 am: **Improved terahertz imaging with a sparse synthetic aperture array**, Zhuopeng Zhang, Takashi Buma, Univ. of Delaware (USA) [7601-02]

8:40 am: **Dual-frequency continuous-wave terahertz transmission imaging of nonmelanoma skin cancers**, Cecil S. Joseph, Univ. of Massachusetts Lowell (USA); Anna N. Yaroslavsky, Wellman Ctr. of Photomedicine (USA); Robert H. Giles, Univ. of Massachusetts Lowell (USA); William E. Nixon, U.S. Army National Ground Intelligence Ctr. (USA) [7601-03]

9:00 am: **Coherent imaging at 2.4 THz with a CW quantum cascade laser transmitter**, Andriy A. Danylov, Thomas M. Goyette, Jerry Waldman, Michael J. Coulombe, Robert H. Giles, Xifeng Qian, Shivashankar Vangala, Neelima Chandrayan, William D. Goodhue, Univ. of Massachusetts Lowell (USA); William E. Nixon, U.S. Army National Ground Intelligence Ctr. (USA) [7601-04]

9:20 am: **Application of wavelet transforms in terahertz spectroscopy of rough surface targets**, M. Hassan H. Arbab, Dale P. Winebrenner, Eric I. Thorsos, Antao Chen, Univ. of Washington (USA) [7601-05]

9:40 am: **THz pulse time-domain holography**, Andrei A. Gorodetsky, Victor G. Bespalov, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [7601-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 222 (Mezzanine) Thurs. 10:30 to 11:50 am

THz Modeling and Simulation

Session Chairs: **Neil A. Trappe**, National Univ. of Ireland, Maynooth (Ireland); **Laurence P. Sadwick**, InnoSys, Inc.

10:30 am: **Measurement and modeling of rough surface effects on terahertz spectroscopy and imaging**, Samuel C. Henry, Scott Schecklman, Gabriel P. Kniffin, Lisa M. Zurk, Portland State Univ. (USA) [7601-07]

10:50 am: **Modeling of an electrically tunable quantum dot photodetector for terahertz detection**, Wei Wu, Dibyendu Dey, Omer G. Memis, Hooman Mohseni, Northwestern Univ. (USA) [7601-08]

11:10 am: **Optical requirements and modeling of coupling devices for future far-infrared space missions**, Neil A. Trappe, National Univ. of Ireland, Maynooth (Ireland) [7601-09]

11:30 am: **Magnetic-field enhancement beyond the skin depth limit**, Jonghwa Shin, Korea Advanced Institute of Science and Technology (Korea, Republic of); Namkyoo Park, Seoul National Univ. (Korea, Republic of); Shanhui Fan, Stanford Univ. (USA); Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7601-10]
Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 3

Room: 222 (Mezzanine) Thurs. 1:20 to 3:00 pm

THz Sources, Generation and Detection

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc.; **Konstantin L. Vodopyanov**, Stanford Univ.

1:20 pm: **Stimulated emission of terahertz radiation from electro-optic dendrimer**, Anis Rahman, Applied Research & Photonics, Inc. (USA) . [7601-11]

1:40 pm: **Optically synchronized dual-channel THz-signals for high-performance transmitter/receiver system**, Naofumi Shimizu, Kyoung-Hwan Oh, NTT Microsystem Integration Labs. (Japan); Satoshi Kohjiro, Kenichi Kikuchi, National Institute of Advanced Industrial Science and Technology (Japan); Atsushi Wakatsuki, NTT Photonics Labs. (Japan); Naoya Kukutsu, Yuichi Kado, NTT Microsystem Integration Labs. (Japan) [7601-12]

2:00 pm: **Handheld terahertz systems based on telecom technologies**, Helmut Roehle, Bernd Sartorius, Dennis Stanze, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany) [7601-13]

2:20 pm: **Terahertz photonic transmitters with a high-gain open-ended rampart slot array antenna**, Yu-Ru Huang, Hung-Pin Chen, National Taiwan Univ. (Taiwan); Pei-Chin Chiu, Jen-Inn Chyi, National Central Univ. (Taiwan); Bing-Hsiao Wang, Shih-Yuan Chen, National Taiwan Univ. (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) and Research Ctr for Applied Sciences, Academia Sinica (Taiwan) [7601-14]

2:40 pm: **Extended spectral coverage of BWO combined with frequency multipliers**, Walter C. Hurlbut, Vladimir G. Kozlov, Microtech Instruments, Inc. (USA) [7601-15]
Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 222 (Mezzanine) Thurs. 3:30 to 5:10 pm

THz Materials and Configurations

Session Chairs: **R. Jennifer Hwu**, InnoSys, Inc.; **Robert H. Giles**, Univ. of Massachusetts Lowell

3:30 pm: **Terahertz dynamics of ionic liquids from a combined dielectric relaxation, terahertz, and optical Kerr effect study: evidence for mesoscopic aggregation**, Klaas Wynne, David Turton, Univ. of Strathclyde (United Kingdom); Johannes Hunger, Alexander Stoppa, Univ. of Regensburg (Germany); Glenn Hefter, Murdoch Univ. (Australia); Andreas Thoman, Markus Waltherr, Albert-Ludwigs-Univ. Freiburg (Germany); Richard Buchner, Univ. of Regensburg (Germany) [7601-16]

3:50 pm: **Electric coupling resonance variation in THz metamaterials by liquid crystal**, Boyoung Kang, J. H. Woo, E. Y. Choi, Hyun-Hee Lee, J. H. Kim, E. S. Kim, Ewha Womans Univ. (Korea, Republic of); Tae Y. Hong, Jae H. Kim, Yonsei Univ. (Korea, Republic of); Jeong-Weon Wu, Ewha Womans Univ. (Korea, Republic of) [7601-17]

4:10 pm: **A floating gate double-quantum well far-infrared photoconductor**, Elizabeth Ledwosinska, Thomas Szkopek, McGill Univ. (Canada) [7601-18]

4:30 pm: **Design and performance of reflective ultra broadband terahertz time domain spectroscopy with air-biased-coherent-detection**, I-Chen Ho, Xiaoyu Guo, Xi-Cheng Zhang, Rensselaer Polytechnic Institute (USA) . [7601-19]

4:50 pm: **Design of hybrid GaAs waveguide emitters for generation of terahertz radiation based on phase-matched optical rectification process pumped by 1550-nm fiber lasers**, Tianxin Yang, Junlong Wang, Rui Li, Mei Sang, Tianjin Univ. (China) [7601-20]

Gallium Nitride Materials and Devices V

Conference Chairs: **Jen-Inn Chyi**, National Central Univ. (Taiwan); **Yasushi Nanishi**, Ritsumeikan Univ. (Japan); **Hadis Morkoç**, Virginia Commonwealth Univ.

Conference Co-Chairs: **Cole W. Litton**, Air Force Research Lab. - retired; **Joachim Piprek**, NUSOD Institute LLC; **Euijoon Yoon**, Seoul National Univ. (Korea, Republic of)

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Monday 25 January

SESSION 1

Room: 310 (Esplanade). **Mon. 8:00 to 10:00 am**

Growth I

Session Chair: **Hadis Morkoç**, Virginia Commonwealth Univ.

8:00 am: **Growth of self-standing GaN substrates** (*Invited Paper*), Hyun-Jae Lee, Tohoku Univ. (Japan); Seogwoo Lee, Wavesquare Inc. (Korea, Republic of); Jun-Seok Ha, Univ. of California, Santa Barbara (USA); Chinkyoo Kim, Kyunghee Univ. (Korea, Republic of); Ji-Ho Chang, Korea Maritime Univ. (Korea, Republic of); Katsushi Fujii, Takafumi Yao, Tohoku Univ. (Japan) [7602-01]

8:30 am: **Selective growth and impurity incorporation in semipolar GaN grown on Si substrate** (*Invited Paper*), Nobuhiko Sawaki, Aichi Institute of Technology (Japan); Yoshio Honda, Nagoya Univ. (Japan) [7602-02]

9:00 am: **Preparation of the high-quality large-size GaN substrates**, Xiangqian Xiu, Rong Zhang, Nanjing Univ. (China) [7602-03]

9:20 am: **Applications of monolayer of microspheres on LEDs and solar cells**, Chih-Chang Chen, Chia-Hua Chan, Chia-Hung Hou, Guan-Ting Chen, Jen-Inn Chyi, National Central Univ. (Taiwan) [7602-04]

9:40 am: **Stress management and improvement of luminescence efficiency in thick crack free GaN layers MOVPE grown on Si(111) directly imaged by cathodoluminescence microscopy**, Anja Dempewolf, Frank Bertram, Thomas Hempel, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Armin Dadgar, Alois J. Krost, Otto-von-Guericke-Univ. Magdeburg (Germany) and Azzurro Semiconductors AG (Germany) [7602-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 310 (Esplanade). **Mon. 10:30 am to 12:30 pm**

Growth II

Session Chair: **Alois J. Krost**, Otto-von-Guericke-Univ. Magdeburg (Germany)

10:30 am: **The influence of thermal annealing on optical and electrical properties indium nitride films grown by MOVPE** (*Invited Paper*), Bernard Gil, Sandra Ruffenach, Mathieu Moret, Olivier Briot, Univ. Montpellier 2 (France) [7602-06]

11:00 am: **Impacts of point defects on the luminescence properties of (Al,Ga)N** (*Invited Paper*), Shigefusa F. Chichibu, Tohoku Univ. (Japan); Akira Uedono, Univ. of Tsukuba (Japan) [7602-07]

11:30 am: **Threading dislocation evolution in patterned GaN nanocolumn growth and coalescence overgrowth**, Tsung-Yi Tang, Yung-Sheng Chen, Wen-Yu Shiao, Wen-Ming Chang, Che-Hao Liao, Cheng-Hung Lin, Kun-Ching Shen, Chih-Chung Yang, National Taiwan Univ. (Taiwan); Ming-Chi Hsu, Epistar Corp. (Taiwan); Jui-Hung Yeh, Epistar Corp (Taiwan); Ta-Cheng Hsu, Epistar Corp. (Taiwan) [7602-08]

11:50 am: **Molecular beam epitaxial growth, fabrication, and characterization of InN/Si nanowire heterojunction solar cells**, Yi-Lu Chang, Zetian Mi, McGill Univ. (Canada) [7602-09]

12:10 pm: **The comprehensive characteristics of quaternary AlInGaN with various TMI molar rate**, Sheng-Fu Yu, Ray-Ming Lin, Chang Gung Univ. (Taiwan) [7602-10]

Lunch Break 12:30 to 2:00 pm

SESSION 3

Room: 310 (Esplanade). **Mon. 2:00 to 4:30 pm**

Growth III

Session Chair: **Cole W. Litton**, Air Force Research Lab.

2:00 pm: **Ammonothermal growth of GaN substrates** (*Invited Paper*), Robert Dwilinski, Roman Doradzinski, Jerzy Garczynski, Leszek Sierzputowski, Marcin Zajac, Ammono Sp. z o.o. (Poland) [7602-11]

2:30 pm: **Nonpolar m-plane GaN film and polarized InGaN/GaN LED grown on LiAlO₂ (001) substrates** (*Invited Paper*), Rong Zhang, Zili Xie, Bin Liu, Xiangqian Xiu, Deyi Fu, Zeng Zhang, Ping Han, Youdou Zheng, Nanjing Univ. (China); Shengming Zhou, Shanghai Institute of Optics and Fine Mechanics (China) [7602-12]

3:00 pm: **Magnetic cages of GaN nanoclusters doped with Gd and Nd**, Vijay Kumar, Dr. Vijay Kumar Foundation (India); John M. Zavada, U.S. Army Research Office (USA) [7602-13]

Coffee Break 3:20 to 3:50 pm

3:50 pm: **Growth of rare-earth-doped GaN crystals by the ammonothermal technique**, Buguo Wang, David F. Bliss, Michael J. Suscavage, Stacy Swider, Candace Lynch, Wayne Eikenberry, Air Force Research Lab. (USA) . . . [7602-14]

4:10 pm: **Extended defects in semipolar (11-22) nitride semiconductors**, Yadira Arroyo Rojas Dasilva, Pierre Ruterana, Ecole Nationale Supérieure d'Ingenieurs de Caen et Ctr. de Recherche (France); Lise Lahourcade, Eva Monroy, Commissariat à l'Énergie Atomique (France); Gilles Nataf, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France) [7602-15]

SESSION 4

Room: 310 (Esplanade). **Mon. 4:30 to 5:50 pm**

FETs

Session Chair: **Peter H. Handel**, Univ. of Missouri-St. Louis

4:30 pm: **Plasmon-assisted dissipation of LO-mode heat in nitride 2DEG channels**, Arvydas Matulionis, Puslaidininkiu Fizikos Institutas (Lithuania) [7602-16]

4:50 pm: **GaN light-emitting diodes with highly transparent ZnO:Ga oxide cap layer**, Huiyong Liu, Xing Li, Xianfeng Ni, Vitaliy Avrutin, Natalia Izyumskaya, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) [7602-79]

5:10 pm: **The role of buffer/substrate strain and comparison with charge control analysis of gallium nitride HFET failure mechanisms**, Aristos Christou, Univ. of Maryland, College Park (USA) [7602-18]

5:30 pm: **Transmission electron microscopy and XRD investigations of InAlN/GaN thin heterostructures for HEMT applications**, Arantxa Vilalta Clemente, Magali Morales, Marie-Pierre Chauvat, Yadira Arroyo-Rojas Dasilva, Ecole Nationale Supérieure d'Ingenieurs de Caen et Ctr. de Recherche (France); Marie Antoinette Poisson, Alcatel-Thales III-V Lab. (France); Michael Heuken, Christoph Giesen, AIXTRON AG (Germany); Pierre Ruterana, Ecole Nationale Supérieure d'Ingenieurs de Caen et Ctr. de Recherche (France) [7602-19]

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: E. Fred Schubert, Rensselaer Polytechnic Institute; Liang-Chy Chien, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 310 (Esplanade). Tues. 10:30 to 11:50 am

FET Reliability

Session Chair: Yasushi Nanishi, Ritsumeikan Univ. (Japan)

10:30 am: **Quantum 1/f noise theory and experiment in QWIPs**, Amanda M. Truong, Peter H. Handel, Univ. of Missouri-St. Louis (USA) [7602-20]

10:50 am: **HFET and MISHFET stability, 1/f noise, and reliability**, Peter H. Handel, Univ. of Missouri-St. Louis (USA); Hadis Morkoç, Virginia Commonwealth Univ. (USA) [7602-21]

11:10 am: **Analytical calculation of the quantum 1/f coherence parameter for HFETs**, Peter H. Handel, Univ. of Missouri-St. Louis (USA) [7602-22]

11:30 am: **Measurements of gate lag in high quality nearly lattice matched InAlN/AlN/GaN HFET structures**, Jacob H. Leach, Mo Wu, Xianfeng Ni, Xing Li, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) . . . [7602-23]

Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 6

Room: 310 (Esplanade). Tues. 1:20 to 3:40 pm

Advanced Techniques I

Session Chair: Shigefusa F. Chichibu, Tohoku Univ. (Japan)

1:20 pm: **Spatio-time-resolved cathodoluminescence spectroscopy imaging: microscopic correlation of real structure and recombination kinetics in InGaN quantum wells** (*Invited Paper*), Jürgen Christen, Sebastian Metzner, Frank Bertram, Otto-von-Guericke-Univ. Magdeburg (Germany); Thomas Wunderer, Frank Lipski, Stephan Schwaiger, Ferdinand Scholz, Ulm (Germany). [7602-24]

1:50 pm: **Nano-ultrasonic based on GaN nano-layers** (*Invited Paper*), Chi-Kuang Sun, Yu-Chieh Wen, National Taiwan Univ. (Taiwan) [7602-25]

2:20 pm: **Effect of Fe doping on the conductivity of HVPE grown GaN studied by time-domain terahertz spectroscopy**, Filip Kadlec, Christelle Kadlec, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Tanya Paskova, Keith R. Evans, Kyma Technologies, Inc. (USA) [7602-26]

2:40 pm: **Temperature dependent micro-photoluminescence of the inversion domain boundary in GaN**, Ronny Kirste, Technische Univ. Berlin (Germany); Ramon Collazo, North Carolina State Univ. (USA); Gordon Callsen, Markus R. Wagner, Technische Univ. Berlin (Germany); Anthony Rice, North Carolina State Univ. (USA); Seiji Mita, Jinqiao Xie, HexaTech, Inc. (USA); Zlatko Sitar, North Carolina State Univ. (USA); Axel Hoffmann, Technische Univ. Berlin (Germany) [7602-27]

3:00 pm: **Aging of deep-UV AlGaIn quantum well LED studied by scanning near-field optical spectroscopy**, Saullius Marcinkevicius, Kista Photonics Research Ctr (Sweden); Andrea Pinos, Kista Photonics Research Ctr. (Sweden) [7602-28]

3:20 pm: **Thermal Conductivity Measurement of Pulsed-MOVPE InN Alloy Grown on GaN / Sapphire by 3ω Method**, Hua Tong, Juan A. Herbsommer, Vincent A. Handara, Hongping Zhao, Guangyu Liu, Nelson Tansu, Lehigh Univ. (USA) [7602-29]

Coffee Break 3:40 to 4:10 pm

SESSION 7

Room: 310 (Esplanade). Tues. 4:10 to 6:00 pm

Advanced Techniques II

Session Chair: Russell D. Dupuis, Georgia Institute of Technology (USA)

4:10 pm: **Radiative and non-radiative decay in group III nitrides** (*Invited Paper*), Axel Hoffmann, Markus R. Wagner, Ronny Kirste, Technische Univ. Berlin (Germany). [7602-30]

4:40 pm: **Cathodoluminescence microscopy of self-organized InGaN nanostructures on GaN pyramids**, Sebastian Metzner, Frank Bertram, Juergen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Michael Jetter, Clemens Waechter, Peter Michler, Univ. Stuttgart (Germany) [7602-31]

5:00 pm: **Nature of surface states and dislocations on non-polar GaN(1-100) surfaces investigated by scanning tunneling microscopy**, Holger Eisele, Lena Ivanova, Technische Univ. Berlin (Germany); Svetlana Borisova, Forschungszentrum Jülich GmbH (Germany); Mario Dähne, Technische Univ. Berlin (Germany); Philipp Ebert, Forschungszentrum Jülich GmbH (Germany). [7602-32]

5:20 pm: **Effect of UV exposure on the surface photovoltage behavior for GaN**, Alison A. Baski, Michael A. Foussekis, Joseph D. Ferguson, Xianfeng Ni, Michael A. Reshchikov, Hadis Morkoc, Virginia Commonwealth Univ. (USA) [7602-33]

5:40 pm: **Optical and electrical properties of p-InxGa1-xN alloys with high In contents**, Bed N. Pantha, Li Jing, Jingyu Lin, Hongxing Jiang, Texas Tech Univ. (USA) [7602-34]

Wednesday 27 January

SESSION 8

Room: 310 (Esplanade). Wed. 8:00 to 10:10 am

QW and Dots

Session Chair: Bernard Gil, Univ. Montpellier 2 (France)

8:00 am: **Theory for optical spectra of nitride quantum dot systems** (*Invited Paper*), Frank Jahnke, Michael Lorke, Jan Seebeck, Kolja Schuh, Univ. Bremen (Germany); Stefan Schulz, Tyndall National Institute (Ireland); Paul Gartner, Gerd Czyncholl, Univ. Bremen (Germany) [7602-35]

8:30 am: **GaN/AlN quantum dots in nanowires: optical properties** (*Invited Paper*), Bruno Gayral, Julien Renard, Commissariat à l'Énergie Atomique (France); Rudeesun Songmuang, Institut Néel (France); Gabriel Tourbot, Olivier Landré, Commissariat à l'Énergie Atomique (France); Catherine Bougerol, Institut Néel (France); Bruno Daudin, Commissariat à l'Énergie Atomique (France) [7602-36]

9:00 am: **Quantum wells, quantum dots and crystallographic defect in nitride semiconductors** (*Invited Paper*), Pierre Ruterana, ENSICAEN (France); Marie-Pierre Chauvat, Ecole Nationale Supérieure d'Ingenieurs de Caen et Ctr. de Recherche (France); Eva Monroy, Lise Lahourcade, Commissariat à l'Énergie Atomique (France). [7602-37]

9:30 am: **Excitonic complexes in single group-III nitride quantum dots**, Axel Hoffmann, Stefan Werner, Gerald Hönig, Momme Winkelkemper, Dieter Bimberg, Technische Univ. Berlin (Germany); Christian Kindel, Satoshi Kako, Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [7602-38]

9:50 am: **Micro-photoluminescence study of InGaN quantum wells grown on c-plane, semipolar, and nonpolar orientation**, Ulrich T. Schwarz, Julia Danhof, Lukas Schade, Univ. Regensburg (Germany) and Freiburg Univ. (Germany); Tim Wernicke, Markus Weyers, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany); Michael Kneissl, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) and Technical University Berlin (Germany) [7602-39]

Coffee Break 10:10 to 10:40 am

SESSION 9

Room: 310 (Esplanade) Wed. 10:40 am to 12:30 pm

Lasers

Session Chair: Euijoon Yoon,
Seoul National Univ. (Korea, Republic of)

10:40 am: **GaN-based two-dimensional photonic crystal surface-emitting lasers with AlN/GaN DBR** (*Invited Paper*), Tien-Chang Lu, Shih-Wei Chen, Tsung-Ting Kao, Ting-Chun Liu, Chien-Kang Chen, Yen-Ju Hou, Cheng-Hung Chen, Peng-Shiang Weng, Hao-Chung Kuo, Shing-Chung Wang, National Chiao Tung Univ. (Taiwan) [7602-40]

11:10 am: **Investigation of AllInGaN-based laser diodes by the effect of quantum well release layer in blue and green wavelength**, Tae-Hoon Jang, K. S. Jeon, S. M. Cho, Y. S. Eum, Yoon-Ho Choi, Min-Soo Noh, LG Electronics Inc. (Korea, Republic of) [7602-41]

11:30 am: **GaN-based VCSELs: analysis of internal device physics and performance limitations**, Joachim Piprek, NUSOD Institute LLC (USA); Zhanming S. Li, Crosslight Software Inc. (Canada) [7602-42]

11:50 am: **High-power high-efficiency continuous-wave InGaN laser diodes in the violet, blue, and green wavelength regime**, James W. Raring, Eric M. Hall, Matt C. Schmidt, Christiane Poblenz, Ben Li, Nick Pfister, Daniel F. Feezell, Richard Craig, James S. Speck, Steven P. DenBaars, Suji Nakamura, Kaai, Inc. (USA) [7602-43]

12:10 pm: **Growth and properties of blue InGaN-based laser diodes with InGaN waveguides**, Russell D. Dupuis, Jianping Liu, Yun Zhang, Jae-Hyun Ryou, Seongsoo Kim, Shyh-Chiang Shen, Douglas Yoder, Georgia Institute of Technology (USA); Kewei Sun, Qiyuan Wei, Yu Huang, Ti Li, Alec Fischer, Fernando Ponce, Arizona State Univ. (USA) [7602-44]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 10

Room: 310 (Esplanade) Wed. 2:00 to 4:50 pm

Novel Devices

Session Chair: Joachim Piprek, NUSOD Institute LLC

2:00 pm: **Nitride infrared intersubband devices** (*Invited Paper*), Maria Tchernycheva, Houssaine Macchadani, Salam Sakr, Laurent Nevou, Juliette Mangeney, Laurent Vivien, François H. Julien, Univ. Paris-Sud 11 (France); Prem K. Kandaswamy, Alexander Wirthmüller, Eva Monroy, Commissariat à l'Énergie Atomique (France); Alon Vardi, Shmuel E. Schacham, Gad Bahir, Technion-Israel Institute of Technology (Israel); Gianmauro Pozzovivo, Sebastian Golka, Gottfried Strasser, Technische Univ. Wien (Austria) [7602-45]

2:30 pm: **First-principles simulation of GaN material and devices: an application to GaN APDs** (*Invited Paper*), Enrico Bellotti, Michele Moresco, Francesco Bertazzi, Boston Univ. (USA) [7602-46]

3:00 pm: **Low-frequency and high-efficiency energy harvesting with micromachined AlN suspended structures** (*Invited Paper*), Adriana Passaseo, Alessandro Massaro, Stefano De Guido, Massimo De Vittorio, National Nanotechnology Lab. (Italy) [7602-47]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **GaN-based optoelectronics on silicon** (*Invited Paper*), Alois J. Krost, Otto-von-Guericke-Univ. Magdeburg (Germany) [7602-48]

4:30 pm: **Promising composite die-bonding materials for high-power GaN-based LED applications**, Ray-Hua Horng, Jhih-Sin Hong, Yu-Li Tsai, Dong-Sing Wu, National Chung Hsing Univ. (Taiwan) [7602-50]

SESSION 11

Room: 310 (Esplanade) Wed. 4:50 to 5:30 pm

Poster Highlight

Session Chair: Hadis Morkoç, Virginia Commonwealth Univ.

4:50 pm: **Ab initio study of structural properties for zincblende AlInN: comparison of LDA and GGA**, Bo-Ting Liou, Hsiuping Institute of Technology (Taiwan); Bang-Yenn Wu, De Lin Institute of Technology (Taiwan) [7602-68]

4:54 pm: **Output power enhancement of light-emitting diodes with defect passivation layer**, Ming-Hua Lo, Yuh-Jen Cheng, National Chiao Tung Univ. (Taiwan) [7602-69]

4:58 pm: **Comparison of the light extraction efficiency of InGaN/GaN light-emitting diodes with two-dimensional hole and pillar photonic crystal structures**, Young Chul Shin, Dong Ho Kim, Byung Gyu Lee, Wan Ho Lee, Dong Ju Chae, Ji Won Yang, Su Jin Kim, Hee Dong Kim, Yu Jung Seo, Kyoung Chan Kim, Korea Univ. (Korea, Republic of); Joong-Mok Park, Kristen P. Constant, Kai-Ming Ho, Iowa State Univ. (USA); Han-Youl Ryu, Inha Univ. (Korea, Republic of); Jong Hyeob Baek, Tak Jung, Korea Photonics Technology Institute (Korea, Republic of); Tae Geun Kim, Korea Univ. (Korea, Republic of) [7602-70]

5:02 pm: **Crystal quality improvement of a-plane GaN using epitaxial lateral overgrowth on nanorods**, Shih-Chun Ling, Tien-Chang Lu, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan) [7602-72]

5:06 pm: **Non-polar m-plane GaN on patterned Si(112) substrates by metalorganic chemical vapor deposition**, Xianfeng Ni, Mo Wu, Jaesoong Lee, Xing Li, Alison Baski, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) [7602-73]

5:10 pm: **Comparison of different template structures for high quality and self-separation thick GaN growth**, Yen-Hsiang Fang, Chu-Li Chao, Tung-Wei Chi, Kuei-Ming Chen, Po-Chun Liu, Jenq-Dar Tsay, Industrial Technology Research Institute (Taiwan) [7602-74]

5:14 pm: **Analytical methods to study burn-in effects in blue InGaN laser diodes**, Jens Müller, Georg Brüderl, Sönke Tautz, Marc O. Schillgalies, Andreas Breidenassel, Stephan Lutgen, OSRAM Opto Semiconductors GmbH (Germany) [7602-75]

5:18 pm: **Reduction in operating voltage of UV laser diode**, Tomokichi Ichikawa, Kenichiro Takeda, Yuji Ogiso, Kengo Nagata, Motoaki Iwaya, Satoshi Kamiyama, Hiroshi Amano, Isamu Akasaki, Meijo Univ. (Japan); Harumasa Yoshida, Masakazu Kuwabara, Yoji Yamashita, Hirofumi Kan, Hamamatsu Photonics K.K. (Japan) [7602-76]

5:22 pm: **On the effect of InGaN-based LED structure on internal quantum efficiency**, Jaesoong Lee, Xianfeng Ni, Mo Wu, Xing Li, Ryoko Shimada, Ümit Özgür, Alison Baski, Hadis Morkoç, Virginia Commonwealth Univ. (USA); Tanya Paskova, Greg Mulholland, Keith Evans, Kyma Technologies, Inc. (USA) [7602-77]

5:26 pm: **Analysis and comparison of UV photodetectors based on wide bandgap semiconductors**, Qin Wang, Susan Savage, Bertrand Noharet, Ingemar Petermann, Sirpa Persson, Mietek Bakowski, Jan Y. Andersson, Acree AB (Sweden) and IMAGIC Ctr. (Sweden) [7602-78]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Ab initio study of structural properties for zincblende AlInN: comparison of LDA and GGA, Bo-Ting Liou, Hsiuping Institute of Technology (Taiwan); Bang-Yenn Wu, De Lin Institute of Technology (Taiwan) [7602-68]

Output power enhancement of light-emitting diodes with defect passivation layer, Ming-Hua Lo, Yuh-Jen Cheng, National Chiao Tung Univ. (Taiwan) [7602-69]

Comparison of the light extraction efficiency of InGaN/GaN light-emitting diodes with two-dimensional hole and pillar photonic crystal structures, Young Chul Shin, Dong Ho Kim, Byung Gyu Lee, Wan Ho Lee, Dong Ju Chae, Ji Won Yang, Su Jin Kim, Hee Dong Kim, Yu Jung Seo, Kyoung Chan Kim, Korea Univ. (Korea, Republic of); Joong-Mok Park, Kristen P. Constant, Kai-Ming Ho, Iowa State Univ. (USA); Han-Youl Ryu, Inha Univ. (Korea, Republic of); Jong Hyeob Baek, Tak Jung, Korea Photonics Technology Institute (Korea, Republic of); Tae Geun Kim, Korea Univ. (Korea, Republic of)[7602-70]

Crystal quality improvement of a-plane GaN using epitaxial lateral overgrowth on nanorods, Shih-Chun Ling, Tien-Chang Lu, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan)[7602-72]

Non-polar m-plane GaN on patterned Si(112) substrates by metalorganic chemical vapor deposition, Xianfeng Ni, Mo Wu, Jaesoong Lee, Xing Li, Alison Baski, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA)[7602-73]

Comparison of different template structures for high quality and self-separation thick GaN growth, Yen-Hsiang Fang, Chu-Li Chao, Tung-Wei Chi, Kuei-Ming Chen, Po-Chun Liu, Jenq-Dar Tsay, Industrial Technology Research Institute (Taiwan)[7602-74]

Analytical methods to study burn-in effects in blue InGaN laser diodes, Jens Müller, Georg Brüderl, Sönke Tautz, Marc O. Schillgalies, Andreas Breidenassel, Stephan Lutgen, OSRAM Opto Semiconductors GmbH (Germany)[7602-75]

Reduction in operating voltage of UV laser diode, Tomoki Ichikawa, Kenichiro Takeda, Yuji Ogiso, Kengo Nagata, Motoaki Iwaya, Satoshi Kamiyama, Hiroshi Amano, Isamu Akasaki, Meijo Univ. (Japan); Harumasa Yoshida, Masakazu Kuwabara, Yoji Yamashita, Hirofumi Kan, Hamamatsu Photonics K.K. (Japan)[7602-76]

On the effect of InGaN-based LED structure on internal quantum efficiency, Jaesoong Lee, Xianfeng Ni, Mo Wu, Xing Li, Ryoko Shimada, Ümit Özgür, Alison Baski, Hadis Morkoç, Virginia Commonwealth Univ. (USA); Tanya Paskova, Greg Mulholland, Keith Evans, Kyma Technologies, Inc. (USA)[7602-77]

Analysis and comparison of UV photodetectors based on wide bandgap semiconductors, Qin Wang, Susan Savage, Bertrand Noharet, Ingemar Petermann, Sirpa Persson, Mietek Bakowski, Jan Y. Andersson, Acreo AB (Sweden) and IMAGIC Ctr. (Sweden)[7602-78]

Thursday 28 January

SESSION 12

Room: 310 (Esplanade).Thurs. 8:00 to 10:00 am

LEDs I

Session Chair: Chuong Tran, SemiLEDs Corp.

8:00 am: **Realization of high-efficiency AlGaIn-based ultraviolet light emitters** (*Invited Paper*), Seong-Ran Jeon, Korea Photonics Technology Institute (Korea, Republic of)[7602-51]

8:30 am: **Novel device concept for high-efficiency InGaN quantum wells light-emitting diodes** (*Invited Paper*), Nelson Tansu, Hongping Zhao, Yik-Khoon Ee, Guangyu Liu, Xiao-Hang Li, Gen-Sheng Huang, Lehigh Univ. (USA)[7602-52]

9:00 am: **Role of interface roughness on lateral transport in InGaN/GaN LEDs: diffusion length, dislocation spacing, and radiative efficiency**, I-Lin Lu, Yuh-Renn Wu, National Taiwan Univ. (Taiwan); John M. Hinckley, Jasprit Singh, Univ. of Michigan (USA)[7602-53]

9:20 am: **Reduction of the efficiency droop of InGaN quantum well light-emitting diodes by using an $\text{In}_{0.04}\text{Ga}_{0.96}\text{N}$ pre-layer and trimethylindium treatment**, Hsueh-Hsing Liu, Peng-Ren Chen, Hung-Cheng Lin, Jen-Inn Chyi, National Central Univ. (Taiwan)[7602-54]

9:40 am: **A measurement method of internal quantum efficiency in InGaN light-emitting diodes without any parameter assumptions**, Jong-In Shim, Hyusung Kim, Hanyang Univ. (Korea, Republic of); Hyundon Jung, Wonnam Kim, EtaMax Co. (Korea, Republic of)[7602-55]

Coffee Break10:00 to 10:30 am

SESSION 13

Room: 310 (Esplanade).Thurs. 10:30 am to 12:00 pm

LEDs II

Session Chair: Ferdinand Scholz, Univ. Ulm (Germany)

10:30 am: **Development of high-power UV LEDs for epoxy curing applications** (*Invited Paper*), Chuong Tran, SemiLEDs Corp. (USA) . . .[7602-56]

11:00 am: **Original GaN-based LED structure on ZnO template by metal organic chemical deposition**, Ray-Ming Li, Chung Gung Univ. (Taiwan); Sheng-Fu Yu, National Cheng-Kung Univ. (Taiwan)[7602-57]

11:20 am: **Increasing light extraction efficiency of blue-light-emitting diodes a using moth-eye structure**, Toshiyuki Kondo, Atsushi Suzuki, Fumiharu Teramae, Tsukasa Kitano, Yukio Kaneko, Ryosuke Kawai, EL-SEED Corp. (Japan); Kazuki Teshima, Satoru Maeda, Satoshi Kamiyama, Motoaki Iwaya, Hiroshi Amano, Isamu Akasaki, Meijo Univ. (Japan)[7602-58]

11:40 am: **Internal quantum efficiency of m-plane InGaN on Si and GaN**, Jaesoong Lee, Xianfeng Ni, Mo Wu, Xing Li, Ryoko Shimada, Ümit Özgür, Alison Baski, Hadis Morkoç, Virginia Commonwealth Univ. (USA); Tanya Paskova, Greg Mulholland, Keith Evans, Kyma Technologies, Inc. (USA)[7602-59]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 14

Room: 310 (Esplanade).Thurs. 1:30 to 3:00 pm

LEDs III

Session Chair: Hideto Miyake, Mie Univ. (Japan)

1:30 pm: **Development of high-efficient InGaN-based blue LED for lighting applications** (*Invited Paper*), Ta-Cheng Hsu, Ming-Chi Hsu, Min-Hsun Hsieh, Ming-Jiunn Jou, Epistar Corp. (Taiwan); Tsung-Yi Tang, Yung-Sheng Chen, Wen-Yu Shiao, Cheng-Hung Lin, Wen-Ming Chang, Che-Hao Liao, Kun-Ching Shen, Chih-Chung Yang, National Taiwan Univ. (Taiwan)[7602-60]

2:00 pm: **Efficiency enhancement of InGaN LEDs with an n-type AlGaIn/GaN/InGaN current spreading layer**, Peng-Ren Chen, Hsueh-Hsing Liu, Geng-Yen Lee, Hung-Cheng Lin, Jen-Inn Chyi, National Central Univ. (Taiwan)[7602-61]

2:20 pm: **High-quality AlN for deep UV applications**, Sergey A. Nikishin, Boris Borisov, Mahesh Pandikunta, Rajendra P. Dahal, Jingyu Lin, Hongxing Jiang, Mark Holtz, Texas Tech Univ. (USA)[7602-62]

2:40 pm: **Efficiency retention at high current injection levels in m-plane InGaN LEDs**, Xing Li, Xianfeng Ni, Jaesoong Lee, Mo Wu, Ümit Özgür, Hadis Morkoc, Virginia Commonwealth Univ. (USA); Tanya Paskova, Greg Mulholland, Keith Evans, Kyma Technologies, Inc. (USA)[7602-63]

Coffee Break3:00 to 3:30 pm

SESSION 15

Room: 310 (Esplanade).Thurs. 3:30 to 5:10 pm

LEDs IV

Session Chair: Jen-Inn Chyi, National Central Univ. (Taiwan)

3:30 pm: **AlGaInN heterostructures on semipolar side facets of selectively grown GaN stripes for optoelectronic applications** (*Invited Paper*), Ferdinand Scholz, Thomas Wunderer, Martin Feneberg, Klaus Thonke, Andrei Chuvilin, Ute Kaiser, Univ. Ulm (Germany); Sebastian Metzner, Frank Bertram, Juergen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany)[7602-64]

4:00 pm: **Fabrication of ultraviolet-C light source using MOVPE grown AlGaIn layer on AlN/sapphire** (*Invited Paper*), Hideto Miyake, Mie Univ. (Japan)[7602-65]

4:30 pm: **Electroluminescence characteristics of nonpolar a-plane ([11-20]) InGaN/GaN light-emitting diodes grown on r-plane sapphire substrates**, Dong Ho Kim, Byung Gyu Lee, Wan Ho Lee, Dong Ju Chae, Ji Won Yang, Kyung Chan Kim, Ho Myoung An, Korea Univ. (Korea, Republic of); Sung Min Hwang, Yong Gon Seo, Korea Electronics Technology Institute (Korea, Republic of); Tae Geun Kim, Korea Univ. (Korea, Republic of)[7602-66]

4:50 pm: **Blue superluminescent light-emitting diodes**, Marco Rossetti, Exalos AG (Switzerland); Eric Feltin, NOVAGAN s.a.r.l. (Switzerland); Jean-François Carlin, Antonino Castiglia, Gatién Cosendey, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Julien Dorsaz, Valerio Laino, Marcus Duellk, Christian Velez, Exalos AG (Switzerland)[7602-67]

Oxide-based Materials and Devices

Conference Chairs: **Ferechteh Hosseini Teherani**, Nanovation SARL (France); **David C. Look**, Wright State Univ.; **Cole W. Litton**, Air Force Research Lab. - retired; **David J. Rogers**, Nanovation SARL (France)

Program Committee: **Rodrigo Ferrão de Paiva Martins**, Uninova/CEMOP (Portugal); **Elvira M. C. Fortunato**, Univ. Nova de Lisboa (Portugal); **Hiroshi Fujioka**, The Univ. of Tokyo (Japan); **Michael D. Gerhold**, U.S. Army Research Office; **Hanns-Ulrich Habermeier**, Max-Planck-Institut für Festkörperforschung (Germany); **Masashi Kawasaki**, Tohoku Univ. (Japan); **Tatsuo Okada**, Kyushu Univ. (Japan); **Stuart S. P. Parkin**, IBM Almaden Research Ctr.; **Manijeh Razeghi**, Northwestern Univ.; **Donald J. Silversmith**, Air Force Office of Scientific Research; **Zhong Lin Wang**, Georgia Institute of Technology

Sunday 24 January

Opening Remarks

Room: 238 (Mezzanine) Sun. 8:30 to 8:40 am

Ferechteh Hosseini Teherani, Nanovation SARL (France);
David J. Rogers, Nanovation SARL (France)

SESSION 1

Room: 238 (Mezzanine) Sun. 8:40 to 10:10 am

ZnO-based Materials: Electronic Structure, Transport, Emission, Absorption, and Polarity I

Session Chairs: **David C. Look**, Wright State Univ.;
Michael D. Gerhold, U.S. Army Research Office

8:40 am: **Conduction in disordered thin films: application to ZnO**, David C. Look, Wright State Univ. (USA) [7603-01]

9:10 am: **Theory of high field carrier transport and impact ionization in ZnO** (*Invited Paper*), Francesco Bertazzi, Boston Univ. (USA) and Politecnico di Torino (Italy); Michele Penna, Michele Goano, Politecnico di Torino (Italy); Enrico Bellotti, Boston Univ. (USA) [7603-02]

9:30 am: **Ultrafast carrier relaxation and diffusion dynamics in ZnO systems** (*Invited Paper*), Christopher J. Stanton, Chris J. Cook, Univ. of Florida (USA); Suffian Khan, Univ. of Illinois (USA); Xiaoming Wang, The Univ. of Texas at Austin (USA); Young-Dahl Jho, Gwangju Institute of Science and Technology (Korea, Republic of); David H. Reitze, Univ. of Florida (USA) [7603-03]

9:50 am: **Optical and vibrational properties of nonpolar a-plane versus polar c-plane ZnO**, Markus R. Wagner, Munise Cobet, Gordon Callsen, Ronny Kirste, Martin Kaiser, Axel G. Hoffmann, Technische Univ. Berlin (Germany); Sebastian Eisermann, Stefan Lautenschläger, Joachim Sann, Bruno K. Meyer, Justus-Liebig-Universität Giessen (Germany) [7603-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 238 (Mezzanine) Sun. 10:40 am to 12:00 pm

ZnO-based Materials: Electronic Structure, Transport, Emission, Absorption, and Polarity II

Session Chairs: **David C. Look**, Wright State Univ.;
Michael D. Gerhold, U.S. Army Research Office

10:40 am: **Mechanisms of enhancement of visible light absorption in ZnO films for photoelectrochemical splitting of water** (*Invited Paper*), Jose Luis Pau Vizcaino, Maria J. Hernandez, Manuel Cervera, Leopold Wolff, Juan Piqueras, Univ. Autónoma de Madrid (Spain) [7603-05]

11:00 am: **Growth and properties of nonpolar and polar MgZnO/ZnO quantum wells** (*Invited Paper*), Hiroaki Matsui, The Univ. of Tokyo (Japan) [7603-06]

11:20 am: **Intersubband transitions in ZnO quantum wells** (*Invited Paper*), Keita Ohtani, Mohamed Belmoubarik, Hideo Ohno, Tohoku Univ. (Japan) [7603-07]

11:40 am: **Valence electronic structure of oxide semiconductors** (*Invited Paper*), Chris F. McConville, Philip D. C. King, Tim D. Veal, Univ. of Warwick (United Kingdom); Andre Schleife, Frank Fuchs, Friedhelm Bechstedt, Friedrich-Schiller-Universität Jena (Germany) [7603-08]

Lunch Break 12:00 to 1:10 pm

SESSION 3

Room: 238 (Mezzanine) Sun. 1:10 to 3:30 pm

Use of ZnO and TCO in Photovoltaics

Session Chairs: **Manijeh Razeghi**, Northwestern Univ.;
Jose Luis Pau Vizcaino, Univ. Autónoma de Madrid

1:10 pm: **Transparent conductive oxide for n-i-p thin film silicon solar cells** (*Invited Paper*), Thomas Söderström, Franz-Joseph Haug, Christophe Ballif, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7603-09]

1:30 pm: **Opportunities and challenges of metal oxides in organic semiconductor devices** (*Invited Paper*), Graham B. Murdoch, Michael G. Helander, Mark T. Greiner, Zhibin Wang, Zhenghong Lu, Univ. of Toronto (Canada) [7603-10]

1:50 pm: **Growth and characterization of ZnO-based buffer layers for CIGS solar cells** (*Invited Paper*), Tobias Törndahl, Adam Hultqvist, Charlotte Platzer-Björkman, Marika Edoff, Uppsala Univ. (Sweden) [7603-12]

2:10 pm: **Aluminum-doped ZnO layers for thin film silicon solar cells** (*Invited Paper*), Jatindra K. Rath, Utrecht Univ. (Netherlands) [7603-13]

2:30 pm: **Band gap engineering of ZnO for high efficiency CIGS based solar cells** (*Invited Paper*), Charlotte Platzer-Björkman, Adam Hultqvist, Jonas Pettersson, Tobias Törndahl, Uppsala Univ. (Sweden) [7603-14]

2:50 pm: **Self textured transparent conductive oxide film for efficiency improvement in solar cell** (*Invited Paper*), Do Young Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Junsin Yi, Sungkyunkwan Univ. (Korea, Republic of); Hyungjun Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [7603-15]

3:10 pm: **Excitonic emission of ZnO nanoparticles** (*Invited Paper*), Bruno Masenelli, Dimitri Tainoff, Univ. Claude Bernard Lyon 1 (France); Patrice Melinon, Univ. Claude-Bernard Lyon 1 (France) [7603-16]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 238 (Mezzanine) Sun. 4:00 to 5:20 pm

Doping Studies of ZnO

Session Chairs: **Cole W. Litton**, Air Force Research Lab.;
Chris F. McConville, Univ. of Warwick (United Kingdom)

4:00 pm: **Cathodoluminescence and synchrotron-based x-ray absorption characterisation of iron in-diffusion in ZnO** (*Invited Paper*), Cuong Ton-That, Matthew Phillips, Matthew Foley, Laurent Lee Cheong Lem, Geoffrey McCredie, Univ. of Technology, Sydney (Australia) [7603-17]

4:20 pm: **Hydrogen in ZnO** (*Invited Paper*), Eduard Lavrov, Technische Univ. Dresden (Germany) [7603-18]

4:40 pm: **Lattice location of the group V elements Sb, As, and P in ZnO** (*Invited Paper*), Ulrich Wahl, Instituto Tecnológico e Nuclear (Portugal); João G. Correia, European Organization for Nuclear Research (Switzerland); Tânia de Melo Mendonça, Univ. do Porto (Portugal); Stefan Decoster, Katholieke Univ. Leuven (Belgium) [7603-19]

5:00 pm: **A detailed temperature dependent Hall study of As-doped ZnO thin films**, Saurabh Nagar, Subhananda Chakrabarti, Indian Institute of Technology, Bombay (India) [7603-20]

Monday 25 January

SESSION 5

Room: 238 (Mezzanine) Mon. 8:00 to 9:00 am

Progress in Spin-based Materials and Devices

Session Chairs: **Chenglong Jia**, Martin-Luther-Univ. Halle-Wittenberg (Germany); **John M. Zavada**, U.S. Army Research Office

8:00 am: **Interfacial magnetoelectric coupling for electrically controllable spin-based properties** (*Invited Paper*), Vincent Garcia, Manuel Bibes, Karim Bouzehouane, Stéphane Fusil, Arnaud Crassous, Cyrille Deranlot, Agnes Barthelemy, Unité Mixte de Physique CNRS/Thales (France); Neil Mathur, Univ. of Cambridge (United Kingdom); Sergio Valencia, Florian Kronast, Helmholtz-Zentrum Berlin BESSY (France); Shaima Enouz-Vedrenne, Thales Research and Technology (France); Laura Bocher, Alexandre Gloter, Dominique Imhoff, Univ. Paris-Sud 11 (France)[7603-57]

8:20 am: **Complex oxide heterostructures grown by pulsed laser deposition**, Matthias A. Brandt, Holger von Wenckstern, Michael Lorenz, Heiko Frenzel, Gabriele Benndorf, Martin Lange, Marko Stölzel, Christoph Dietrich, Jan Zippel, Marius Grundmann, Univ. Leipzig (Germany)[7603-22]

8:40 am: **Flash memory and spin-field-effect transistor using multiferroic oxides** (*Invited Paper*), Chenglong Jia, Jamal Berakdar, Martin-Luther-Univ. Halle-Wittenberg (Germany)[7603-23]

SESSION 6

Room: 238 (Mezzanine) Mon. 9:00 to 10:25 am

Growth and Properties of Multifunctional Oxides I

Session Chairs: **Hanns-Ulrich Habermeier**, Max-Planck-Institut für Festkörperforschung (Germany); **Pasquale Orgiani**, Univ. degli studi di Salerno (Italy)

9:00 am: **Oxide thin films and devices for large-area electronics and optoelectronics** (*Invited Paper*), Douglas A. Keszler, Stephen T. Meyers, Kai Jiang, Jason K. Stowers, Alan Telecky, Oregon State Univ. (USA)[7603-24]

9:20 am: **Photon-assisted synthesis of functional oxide thin films: mechanisms and applications to oxide electronics** (*Invited Paper*), Shriram Ramanathan, Harvard Univ. (USA)[7603-25]

9:40 am: **ALD growth and properties of ZrOx/LaOx thin films** (*Invited Paper*), Stephan Abermann, Christoph Henkel, Ole Bethge, Emmerich Bertagnoli, Technische Univ. Wien (Austria)[7603-26]

10:00 am: **Complex oxide heterostructures and superlattices: the role of interfaces**, Hanns-Ulrich Habermeier, Max-Planck-Institut für Festkörperforschung (Germany)[7603-27]

Coffee Break10:25 to 10:50 am

SESSION 7

Room: 238 (Mezzanine) Mon. 10:50 am to 12:30 pm

Growth and Properties of Multifunctional Oxides II

Session Chairs: **Hanns-Ulrich Habermeier**, Max-Planck-Institut für Festkörperforschung (Germany); **Pasquale Orgiani**, Univ. degli studi di Salerno (Italy)

10:50 am: **Interface control in BaTiO₃ based supercapacitors** (*Invited Paper*), Mario Maglione, Catherine Elissalde, Chung U-Chan, Univ. Bordeaux 1 (France)[7603-28]

11:10 am: **Computational study of the deposition of metal-oxide thin films on strontium titanate: morphology and growth modes** (*Invited Paper*), Jennifer L. Wohlwend, Univ. of Florida (USA); Cosima N. Boswell, Univ. of California, Berkeley (USA); Simon R. Phillpot, Susan B. Sinnott, Univ. of Florida (USA)[7603-29]

11:30 am: **Enhanced transport properties in LaMnO grown on STO** (*Invited Paper*), Pasquale Orgiani, Univ. degli studi di Salerno (Italy); Carmela Aruta, Istituto Nazionale di Fisica Nucleare (Italy); Regina Ciancio, Istituto Nazionale per la Fisica della Materia (Italy); Alice Galdi, Luigi Maritato, Univ. degli Studi di Salerno (Italy)[7603-30]

11:50 am: **Plasmonic effects on the laser-induced metal-insulator transition of vanadium dioxide** (*Invited Paper*), Davon W. Ferrara, Evan R. MacQuarrie, Joyeeta Nag, Vanderbilt Univ. (USA); Anthony Kaye, Vanderbilt Univ. (USA) and ITT Advanced Engineering and Sciences (USA); Richard F. Haglund, Jr., Vanderbilt Univ. (USA)[7603-31]

12:10 pm: **Properties of anatase Nb-doped TiO₂ transparent conductor** (*Invited Paper*), Taro Hitosugi, Tohoku Univ. (Japan)[7603-32]

Lunch Break12:30 to 1:50 pm

SESSION 8

Room: 238 (Mezzanine) Mon. 1:50 to 3:35 pm

Oxide-based Transistors and Transparent Electronics I

Session Chairs: **Elvira M. C. Fortunato**, Univ. Nova de Lisboa (Portugal); **Stephen J. Pearton**, Univ. of Florida

1:50 pm: **Paper-e: the electronics of future**, Elvira M. C. Fortunato, P. Barquinha, Luisa Pereira, Gonçalo Gonçalves, Nuno M. R. Correia, Rodrigo Martins, CENIMAT, Univ. Nova de Lisboa (Portugal) and CEMOP/Uninova (Portugal)[7603-33]

2:15 pm: **High-performance transparent thin film transistor with atomic layer deposition ZnO-based active channel layer** (*Invited Paper*), Hyungjun Kim, Yonsei Univ. (Korea, Republic of); S. Lim, Jae-Min Kim, Do Young Kim, Pohang Univ. of Science and Technology (Korea, Republic of)[7603-34]

2:35 pm: **Complementary use of organic and oxide semiconductors** (*Invited Paper*), Jong Ho Na, Masatoshi Kitamura, Yasuhiko Arakawa, The Univ. of Tokyo (Japan)[7603-35]

2:55 pm: **Materials engineering for solution-processed InGaZnO thin film transistors** (*Invited Paper*), Junhyung Lim, Hoo-Jeong Lee, Mi Ran Moon, Jong Hyun Shim, Jun Hyuk Choi, Jinho Joo, Kyung Park, Donggeun Jung, Hyoungsub Kim, Sungkyunkwan Univ. (Korea, Republic of)[7603-36]

3:15 pm: **Review on optical and electrical properties of InGaZnO** (*Invited Paper*), Hyun Jae Kim, Yonsei Univ. (Korea, Republic of)[7603-11]

Coffee Break3:35 to 4:00 pm

SESSION 9

Room: 238 (Mezzanine) Mon. 4:00 to 5:40 pm

Oxide-based Transistors and Transparent Electronics II

Session Chairs: **Elvira M. C. Fortunato**, Univ. Nova de Lisboa (Portugal); **Stephen J. Pearton**, Univ. of Florida

4:00 pm: **Floating gate memory paper transistor**, Rodrigo Ferrão de Paiva Martins, P. Barquinha, Luisa Pereira, Gonçalo Gonçalves, I. Ferreira, Elvira M. C. Fortunato, CENIMAT, Univ. Nova de Lisboa (Portugal) and CEMOP/Uninova (Portugal)[7603-37]

4:20 pm: **Oxide thin film transistors on novel flexible substrates** (*Invited Paper*), Stephen J. Pearton, Wantae Lim, Erica Douglas, Fan Ren, Univ. of Florida (USA); Young Woo Heo, Kyungpook National Univ. (Korea, Republic of); David P. Norton, Univ. of Florida (USA)[7603-38]

4:40 pm: **Photosensor application of amorphous InZnO-based thin film transistor** (*Invited Paper*), Po-Tsun Liu, Yi-Teh Chou, Li-Feng Teng, National Chiao Tung Univ. (Taiwan)[7603-39]

5:00 pm: **TCO nanostructures for excitonic solar cells** (*Invited Paper*), Alberto Vomiero, Guido Faglia, Camilla Baratto, Antonio Braga, Elisabetta Comini, Isabella Concina, Matteo Ferroni, Vardan Galstyan, Giselle Jimenez, Iskandar Kholmanov, Nicola Poli, Andrea Ponzoni, Silvia Todros, Giorgio Sberveglieri, INFN-CNR, Univ. degli Studi di Brescia (Italy)[7603-40]

5:20 pm: **ZnO for transparent electronics grown by pulsed laser deposition**, David J. Rogers, Ferechteh H. Teherani, Vinod E. Sandana, Nanovation (France)[7603-41]

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Liang-Chy Chien**, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break10:00 to 10:30 am

SESSION 10

Room: 238 (Mezzanine) Tues. 10:30 am to 12:30 pm

Use of ZnO for UV Applications

Session Chairs: **Federico Capasso**, Harvard Univ.;
David J. Rogers, Nanovation (France)

10:30 am: **Applications of zinc oxide to UV photonics**, Michael D. Gerhold, U.S. Army Research Office (USA) [7603-42]

10:50 am: **Optical properties of metal-semiconductor-metal (MSM) UV photodetectors on ZnO films**, Linghui Li, Univ. of Missouri-Columbia (USA); Yungryel Ryu, MOXtronics, Inc. (USA); Henry White, Ping Yu, Univ. of Missouri-Columbia (USA) [7603-43]

11:10 am: **Molecular beam epitaxial growth of Ternary cubic oxide semiconductors for deep ultraviolet applications** (*Invited Paper*), Winston V. Schoenfeld, Jeremy W. Mares, Ryan C. Boutwell, Matthew Falanga, Amber Scheurer, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7603-44]

11:30 am: **Growth and characterization of wide bandgap ZnMgAlO thin films lattice-matched to ZnO substrate** (*Invited Paper*), Il-Soo Kim, Byung-Teak Lee, Chonnam National Univ. (Korea, Republic of) [7603-45]

11:50 am: **Progress in ZnO template substrates for GaN-based alloys grown by MOVPE** (*Invited Paper*), Abdallah Ougazzaden, Georgia Institute of Technology Lorraine (France); David J. Rogers, Ferechteh H. Teherani, Vinod E. Sandana, Nanovation (France); Gaëlle Orsal, Tarik Moudakir, Simon Gautier, Ctr. National de la Recherche Scientifique (France); François Jomard, Univ. de Versailles Saint-Quentin-en Yvelines (France); Mohamed Abid, Georgia Institute of Technology Lorraine (France); Michael Molinari, Michel Troyon, Univ. de Reims Champagne-Ardenne (France); Nicolas Fressengeas, Ctr. National de la Recherche Scientifique (France); P. Voss, Georgia Institute of Technology Lorraine (France) [7603-46]

12:10 pm: **Hybrid flexible ZnO nanorods ultraviolet LEDs** (*Invited Paper*), Jie Chen, Lorenz Aë, Martha C. Lux-Steiner, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) [7603-47]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 11

Room: 238 (Mezzanine) Tues. 2:00 to 3:30 pm

Nanostructured Oxides and their Applications I

Session Chairs: **Yicheng Lu**, Rutgers, The State Univ. of New Jersey;
Diane M. Steeves, U.S. Army Soldier Systems Ctr.

2:00 pm: **Multifunctional ZnO and its nanostructures for optoelectronic devices** (*Invited Paper*), Yicheng Lu, Rutgers, The State Univ. of New Jersey (USA) [7603-48]

2:25 pm: **ZnO nanowires: optical properties, LEDs and lasers** (*Invited Paper*), Federico Capasso, Harvard Univ. (USA) [7603-49]

2:50 pm: **Nanopatterned optical and magnetic La_{0.7}Sr_{0.3}MnO₃ arrays: synthesis, fabrication, and properties** (*Invited Paper*), Wei-Fang Su, National Taiwan Univ. (Taiwan) [7603-50]

3:10 pm: **Multi-layered water quality sensor based on RuO₂ nanostructures** (*Invited Paper*), Serge Zhuiykov, Commonwealth Scientific and Industrial Research Organisation (Australia) [7603-51]

Coffee Break 3:30 to 4:00 pm

SESSION 12

Room: 238 (Mezzanine) Tues. 4:00 to 5:40 pm

Nanostructured Oxides and their Applications II

Session Chairs: **Regina Luttgé**, Univ. Twente (Netherlands);
Tatsuo Okada, Kyushu Univ. (Japan)

4:00 pm: **Nanolithography for oxide nano-arrays and their application in medical devices** (*Invited Paper*), Regina Luttgé, Univ. Twente (Netherlands) [7603-52]

4:20 pm: **Synthesis and characterization of phosphorus-doped ZnO nanocrystals by nanoparticle-assisted pulsed laser deposition**, Tatsuo Okada, Kyushu Univ. (Japan) [7603-53]

4:40 pm: **Effect of surface modification on the optical properties nanocrystalline zinc oxide materials**, Diane M. Steeves, U.S. Army Soldier Systems Ctr. (USA); Jagdeep Singh, Jisun Im, James E. Whitten, Univ. of Massachusetts Lowell (USA); Jason W. Soares, U.S. Army Soldier Systems Ctr. (USA) [7603-54]

5:00 pm: **Inorganic light emitting device based on ZnO nanoparticles** (*Invited Paper*), Ekaterina Neshataeva, Tilmar Kuemmel, Univ. Duisburg-Essen (Germany); André Ebbbers, Evonik Degussa GmbH (Germany); Gerd Bacher, Univ. Duisburg-Essen (Germany) [7603-55]

5:20 pm: **Solid-state white light source from ZnO-porous silicon nanocomposites**, Ram Gopal Singh, Univ. of Delhi (India); Fouran Singh, Inter Univ. Accelerator Ctr. (India); Vivechana Agarwal, Univ. Autónoma del Estado de Morelos (Mexico); Dinakar Kanjilal, Inter Univ. Accelerator Ctr. (India); Ram Mohan Mehra, Univ. of Delhi (India) [7603-56]

Wednesday 27 January

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Characterization of ZnO UV photoconductors on the 6H-SiC substrate, Linghui Li, Univ. of Missouri-Columbia (USA); Yungryel Ryu, MOXtronics, Inc. (USA); Henry White, Ping Yu, Univ. of Missouri-Columbia (USA) [7603-58]

Structural and electrical properties of rectifying p-ZnO/n-InP heterojunction, Arjun Mandal, Subhananda Chakrabarti, Indian Institute of Technology (India) [7603-59]

Atomic layer epitaxy of ZnO and TiO₂ thin films on c-plane sapphire substrate for novel oxide soft x-ray mirrors, Masaki Murata, Yuji Tanaka, Hiroshi Kunagai, Ataru Kobayashi, Osaka City Univ. (Japan); Tsutomu Shinagawa, Osaka Municipal Technical Research Institute (Japan) [7603-60]

p-n homojunction zinc oxide nanowires-based light-emitting device, Philippe Gilet, Anne Laure Bavencove, Commissariat à l'Énergie Atomique (France); Pierre Ferret, Lab. d'Electronique de Technologie de l'Information (France); Jonathan Garcia, Matthieu Lafossas, François Levy, Patrice Noel, Pascal Marotel, Nicolas Olivier, Commissariat à l'Énergie Atomique (France); Emilie Pougéoise, Lab. d'Electronique de Technologie de l'Information (France); Eddy Latu-romain, Robin Thierry, Guy Feuillet, Commissariat à l'Énergie Atomique (France); Daniel Le Si Dang, Univ. Joseph Fourier (France) . . [7603-61]

Post-annealing of p-type ZnO:Sb thin film grown by pulsed laser deposition, Yoshihiro Yata, Tatsunori Sakano, Minoru Obara, Keio Univ. (Japan) [7603-62]

Highly transparent and conductive Tantalum-doped ZnO films prepared by radio frequency sputtering, Yupeng An, Zhenyu Song, Yiding Wang, Jilin Univ. (China) [7603-63]

Change in properties of spray pyrolysed ZnO thin film due to co doping of fluorine with metals, T. V. Vimal Kumar, Cheranellore Sudha Kartha, K. P. Vijayakumar, Cochin Univ. of Science & Technology (India) [7603-64]

Structural and optical properties of TiO₂ thin films annealed in O₂ and N₂ gases flow, Seon H. Kim, Tae Un Kim, Geum-Yoon Oh, HyunChul Ki, Doo-Gun Kim, Hyo Jin J. Kim, Hang Ju Ko, Myung-Soo Han, Swook Hann, Hwe-Jong Kim, Korea Photonics Technology Institute (Korea, Republic of) [7603-65]

Physical properties of MgZnO film grown by RF magnetron sputtering using ZnO/MgO (80/20 wt%) target, Kuang-Po Hsueh, Vanung Univ. (Taiwan); Chun-Ju Tun, National Synchrotron Radiation Research Ctr. (Taiwan); Hsien-Chin Chiu, Chang Gung Univ. (Taiwan) [7603-66]

Comparison of ZnO nanostructures grown using pulsed laser deposition on various substrates (*Invited Paper*), Vinod E. Sandana, David J. Rogers, Ferechteh H. Teherani, Nanovation (France) [7603-67]

OPTO

Integrated Optics: Devices, Materials, and Technologies XIV

Conference Chairs: **Jean-Emmanuel Broquin**, Institut de Microélectronique Électromagnétisme Photonique/Lab. d'Hyperfréquence et Caractérisation (France); **Christoph M. Greiner**, LightSmyth Technologies, Inc.

Conference Co-Chairs: **Gualtiero Nunzi Conti**, Istituto di Fisica Applicata Nello Carrara (Italy); **Christoph A. Wächter**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

Program Committee: **Pierre Berini**, Univ. of Ottawa (Canada); **Pavel Cheben**, National Research Council Canada (Canada); **Xudong Fan**, Univ. of Missouri, Columbia; **Helmut Heidrich**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Andrea Melloni**, Politecnico di Milano (Italy); **Robert L. Nelson**, Air Force Research Lab.; **Jens H. Schmid**, Canadian Photonics Fabrication Ctr. (Canada); **Frank Schmidt**, JCMwave GmbH (Germany) and Zuse Institute Berlin (Germany); **Yakov Sidorin**, Bromberg & Sunstein LLP; **Stefano Taccheo**, Swansea Univ. (United Kingdom)

Monday 25 January

SESSION 1

Room: 309 (Esplanade) Mon. 8:00 to 10:10 am

Waveguide Engineering I

Session Chair: **Gualtiero Nunzi Conti**, Istituto di Fisica Applicata Nello Carrara (Italy)

8:00 am: **Integrated photonic devices for advanced modulation formats** (*Invited Paper*), Yoshinori Hibino, NTT Photonics Labs. (Japan) [7604-01]

8:30 am: **High-performance optical waveguides based on boron/phosphorous-doped silicon oxynitride**, Fei Sun, Gabriel Sengo, Alfred Driessen, Kerstin Worhoff, Univ. Twente (Netherlands) [7604-02]

8:50 am: **Diamond-based waveguides and devices: fabrication and design**, Mark P. Hiscocks, The Univ. of New South Wales (Australia); Chun-Hsu Su, Kumaravelu Ganesan, Brant C. Gibson, Andrew D. Greentree, The Univ. of Melbourne (Australia); François J. Ladouceur, The Univ. of New South Wales (Australia); Steven D. Praver, The Univ. of Melbourne (Australia) [7604-03]

9:10 am: **Waveguides based on TeGe thick films for spatial interferometry**, Eléonore Barthélémy, Stephanie Albert, Caroline Vigreux-Bercovici, Annie Pradel, Univ. Montpellier 2 (France) [7604-04]

9:30 am: **Fabrication and characterization of garnet/SOI strip-loaded waveguides for integrated optical isolator applications**, Lei Bi, Juejun Hu, Lionel C. Kimerling, Caroline A. Ross, Massachusetts Institute of Technology (USA) [7604-05]

9:50 am: **Microfluidics and thin-film processes: a recipe for organic integrated photonics based on 3D microresonators**, Nolwenn Huby, David Pluchon, Malika Belloul, Alain Moreac, Nathalie Coulon, Univ. de Rennes 1 (France); Etienne Gavot, Univ. du Mans (France); Pascal Panizza, Bruno Beche, Arnaud Saint-Jalmes, Univ. de Rennes 1 (France) [7604-06]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 309 (Esplanade) Mon. 10:40 am to 12:30 pm

Amplifiers and Lasers

Session Chair: **Jean-Emmanuel Broquin**, Institut de Microélectronique Électromagnétisme et Photonique (France)

10:40 am: **Rare-earth-ion-doped Al₂O₃ for integrated optical amplification and lasing** (*Invited Paper*), Kerstin Wörhoff, Markus Pollnau, Laura Agazzi, Jonathan D. B. Bradley, Univ. Twente (Netherlands) [7604-07]

11:10 am: **Application of waveguide amplifiers in optical networks**, Stefano Taccheo, Karin Ennser, Swansea Univ. (United Kingdom) [7604-08]

11:30 am: **Optofluidic FRET dye laser controlled by DNA scaffold**, Yuze Sun, Chung-Shieh Wu, Xudong Fan, Univ. of Missouri, Columbia (USA) [7604-09]

11:50 am: **Demonstration of excitation-wavelength-independent concentration of sensitized Er³⁺ ions in as-deposited and low-temperature-annealed Si-rich SiO₂ films**, Oleksandr Savchyn, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Ravi M. Todi, Kevin R. Coffey, Luis K. Ono, Beatriz Roldan Cuenya, Univ. of Central Florida (USA); Pieter G. Kik, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7604-10]

12:10 pm: **Low threshold Er³⁺/Yb³⁺ co-doped microcavity laser**, Hsiusheng Hsu, The Univ. of Southern California (USA); Can Cai, California Institute of Technology (USA); Andrea M. Armani, The Univ. of Southern California (USA) [7604-11]

Lunch Break 12:30 to 1:40 pm

SESSION 3

Room: 309 (Esplanade) Mon. 1:40 to 3:30 pm

Modelling

Session Chair: **Christoph A. Wächter**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

1:40 pm: **Large-scale simulations in the realm of nano-optics** (*Invited Paper*), Carsten Rockstuhl, Christoph Menzel, Thomas Paul, Stephan Fahr, Falk L. Lederer, Christian Helgert, Christoph Etrich, Thomas Pertsch, Friedrich-Schiller-Univ. Jena (Germany) [7604-12]

2:10 pm: **Propagation analysis of low-optical overlap modes in nanoscale III-V and amorphous membrane waveguides**, Ralph D. Whaley, Jr., Krishna Manoharan, Anupama Solam, Ohio Univ. (USA); Gines Lifante, Univ. Autónoma de Madrid (Spain) [7604-13]

2:30 pm: **Finite element method for accurate 3D simulation of plasmonic waveguide devices**, Lin W. Zschiedrich, Zuse Institute Berlin (Germany); Frank Schmidt, Sven Burger, JCMwave GmbH (Germany) [7604-14]

2:50 pm: **Compact WDM using a multi-channel directional-coupler and partial image revivals**, Ravi J. McCosker, Graham E. Town, Macquarie Univ. (Australia) [7604-15]

3:10 pm: **Coupled mode analysis for graded index multiwaveguide systems**, Krishna C. Patra, Enakshi K. Sharma, Sangeeta Shrivastava, Univ. of Delhi (India) [7604-16]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 309 (Esplanade) Mon. 4:00 to 5:20 pm

Photonic Integration

Session Chair: **Stefano Taccheo**, Swansea Univ. (United Kingdom)

4:00 pm: **Generic packaging concepts in the frame of network of excellence ePIXnet**, Tolga Tekin, Lars Zimmermann, Technische Univ. Berlin (Germany); Henning Schröder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Pieter Dumon, Wim Bogaerts, Univ. Gent (Belgium); Jose Vicente Galan, Pablo Sanchis, Univ. Politécnic de Valencia (Spain); William Whelan-Curtin, Daryl M. Beggs, Univ. of St. Andrews (United Kingdom) [7604-17]

4:20 pm: **Quantum well intermixing in AlInGaAs MQW structures through impurity-free vacancy method**, Ko-Hsin Lee, James R. O'Callaghan, Brendan J. Roycroft, Hua Yang, Tyndall National Institute (Ireland); Frank H. Peters, Tyndall National Institute (Ireland) and Univ. College Cork (Ireland); Brian Corbett, Tyndall National Institute (Ireland) [7604-18]

4:40 pm: **Monolithic integration of optical mode-size converter and high-speed electro-absorption modulators using laterally undercut waveguide**, Yi-Jen Chiu, Fang-Zheng Lin, Tsu-Hsiu Wu, Hung-Jung Yan, Jui-Pin Wu, National Sun Yat-Sen Univ. (Taiwan) [7604-19]

5:00 pm: **The erasing phenomenon in the DBR laser diode with an outer gain section monolithically integrated at the grating side**, Yang Liu, Yuan-Bing Cheng, Song Liang, Bao-Jun Wang, Ling-Juan Zhao, Wei Wang, Institute of Semiconductors (China) [7604-20]

Tuesday 26 January

OPTO Plenary Session
Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am
Session Chairs: E. Fred Schubert, Rensselaer Polytechnic Institute; Liang-Chy Chien, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 309 (Esplanade). Tues. 10:30 am to 12:20 pm

Subwavelength/Diffractive Photonics

Session Chair: Christoph M. Greiner, LightSmyth Technologies, Inc.

10:30 am: **Leaky mode resonance photonics: technology for biosensors, optical components, MEMS, and plasmonics** (*Invited Paper*), Robert Magnusson, The Univ. of Texas at Arlington (USA) [7604-21]

11:00 am: **High-speed optical filtering using active resonant subwavelength gratings**, Aaron V. Gin, Shanalyn A. Kemme, Robert R. Boye, A. Robert Ellis, David W. Peters, Jon R. Ihlefeld, Joel R. Wendt, Lee H. Marshall, Sandia National Labs. (USA); Tony R. Carter, Sandia Staffing Alliance, LLC (USA); Sally Samora, LMATA Government Services LLC (USA) [7604-22]

11:20 am: **Deep-subwavelength focusing and steering of light in an aperiodic metallic waveguide array**, Lieven Verslegers, Peter B. Catrysse, Zongfu Yu, Shanhui Fan, Stanford Univ. (USA) [7604-23]

11:40 am: **Application of resonant subwavelength gratings to a rotary position encoder**, Robert R. Boye, David W. Peters, Joel R. Wendt, Randy J. Shul, Sandia National Labs. (USA); Sally Samora, Sarah G. Rich, LMATA Government Services, LLC (USA); Anthony L. Lentine, Rick A. Kellogg, Sandia National Labs. (USA) [7604-24]

12:00 pm: **Mechanical-strain tuned polymer Bragg reflectors for the tunable laser application**, Kyung-Jo Kim, Min-Cheol Oh, Jun-Whee Kim, Pusan National Univ. (Korea, Republic of) [7604-25]

Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 6

Room: 309 (Esplanade). Tues. 1:50 to 3:30 pm

Non-Linear Devices and Modulators

Session Chair: Jens H. Schmid, National Research Council Canada (Canada)

1:50 pm: **Towards nonlinear photonic wires in lithium niobate** (*Invited Paper*), Hui Hu, Li Gui, Raimund Ricken, Wolfgang Sohler, Univ. Paderborn (Germany) [7604-26]

2:20 pm: **Silicon-organic hybrid nanophotonics** (*Invited Paper*), Michael Hochberg, Tom W. Baehr-Jones, Univ. of Washington (USA) . [7604-27]

2:50 pm: **Electro-optic modulation in optical waveguides written by quasi-solitonic propagation in doped photopolymers**, Hicham Ibn El Ahrach, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Saber Kamoun, Abdelmonem Jemal, Ecole Nationale Supérieure de Chimie de Paris (France); Jean-Pierre Vola, Loic Mager, Alain F. Fort, Institut de Physique et Chimie des Matériaux de Strasbourg (France) [7604-28]

3:10 pm: **High-density integrated optics in ion-sliced lithium niobate thin films**, Gorazd Poberaj, Manuel P. Koechlin, Frederik Sulser, Peter P. Gunter, ETH Zürich (Switzerland) [7604-29]

Coffee Break 3:30 to 4:00 pm

SESSION 7

Room: 309 (Esplanade). Tues. 4:00 to 5:40 pm

Waveguide Engineering II

Session Chair: Pavel Cheben, National Research Council Canada (Canada)

4:00 pm: **Tg: the reversible door to fabrication of novel glass photonic devices and integrated circuits**, Angela B. Seddon, David Furniss, Zheng G. Lian, Wei J. Pan, Trevor M. Benson, The Univ. of Nottingham (United Kingdom) [7604-30]

4:20 pm: **Fabrication and optimization of Tantalum pentoxide waveguides for optical micropropulsion**, Balpreet S. Ahluwalia, Olav Gaute Hellesø, Univ. of Tromsø (Norway); Ananth Z. Subramanian, Nicolas M. B. Perney, Neil P. Sessions, James S. Wilkinson, Univ. of Southampton (United Kingdom) [7604-31]

4:40 pm: **Fabrication of buried-type waveguide with optical gates by nano-ion-exchange method**, Tetsuji Yano, Eiji Shokatsu, Hiroyo Segawa, Shuichi Shibata, Tokyo Institute of Technology (Japan) [7604-32]

5:00 pm: **Refractive index engineering by fast ion implantations: a generic method for constructing multicomponents electro-optical circuits**, Aharon J. Agranat, Alexander Gumennik, Harel Ilan, The Hebrew Univ. of Jerusalem (Israel) [7604-33]

5:20 pm: **Highly photorefractive Eu³⁺ activated sol-gel SiO₂-SnO₂ thin film waveguides**, Simone Berneschi, Istituto di Fisica Applicata Nello Carrara (Italy); Shivakiran N. B. Bhaktha, Lab. de Physique de la Matière Condensée (France); Andrea Chiappini, Alessandro Chiasera, Maurizio Ferrari, Istituto di Fotonica e Nanotecnologie (Italy); Christophe Kinowski, Sylvia Turrell, Lab. de Spectrochimie Infrarouge et Raman (France); Cosimo Trono, Massimo Brenci, Ilaria Cacciari, Gualtiero Nunzi Conti, Stefano Pelli, Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy) [7604-34]

Wednesday 27 January

SESSION 8

Room: 309 (Esplanade). Wed. 8:00 to 10:10 am

Sensing

Session Chair: Xudong Fan, Univ. of Missouri-Columbia

8:00 am: **Enhanced fluorescence sensing by nano-apertures** (*Invited Paper*), Steve Blair, The Univ. of Utah (USA) [7604-35]

8:30 am: **Realization of a compact static Fourier transform spectrometer in glass integrated optics**, Bruno Martin, Institut de Microélectronique Électromagnétisme et Photonique (France) and MINATEC (France); Alain Morand, Institut de Microélectronique Électromagnétisme et Photonique (France); Laurent Jocou, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Gregory Grosa, Institut de Microélectronique Électromagnétisme et Photonique (France); Pierre Y. Kern, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Pierre Benech, Institut de Microélectronique Électromagnétisme et Photonique (France); Etienne P. Le Coarer, Lab. d'Astrophysique de l'Observatoire de Grenoble (France) [7604-36]

8:50 am: **Design of metamaterial-based photonic sensors for pressure measurement**, Rola Aylo, Partha P. Banerjee, Univ. of Dayton (USA); Anjan K. Ghosh, Pramode Verma, Univ. of Oklahoma (USA) [7604-37]

9:10 am: **Fiber-based optical Fabry-Pérot gas sensor for fast and on-column detection**, Jing Liu, Yuze Sun, Xudong Fan, Univ. of Missouri, Columbia (USA) [7604-38]

9:30 am: **Stationary wave integrated Fourier transform spectrometer (SWIFTS)**, Jerome Ferrand, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Guillaume Custillon, Ecole Nationale Supérieure d'Electronique et de Radioélectrité de Grenoble (France); Gregory Leblond, Univ. de Technologie Troyes (France); Fabrice Thomas, Thibaut Moulin, Etienne Le Coarer, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Alain Morand, Institut de Microélectronique Électromagnétisme et Photonique (France); Sylvain Blaize, Univ. de Technologie Troyes (France); Alain Cheli, Lab. d'Astrophysique de l'Observatoire de Grenoble (France) [7604-39]

9:50 am: **Integrated optical chip in fiber optic gyros**, Vardhani P. Chunduru, Varalakshmi Ramisetty, Osmania Univ. (India) [7604-40]

Coffee Break 10:10 to 10:40 am

OPTO

SESSION 9

Room: 309 (Esplanade). Wed. 10:40 am to 12:10 pm

Plasmonics I

Session Chair: Pierre Berini, Univ. of Ottawa (Canada)

10:40 am: **Extreme-parameter plasmonics** (*Invited Paper*), Nader Engheta, Univ. of Pennsylvania (USA) [7604-41]

11:10 am: **Experimental characterization of dispersion in plasmonic nanostripes for integrated DNA sensing**, Paul Steinvurzel, Tian Yang, Kenneth B. Crozier, Harvard Univ. (USA) [7604-42]

11:30 am: **Guided subwavelength optical mode with slow group velocity supported by a periodic plasmonic waveguide**, Liu Yang, Changjun Min, Georgios Veronis, Louisiana State Univ. (USA) [7604-47]

11:50 am: **Nanoplasmonic couplers and modulators based on metal-insulator-metal structures**, Zhaolin Lu, Ruoxi Yang, Rami A. Wahsheh, Mustafa A. G. Abushagur, Rochester Institute of Technology (USA) [7604-44]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 10

Room: 309 (Esplanade). Wed. 1:40 to 2:50 pm

Plasmonics II

Session Chair: Robert L. Nelson, Air Force Research Lab.

1:40 pm: **Optimal plasmonic focusing through matching plasmonic lens structure to illumination conditions** (*Invited Paper*), Qiwen Zhan, Weibin Chen, Univ. of Dayton (USA); Don C. Abeyasinghe, Univ. of Cincinnati (USA); Robert L. Nelson, Air Force Research Lab. (USA) [7604-45]

2:10 pm: **Manipulation of near-field polarization and locations by far-field excitation**, Shiu-an-Yeh Chen, Anne A. Lazarides, Duke Univ. (USA) [7604-46]

2:30 pm: **Efficient sensitivity analysis of surface plasmon waveguide structures**, Mohamed A. Swillam, Mohamed H. Bakr, Xun Li, McMaster Univ. (Canada) [7604-43]

POSTERS—Wednesday

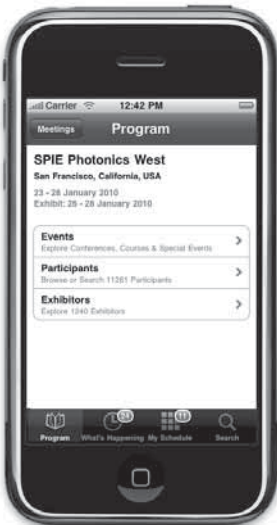
Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Detailed observation of optical intensity and frequency signal transmission in random metal-dielectric film, Mitsuo Fukuda, Kenzo Yamaguchi, Toyohashi Univ. of Technology (Japan) [7604-48]

Lowloss plasmonic sharp splitter and bend, Zhong Shi, Vladimir Kochergin, Luna Innovations, Inc. (USA) [7604-49]

Label-free biosensors with enhanced sensitivity based on polymer waveguide Bragg reflectors, Jun-Whee Kim, Kyung-Jo Kim, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of) [7604-50]



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See p. 10

Optoelectronic Integrated Circuits XII

Conference Chairs: **Louay A. Eldada**, HelioVolt Corp.; **El-Hang Lee**, Inha Univ. (Korea, Republic of)

Program Committee: **Yung-Jui Chen**, Univ. of Maryland, Baltimore County; **Larry A. Coldren**, Univ. of California, Santa Barbara; **Mario Dagenais**, Univ. of Maryland, College Park; **P. Daniel Dapkus**, Univ. of Southern California; **Yehaiahu Fainman**, Univ. of California, San Diego; **Chennupati Jagadish**, The Australian National Univ. (Australia); **Richard M. Osgood, Jr.**, Columbia Univ.; **Manijeh Razeghi**, Northwestern Univ.; **Giancarlo Cesare Righini**, Istituto di Fisica Applicata Nello Carrara (Italy)

Wednesday 27 January

SESSION 1

Room: 208/210 (Mezzanine) Wed. 1:00 to 2:20 pm

Trends in OEICs

Session Chair: **Louay A. Eldada**, HelioVolt Corp.

1:00 pm: **Hybrid organic-inorganic photonic bandgap structures for lasing and switching applications** (*Invited Paper*), Rainer F. Mahrt, Thilo Stoeferle, Sophie Schoenenberger, Nikolai Moll, IBM Zürich Research Lab. (Switzerland); Thorsten Wahlbrink, Jens Bolten, AMO GmbH (Germany) [7605-01]

1:30 pm: **New perspectives and applications of silicon nanophotonics** (*Invited Paper*), Ivo Rendina, Consiglio Nazionale delle Ricerche (Italy) . [7605-02]

2:00 pm: **Monolithic integration photonic crystal devices integrated with photodiodes**, Chii-Chang Chen, W. Y. Chiu, National Central Univ. (Taiwan) [7605-03]

SESSION 2

Room: 208/210 (Mezzanine) Wed. 2:20 to 4:50 pm

Highly Integrated OEICs

Session Chair: **El-Hang Lee**, Inha Univ. (Korea, Republic of)

2:20 pm: **InP photonic integrated circuits for optical switching and processing** (*Invited Paper*), Yoshiaki Nakano, Takuo Tanemura, The Univ. of Tokyo (Japan) [7605-04]

2:50 pm: **System-in-package technologies for photonics** (*Invited Paper*), Tolga Tekin, TU Berlin Microperipheral Technologies (Germany) [7605-05]

Coffee Break 3:20 to 3:50 pm

3:50 pm: **Development of optical polymer waveguide devices** (*Invited Paper*), Kin-Seng Chiang, City Univ. of Hong Kong (Hong Kong, China) [7605-06]

4:20 pm: **Simple and reliable evaluation method of multimode polymer optical waveguides** (*Invited Paper*), Okihiro Sugihara, Freddy S. Tan, Toshikuni Kaino, Tohoku Univ. (Japan); Manabu Kagami, Masatoshi Yonemura, Akari Kawasaki, Toyota Central Research and Development Labs., Inc. (Japan) [7605-07]

SESSION 3

Room: 208/210 (Mezzanine) Wed. 4:50 to 6:00 pm

Silicon OEICs

Session Chair: **Mario Dagenais**, Univ. of Maryland, College Park

4:50 pm: **Silicon photonics for on-chip interconnects and telecommunications** (*Invited Paper*), Long Chen, Alcatel-Lucent Bell Labs. (USA); Kyle Preston, Michal F. Lipson, Cornell Univ. (USA); Christopher R. Doerr, Young-Kai Chen, Alcatel-Lucent Bell Labs. (USA) [7605-08]

5:20 pm: **Gathering effect on dark current for CMOS fully integrated PIN-photodiodes**, Jordi Teva-Merono, Ingrid Jonak-Auer, Jochen Kraft, Joerg Siegert, Franz Schrank, Ewald Wachmann, austriamicrosystems AG (Austria) [7605-09]

5:40 pm: **Design and manufacture of quantum-confined punch-through SOI light sources**, Alfons W. Bogalecki, INSiAVA (Pty) Ltd. (South Africa); Monuko du Plessis, Univ. of Pretoria (South Africa) [7605-10]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

A novel fabrication process of polymeric photonic crystal, SeungHun Oh, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of); El-Hang Lee, Inha Univ. (Korea, Republic of); Myung Yung Jeong, Pusan National Univ. (Korea, Republic of) [7605-26]

A white-light interferometry scheme to measure wide-wavelength dispersion of thermo-optic coefficients of optical switch materials, Se-min Kim, Seung Hwan Kim, Kyong-Hon Kim, Ju Hyun Oh, Yong Ku Kwon, El-Hang Lee, Inha Univ. (Korea, Republic of) [7605-27]

Development of integration technology for optical PCB and electrical PCB, Doo Yeol Cha, Se Jun Cho, Jai Hyuk Lee, Sung Pil Chang, Inha Univ. (Korea, Republic of) [7605-28]

Measurement of optical constants of thin metal films with a λ -SPR systems, Dong-Jin Lee, Sung-Hoon Hong, Chang-Hyung Kong, Seung-Gol Lee, Se-Geun Park, El-Hang Lee, Beom-Hoan O, Inha Univ. (Korea, Republic of) [7605-29]

Thursday 28 January

SESSION 4

Room: 208/210 (Mezzanine) Thurs. 8:00 to 9:00 am

Biological and Fluidic OEICs

Session Chair: **El-Hang Lee**, Inha Univ. (Korea, Republic of)

8:00 am: **A platform for multiplexed sensing of biomolecules using high-Q microring resonator arrays** (*Invited Paper*), Igal Brener, Jeremy B. Wright, Karl R. Westlake, Darren W. Branch, Michael J. Shaw, G. A. Vawter, Sandia National Labs. (USA) [7605-11]

8:30 am: **Integrated bio-inspired fluidic imaging system** (*Invited Paper*), Yu-Hwa Lo, Univ. of California, San Diego (USA) [7605-12]

SESSION 5

Room: 208/210 (Mezzanine) Thurs. 9:00 to 10:00 am

Green OEIC Technologies

Session Chair: **El-Hang Lee**, Inha Univ. (Korea, Republic of)

9:00 am: **Solar spectrum rectification using nano-antennas and tunneling diodes** (*Invited Paper*), Mario Dagenais, Kwangsik Choi, Filiz Yesilkoy, Athanasios N. Chryssis, Martin C. Peckerar, Univ. of Maryland, College Park (USA) [7605-13]

9:30 am: **Design, development and manufacture of high-efficiency low-cost solar modules based on CIGS PVICs** (*Invited Paper*), Louay A. Eldada, HelioVolt Corp. (USA) [7605-14]

Coffee Break 10:00 to 10:30 am

OPTO

SESSION 6

Room: 208/210 (Mezzanine).Thurs. 10:30 am to 12:00 pm

Nonlinear and Quantum OEICs

Session Chair: Louay A. Eldada, HelioVolt Corp.

10:30 am: **Nonlinear and quantum optics in photonic nanostructures** (*Invited Paper*), Chee Wei Wong, James F. McMillan, Ranojoy Bose, Rohit Chatterjee, Charlton J. Chen, Jie Gao, Tingyi Gu, Chad A. Husko, Serdar Kocaman, Fangwen Sun, Columbia Univ. (USA); Yunfeng Xiao, BeiHang Univ. (China); Xiaodong Yang, Univ. of California, Berkeley (USA)[7605-15]

11:00 am: **Slow light enhanced nonlinear photonic functionalities** (*Invited Paper*), Thomas F. Krauss, Univ. of St. Andrews (United Kingdom)[7605-16]

11:30 am: **Design and integration of plasmonic and dielectric nanowires for VLSI photonic circuit application** (*Invited Paper*), El-Hang Lee, Inha Univ. (Korea, Republic of)[7605-17]

Lunch/Exhibition Break12:00 to 1:00 pm

SESSION 7

Room: 208/210 (Mezzanine).Thurs. 1:00 to 2:20 pm

Novel Active OEICs

Session Chair: Louay A. Eldada, HelioVolt Corp.

1:00 pm: **High performance quantum dot and quantum well infrared focal plane arrays** (*Invited Paper*), Manijeh Razeghi, Northwestern Univ. (USA)[7605-18]

1:30 pm: **Selective co-doped erbium Ti:LiNbO₃ waveguide amplifiers**, Rafael Salas-Montiel, Christi K. Madsen, Texas A&M Univ. (USA)[7605-19]

1:50 pm: **On-chip integrated lasers in Al₂O₃:Er on silicon** (*Invited Paper*), Markus Pollnau, Jonathan D. B. Bradley, Feridun Ay, Edward H. Bernhardt, René M. de Ridder, Kerstin Wörhoff, Univ. Twente (Netherlands)[7605-20]

SESSION 8

Room: 208/210 (Mezzanine).Thurs. 2:20 to 3:20 pm

OEIC Technologies for Modulation and Isolation

Session Chair: Manijeh Razeghi, Northwestern Univ.

2:20 pm: **Advanced LiNbO₃ devices and materials technology for optical circuit applications** (*Invited Paper*), Richard M. Osgood, Jr., Ophir Gaathon, Avishai Ofan, Columbia Univ. (USA)[7605-21]

2:50 pm: **Dynamic photonic structures for integrated photonics** (*Invited Paper*), Shanhui Fan, Zongfu Yu, Stanford Univ. (USA)[7605-22]

Coffee Break3:20 to 3:50 pm

SESSION 9

Room: 208/210 (Mezzanine).Thurs. 3:50 to 5:20 pm

Microring, Microdisk, and Microsphere OEICs

Session Chair: Richard M. Osgood, Jr., Columbia Univ.

3:50 pm: **Birefringent ring resonator-based optical filters** (*Invited Paper*), Christi K. Madsen, Mehmet Solmaz, Texas A&M Univ. (USA)[7605-23]

4:20 pm: **Large-scale integrated silicon photonics using microdisk and microring resonators** (*Invited Paper*), Andrew W. Poon, Xianshu Luo, Shaoqi Feng, Hui Chen, Hong Cai, Hong Kong Univ. of Science and Technology (Hong Kong, China)[7605-24]

4:50 pm: **Integrated microsphere resonator arrays: light focusing and propagation effects** (*Invited Paper*), Vasily N. Astratov, Arash Darafsheh, Matthew D. Kerr, Kenneth W. Allen, The Univ. of North Carolina at Charlotte (USA)[7605-25]

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Silicon Photonics V

Conference Chairs: **Joel A. Kubby**, Univ. of California, Santa Cruz; **Graham T. Reed**, Univ. of Surrey (United Kingdom)

Program Committee: **Laurence W. Cahill**, La Trobe Univ. (Australia); **Philippe M. Fauchet**, Univ. of Rochester; **L. Cary Gunn**, Genalyte, Inc.; **Siegfried Janz**, National Research Council Canada (Canada); **Andrew P. Knights**, McMaster Univ. (Canada); **Laura M. Lechuga**, Ctr. d'Investigacions en Nanociència i Nanotecnologia (Spain); **Sebania Libertino**, Istituto per la Microelettronica e Microsistemi (Italy); **Mario J. Paniccia**, Intel Corp.; **Andrew W. Poon**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Holger Schmidt**, Univ. of California, Santa Cruz; **Dan-Xia Xu**, National Research Council Canada (Canada)

Sunday 24 January

SESSION 1

Room: 226 (Mezzanine) Sun. 10:30 to 11:50 am

Materials

Session Chair: **Andrew P. Knights**, McMaster Univ. (Canada)

10:30 am: **InP overgrowth on SiO₂ for active photonic devices on silicon**, Carl Junesand, Zhechao Wang, Lech Wosinski, Sebastian Lourduoss, Royal Institute of Technology (Sweden) [7606-01]

10:50 am: **Stranski-Krastanov mode grown multilayer InAs/GaAs quantum dot heterostructures on Germanium: a step toward integrating III-V photonics on silicon**, Sreetama Banerjee, Nilanjan Halder, Subhananda Chakrabarti, Indian Institute of Technology, Bombay (India) [7606-02]

11:10 am: **Efficient photoluminescence from GaSb/AlGaSb multiple quantum wells grown on Si substrate**, Duy H. Nguyen, Jaggyu Park, Young K. Noh, Moon D. Kim, Donghan Lee, Chungnam National Univ. (Korea, Republic of); Jae E. Oh, Hanyang Univ. (Korea, Republic of) [7606-03]

11:30 am: **Correlation of optical and electrical characterization of point defects introduced via ion implantation**, Jonathan K. Doylend, A. P. Knights, McMaster Univ. (Canada) [7606-04]

SESSION 2

Room: 226 (Mezzanine) Sun. 11:50 am to 12:10 pm

Detectors

Session Chair: **Andrew P. Knights**, McMaster Univ. (Canada)

11:50 am: **Single photon Si detectors**, Roberto Pagano, Univ. di Catania (Italy) and Consiglio Nazionale delle Ricerche (Italy); Sebania Libertino, Salvatore A. Lombardo, Istituto per la Microelettronica e Microsistemi (Italy); Giuseppina G. Valvo, Giovanni Condorelli, Delfo D. Sanfilippo, Giorgio G. Fallica, STMicroelectronics (Italy) [7606-05]

Lunch Break 12:10 to 1:40 pm

SESSION 3

Room: 226 (Mezzanine) Sun. 1:40 to 3:10 pm

Lab-on-a-Chip I

Session Chair: **Holger Schmidt**, Univ. of California, Santa Cruz

1:40 pm: **Handheld microfluidic-based detection platform for on-the-flow analyte characterization (Invited Paper)**, Peter Kiesel, Markus Beck, Noble M. Johnson, Palo Alto Research Center, Inc. (USA) [7606-06]

2:10 pm: **Optofluidic biosensing for the study of disease at the molecular level (Invited Paper)**, Ian M. White, Univ. of Maryland, College Park (USA) [7606-07]

2:40 pm: **Waveguide-based optofluidics (Invited Paper)**, Genni Testa, Consiglio Nazionale delle Ricerche (Italy); Yujian Huang, Technische Univ. Delft (Netherlands); Luigi Zeni, Seconda Univ. degli Studi di Napoli (Italy); Pasqualina M. Sarro, Technische Univ. Delft (Netherlands); Romeo Bernini, Consiglio Nazionale delle Ricerche (Italy) [7606-08]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 226 (Mezzanine) Sun. 3:40 to 5:10 pm

Lab-on-a-Chip II

Session Chair: **Holger Schmidt**, Univ. of California, Santa Cruz

3:40 pm: **Planar FRET detection from biomolecules on an optofluidic chip**, Aiqing Chen, Phillip Measor, Univ. of California, Santa Cruz (USA); Evan J. Lunt, Brian S. Phillips, Aaron R. Hawkins, Brigham Young Univ. (USA); Holger Schmidt, Univ. of California, Santa Cruz (USA) [7606-09]

4:00 pm: **Arrays of SOI photonic wire biosensors for label-free molecular detection**, Adam Densmore, Dan-Xia Xu, Martin Vachon, Siegfried Janz, Rubin Ma, Yunhui Li, Gregory Lopinski, Christian Luebbert, Jens H. Schmid, André Delâge, Pavel Cheben, National Research Council Canada (Canada) . . [7606-10]

4:20 pm: **A photonic biosensor system on a CMOS chip (Invited Paper)**, Kevin L. Lear, Rongjin Yan, Colorado State Univ. (USA) [7606-11]

4:50 pm: **A porous silicon based microarray for label-free optical detection of DNA hybridization**, Ilaria Rea, Giuseppe Coppola, Mariano Gioffrè, Edoardo De Tommasi, Ivo Rendina, Istituto per la Microelettronica e Microsistemi (Italy); Annalisa Lamberti, Univ. degli Studi di Napoli Federico II (Italy); Luca De Stefano III, Istituto per la Microelettronica e Microsistemi (Italy) [7606-12]

Monday 25 January

SESSION 5

Room: 226 (Mezzanine) Mon. 8:30 to 10:00 am

Waveguides I

Session Chair: **Graham T. Reed**, Univ. of Surrey (United Kingdom)

8:30 am: **Applications of subwavelength grating structures in silicon-on-insulator waveguides (Invited Paper)**, Jens H. Schmid, Pavel Cheben, National Research Council Canada (Canada); Przemek J. Bock, Univ. of Ottawa (Canada); Siegfried Janz, William Sinclair, National Research Council Canada (Canada); Jaime Garcia, Univ. Politècnica de Valencia (Spain); Jean Lapointe, Daniel Poitras, Yunhui Li, Gregory Lopinski, André Delâge, Adam S. Densmore, Boris Lamontagne, Rubin Ma, Matthew Shiu, Dan-Xia Xu, National Research Council Canada (Canada) [7606-13]

9:00 am: **Germanium implanted Bragg gratings in silicon on insulator waveguides**, Renzo Loiacono, Graham T. Reed, Russell M. Gwilliam, Goran Z. Mashanovich, Univ. of Surrey (United Kingdom); Liam O'Faolain, Thomas Krauss, Univ. of St. Andrews (United Kingdom); Giorgio Lulli, Istituto per la Microelettronica e Microsistemi (Italy); Christopher Jaynes, Univ. of Surrey (United Kingdom); Richard Jones, Intel Corp. (USA) [7606-14]

9:20 am: **Effects of annealing silicon ion irradiated rib waveguides with respect to free carrier lifetime**, Nicholas M. Wright, Andrew J. Smith, Konstantin Litvinenko, Russell Gwilliam, Goran Mashanovich, Graham Reed, Univ. of Surrey (United Kingdom) [7606-15]

9:40 am: **Early stage growth of silicon nanocrystals formed in SiO₂ by Si+ implantation and rapid thermal annealing**, Andrew P. Knights, Oksana Hul'ko, McMaster Univ. (Canada); Iain Crowe, Nicholas Hylton, Matthew Halsall, The Univ. of Manchester (United Kingdom); Russell M. Gwilliam, Univ. of Surrey (United Kingdom) [7606-16]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 226 (Mezzanine) Mon. 10:30 am to 12:00 pm

Waveguides II

Session Chair: Graham T. Reed, Univ. of Surrey (United Kingdom)

10:30 am: **Cantilever couplers for fiber coupling to silicon photonic integrated circuits** (*Invited Paper*), Ronald M. Reano, Peng Sun, Ohio State Univ. (USA) [7606-17]

11:00 am: **Fabrication of porous silicon channel waveguides with multilayer Bragg cladding**, Andrew A. Bettiol, Ee Jin Teo, National Univ. of Singapore (Singapore); Shuvan Prashant, Sri Sathya Sai Univ. (India); Boqian Xiong, Mark B. H. Breese, National Univ. of Singapore (Singapore) [7606-18]

11:20 am: **Self-alignment and instability of waveguides induced by forces of guided and radiated fields**, Amit Mizrahi, Kazuhiro Ikeda, Fabio Bonomelli, Vitaliy Lomakin, Yeshaiah Fainman, Univ. of California, San Diego (USA) [7606-19]

11:40 am: **Low-loss silicon-on-insulator waveguides fabricated using proton beam irradiation**, Ee Jin Teo, Andrew Bettiol, Mark B. H. Breese, National Univ. of Singapore (Singapore); Pengyuan Yang, Univ. of Surrey (United Kingdom); Boqian Xiong, National Univ. of Singapore (Singapore); Goran Z. Mashanovich, Graham T. Reed, Univ. of Surrey (United Kingdom) [7606-20]

Lunch Break 12:00 to 1:00 pm

SESSION 7

Room: 226 (Mezzanine) Mon. 1:00 to 3:30 pm

Modulators

Session Chair: Philippe M. Fauchet, Univ. of Rochester

1:00 pm: **Slow light photonic crystal switches and modulators** (*Invited Paper*), Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) [7606-21]

1:30 pm: **High-speed silicon optical modulator** (*Invited Paper*), Delphine Marris-Morini, Gilles Rasigade, Institut d'Électronique Fondamentale (France); Laurent Vivien, Paul Crozat, Eric Cassan, Institut d'Électronique Fondamentale (France); Philippe Lyan, Pierrette Rivallin, Jean-Marc Fédéli, Commissariat à l'Énergie Atomique (France) [7606-22]

2:00 pm: **Power and speed analysis of miniaturized SOI Y-branch Mach-Zehnder thermo-optic switches**, Kuan Pei Yap, National Research Council Canada (Canada) and Carleton Univ. (Canada); Tom J. Smy, Carleton Univ. (Canada); Jens H. Schmid, Philip Waldron, Adam S. Densmore, National Research Council Canada (Canada); Barry A. Syrett, Carleton Univ. (Canada); Siegfried Janz, National Research Council Canada (Canada) [7606-23]

2:20 pm: **Strain engineering of Ge/SiGe quantum confined Stark effect modulators for communications wavelengths**, Leon J. Lever, Zoran Ikonik, Robert W. Kelsall, Univ. of Leeds (United Kingdom) [7606-24]

2:40 pm: **Charge injection using conformal junctions for low-energy optical switching**, Sean P. Anderson, Philippe M. Fauchet, Univ. of Rochester (USA) [7606-25]

3:00 pm: **Modulators and photodetectors developed in the framework of the European HELIOS project** (*Invited Paper*), Laurent Vivien, Institut d'Électronique Fondamentale (France); J. M. Fédéli, Lab. d'Électronique de Technologie de l'Information (France); Dave Thomson, Univ. of Surrey (United Kingdom); Joost Brouckaert, Univ. Gent (Belgium); Johann Osmond, Gilles Rasigade, Delphine Marris-Morini, Institut d'Électronique Fondamentale (France); Frederic Y. Gardes, Univ. of Surrey (United Kingdom); Paul Crozat, Institut d'Électronique Fondamentale (France); Dries Van Thourhout, Univ. Gent (Belgium); Eric Cassan, Institut d'Électronique Fondamentale (France); J. F. Damlencourt, Lab. d'Électronique de Technologie de l'Information (France); Graham T. Reed, Univ. of Surrey (United Kingdom) [7606-26]

Coffee Break 3:30 to 4:00 pm

SESSION 8

Room: 226 (Mezzanine) Mon. 4:00 to 5:50 pm

Integration

Session Chair: Andrew W. Poon, Hong Kong Univ. of Science and Technology (Hong Kong, China)

4:00 pm: **Integrated photonic platform based on silicon photonic wire waveguides** (*Invited Paper*), Koji Yamada, Tai Tsuchizawa, Toshifumi Watanabe, Hiroyuki Shinojima, Hiroshi Fukuda, Hidetaka Nishi, Sungbong Park, Nippon Telegraph and Telephone Corp. (Japan); Yasuhiko Ishikawa, Kazumi Wada, The Univ. of Tokyo (Japan); Seiichi Itabashi, Nippon Telegraph and Telephone Corp. (Japan) [7606-27]

4:30 pm: **Semiconductor nanomembranes for stacked and flexible photonics** (*Invited Paper*), Weidong Zhou, The Univ. of Texas at Arlington (USA); Zhenqiang Ma, Univ. of Wisconsin-Madison (USA) [7606-29]

5:00 pm: **Nanomembrane enabled nanophotonic devices**, Ahmed S. Sharkawy, Ozgenc Ebil, EM Photonics, Inc. (USA); Mathew J. Zablocki, Dennis W. Prather, Univ. Of Delaware (USA) [7606-30]

5:20 pm: **Integrated recirculating optical buffers** (*Invited Paper*), Martijn J. R. Heck, Geza Kurczveil, Emily F. Burmeister, Hyundai Park, John P. Mack, Daniel J. Blumenthal, John E. Bowers, Univ. of California, Santa Barbara (USA) [7606-31]

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: E. Fred Schubert, Rensselaer Polytechnic Institute; Liang-Chy Chien, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 226 (Mezzanine) Tues. 10:30 am to 12:00 pm

Resonators

Session Chair: Graham T. Reed, Univ. of Surrey (United Kingdom)

10:30 am: **Optofluidic ring resonator dye lasers** (*Invited Paper*), Yuze Sun, Jonathan D. Suter, Xudong Fan, Univ. of Missouri, Columbia (USA) . . [7606-32]

11:00 am: **16-channel MUX/DeMUX Si ring filters designed and fabricated by 365nm Hg-I line photolithography**, Sahnggi Park, Kap-Joong Kim, Gyungock Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) [7606-33]

11:20 am: **Highly dispersive one-dimensional photonic crystal embedded silicon microring cavities**, Jonathan Y. H. Lee, Philippe M. Fauchet, Univ. of Rochester (USA) [7606-34]

11:40 am: **Numerical investigation of high-Q resonances in circular grating resonators**, Sven Burger, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Frank Schmidt, Lin W. Zschiedrich, JCMwave (Germany) . [7606-35]

Lunch/Exhibition Break 12:00 to 1:10 am

SESSION 10

Room: 226 (Mezzanine) Tues. 1:10 to 2:40 pm

Emitters

Session Chair: Joel A. Kubby, Univ. of California, Santa Cruz

1:10 pm: **Applications of coherent anti-Stokes Raman scattering in silicon photonics** (*Invited Paper*), Nathalie Vermeulen, Christof Debaes, Hugo Thienpont, Vrije Univ. Brussel (Belgium) [7606-36]

1:40 pm: **Using reach-through techniques to improve the external power efficiency of silicon CMOS light emitting devices**, Monuko du Plessis, Petrus J. Venter, Univ. of Pretoria (South Africa); Alfons W. Bogalecki, INSIAVA (Pty) Ltd. (South Africa) [7606-37]

2:00 pm: **New interpretation of photonic yield processes (450-750nm) in two-junction Si CMOS LEDs: simulation and analyses**, Lukas W. Snyman, Tshwane Univ. of Technology (South Africa); Enrico Bellotti, Boston Univ. (USA)[7606-38]

2:20 pm: **Lateral electrical injection into Si/SiO₂ horizontal multislot waveguides**, Sean P. Anderson, Han G. Yoo, Karl Ni, Philippe M. Fauchet, Univ. of Rochester (USA)[7606-39]

SESSION 11

Room: 226 (Mezzanine) Tues. 2:40 to 3:30 pm

Photonic Crystals

Session Chair: Joel A. Kubby, Univ. of California, Santa Cruz

2:40 pm: **Waveguide-based optofluidics (Invited Paper)**, Christian Karnutsch, The Univ. of Sydney (Australia) and Hochschule Karlsruhe (Germany); Snjezana Tomljenovic-Hanic, Christelle Monat, Christian Grillet, Peter Domachuk, Ross McPhedran, Benjamin J. Eggleton, The Univ. of Sydney (Australia); Liam O’Faolain, Thomas F. Krauss, Univ. of St. Andrews (United Kingdom); Sanshui Xiao, Niels A. Mortensen, Technical Univ. of Denmark (Denmark)[7606-40]

3:10 pm: **Photonic crystal microcavities in SOI waveguides produced in a CMOS environment**, Stefan Meister, Aws Al-Saadi, Bülent A. Franke, Shaimaa Mahdi, Karsten Voigt, Technische Univ. Berlin (Germany); Berndt Kuhlow, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); Bernd Tillack, Harald H. Richter, Lars Zimmermann, IHP GmbH (Germany); Viachaslau Ksianzou, Sigurd K. Schrader, Technische Fachhochschule Wildau (Germany); Hans-Joachim Eichler, Technische Univ. Berlin (Germany)[7606-41]

Coffee Break3:30 to 4:00 pm

SESSION 12

Room: 206 (Mezzanine) Tues. 4:00 to 6:00 pm

Silicon Photonics

Joint Session with Conference 7616

Session Chair: Mario J. Paniccia, Intel Corp.

4:00 pm: **Thin film III-V edge emitting lasers integrated onto silicon (Invited Paper)**, Nan M. Jokerst, Sabarni Palit, Duke Univ. (USA); Jeremy Kirch, Gene Tsvid, Luke J. Mawst, Thomas F. Kuech, Univ. of Wisconsin-Madison (USA)[7616-28]

4:30 pm: **Compact hybrid Si microring lasers (Invited Paper)**, Di Liang, John E. Bowers, Univ. of California, Santa Barbara (USA); Marco Fiorentino, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA)[7616-29]

5:00 pm: **Monolithic integration of the Ga(NAsP)-laser material lattice matched on (001) Si-substrate (Invited Paper)**, Wolfgang Stolz, Philipps-Univ. Marburg (Germany); Bernardette Kunert, NAsP III/IV GmbH (Germany); Sven Liebich, Martin Zimprich, Steffen Zinnkann, Kerstin Volz, Philipps-Univ. Marburg (Germany)[7616-30]

5:30 pm: **Sb-based laser sources grown by molecular beam epitaxy on silicon substrates (Invited Paper)**, Jean-Baptiste Rodriguez, Laurent Cerutti, Pierre Grech, Guilhem Boissier, Gregoire Narcy, Eric Tournie, Univ. Montpellier 2 (France)[7616-31]

Wednesday 27 January

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Silicon radiative cooler and optical amplifier by light down conversion, Volodymyr K. Malyutenko, Viacheslav V. Bogatyrenko, Oleg Y. Malyutenko, V. Lashkaryov Institute of Semiconductor Physics (Ukraine)[7606-28]

Silicon photonics: ready to wafer-bonding fibre grating coupler, Christophe H. Kopp, Tiphaine Dupont, Jean-Marc Fedeli, Commissariat à l’Énergie Atomique (France)[7606-42]

Light emission from Si LED controlling by a gate voltage and SOS tunneling junction, Wei Lian Guo, Xiao-Yun Li, Guang Hua Yang, Ping Juan Niu, Tianjin Polytechnic Univ. (China); Chun Hong Huang, Tianjin Samsung optoelectronics Co. Ltd. (China)[7606-43]

Athermal and low loss ridge silicon waveguides, Milan M. Milosevic, Goran Z. Mashanovich, Frederic Y. Gardes, Youfang Hu, Univ. of Surrey (United Kingdom); Andrew P. Knights, McMaster Univ. (Canada); N. Garry Tarr, Carleton Univ. (Canada); Graham T. Reed, Univ. of Surrey (United Kingdom) ...[7606-44]

High-performance ring microresonator on SOI coupled to photonic wires, Vasily A. Melnikov, Michael Lynch, John F. Donegan, Tatiana S. Perova, Trinity College Dublin (Ireland)[7606-45]

Taper-integrated multimode-interference based crossings for silicon wire waveguides, Chia-Hsiang Chiu, Chyong-Hua Chen, National Chiao Tung Univ. (Taiwan)[7606-46]

High phase-shift efficiency in a silicon optical modulator based on carrier depletion effect in a PN diode, Jeong Woo Park, Electronics and Telecommunications Research Institute (Korea, Republic of)[7606-47]

Experimental and numerical analysis study of 1D photonic crystal in Si photonic wire waveguides, Kira Tomohiro, Hirohito Yamada, Tohoku Univ. (Japan)[7606-48]

Analysis of all optical logic gate based on photonic crystals multimode interference, Hong Seung Kim, Chung-Ang Univ. (Korea, Republic of); Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Tae-Kyeong Lee, Geum-Yoon Oh, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of)[7606-49]

Mode properties of ALD filled silicon slot waveguides, Antti Säynätjoki, Tapani Alasaarela, Amit Khanna, Ari Tervonen, Seppo K. Honkanen, Helsinki Univ. of Technology (Finland)[7606-50]

Design and characterization of a large cross-section MZI rib waveguide on SOI substrate for biosensing application, Joseph M. Novak, Shengling Deng, George Soliman, Z. Rena Huang, Rensselaer Polytechnic Institute (USA)[7606-51]

Nano-circular Aperture with mirror for photonic tornado effect, Seong-Soo Choi, Sun Moon Univ. (Korea, Republic of); Namkyoo Park, S. H. Han, Dai-Sik Kim, Seoul National Univ. (Korea, Republic of); Myoung Jin Park, Korea Military Academy (Korea, Republic of); Vinaya Jha, Om K. Suwal, Sun Moon Univ. (Korea, Republic of)[7606-53]

An all-silicon optical transmission system for clock and data transmission, Petrus J. Venter, Paul Ellinghaus, Monuko du Plessis, Univ. of Pretoria (South Africa) and INSiAVA (Pty) Ltd. (South Africa); Pieter Rademeyer, INSiAVA (Pty) Ltd. (South Africa); Alfons W. Bogalecki, Univ. of Pretoria (South Africa) and INSiAVA (Pty) Ltd. (South Africa)[7606-54]

Optical spectroscopy of Er doped Si-nanocrystals on sapphire substrates fabricated by ion implantation into SiO₂, Nicholas P. Hylton, Iain F. Crowe, The Univ. of Manchester (United Kingdom); Oksana Hul’ko, McMaster Univ. (Canada); R. Jalili-Kashitaban, Ursel Bangert, The Univ. of Manchester (United Kingdom); Andrew P. Knights, McMaster Univ. (Canada); Matthew P. Halsall, The Univ. of Manchester (United Kingdom); Anthony J. Kenyon, Univ. College London (United Kingdom); Simon Ruffell, The Australian National Univ. (Australia); Russell M. Gwilliam, Univ. of Surrey (United Kingdom)[7606-55]

Formation of Si-nanocrystals in SiO₂ on Al₂O₃ via ion implantation and rapid thermal processing, Iain F. Crowe, Nicholas P. Hylton, The Univ. of Manchester (United Kingdom); Oksana Hul’ko, McMaster Univ. (Canada); R. Jalili-Kashitaban, Ursel Bangert, The Univ. of Manchester (United Kingdom); Andrew P. Knights, McMaster Univ. (Canada); Matthew P. Halsall, The Univ. of Manchester (United Kingdom); Russell M. Gwilliam, Univ. of Surrey (United Kingdom)[7606-56]

Germanium p-i-n photodiode on silicon for integrated photonic applications, Jay Mathews, Radek Roucka, Change Weng, John Tolle, Jose Menendez, John Kouvetakis, Arizona State Univ. (USA)[7606-58]

OPTO

Optoelectronic Interconnects and Component Integration X

Conference Chairs: **Alexei L. Glebov**, OptiGrate Corp.; **Ray T. Chen**, The Univ. of Texas at Austin

Program Committee: **Jerry R. Bautista**, Intel Corp.; **John E. Cunningham**, Sun Microsystems, Inc.; **Allen M. Earman**, Arasor; **Ruth Houbertz-Krauss**, Fraunhofer-Institut für Silicatforschung (Germany); **Willem Hoving**, XiO Photonics (Netherlands); **Jurgen Jahns**, FernUniv. in Hagen (Germany); **Takashi Mikawa**, National Institute of Advanced Industrial Science and Technology (Japan); **Bert Jan Offrein**, IBM Zürich Research Lab. (Switzerland); **Hyo-Hoon Park**, Information and Communications Univ. (Korea, Republic of); **David R. Rolston**, Reflex Photonics, Inc. (Canada); **Yakov G. Soskind**, David H. Pollock Consultants, Inc.; **Peter Van Daele**, Univ. Gent (Belgium); **Xiaolong Wang**, Omega Optics, Inc.; **Tetsuzo Yoshimura**, Tokyo Univ. of Technology (Japan)

Monday 25 January

SESSION 1

Room: 222 (Mezzanine) Mon. 8:00 to 10:00 am

Ultra-Performance Nanophotonic Interconnects

Session Chair: **John Cunningham**, Sun Microsystems, Inc.

8:00 am: **“Macrochip” computer systems enabled by silicon photonic interconnects** (*Invited Paper*), Kannan Raj, Ashok V. Krishnamoorthy, John E. Cunningham, Xuezhe Zheng, Ron Ho, Sun Microsystems, Inc. (USA) . . . [7607-01]

8:30 am: **Ultralow-power silicon photonic interconnect for high-performance computing systems** (*Invited Paper*), GuoLiang Li, Xuezhe Zheng, Ashok V. Krishnamoorthy, John E. Cunningham, Kannan Raj, Ron Ho, Jon Lexau, Dinesh Patil, Frankie Liu, Hiren Thacker, Ying Luo, Jing Shi, Jin Yao, Ivan N. Shubin, Sun Microsystems, Inc. (USA) . . . [7607-02]

9:00 am: **A compact high-performance germanium photodetector integrated on 0.25µm thick silicon-on-insulator waveguide**, Ning-Ning Feng, Shirong Liao, Po Dong, Dawei Zheng, Hong Liang, Cheng-Chih Kung, Roshanak Shafiiha, Dazeng Feng, Mehdi Asghari, Kotura, Inc. (USA) . . . [7607-03]

9:20 am: **Coupled vertical gratings on silicon for applications in wavelength division multiplexing**, Dawn Tan, Univ. of California, San Diego (USA); Kazuhiro Ikeda, Nara Institute of Science and Technology (Japan); Yeshiaiahu Fainman, Univ. of California, San Diego (USA) . . . [7607-04]

9:40 am: **High-performance Ge quantum well modulators**, Stephanie A. Clausen, Stanford Univ. (USA) . . . [7607-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 222 (Mezzanine) Mon. 10:30 am to 12:10 pm

Optical Interconnect System Integration

Session Chair: **Alexei L. Glebov**, OptiGrate Corp.

10:30 am: **Photonic buses for computer applications** (*Invited Paper*), Michael R. Tan, Hewlett-Packard Labs. (USA) . . . [7607-06]

11:00 am: **Photonic-electronic integration technologies for high density and energy-efficient interconnects** (*Invited Paper*), Ichiro Ogura, Hikaru Kouta, Shigenari Yanagimachi, Youichi Hashimoto, Ryosuke Kuribayashi, Kazuhiko Kurata, NEC Corp. (Japan) . . . [7607-07]

11:30 am: **200Gb/s miniature optical interconnect transmitter module for high-performance computing**, Edris M. Mohammed, Hinmeng Au, Intel Corp. (USA) . . . [7607-08]

11:50 am: **Semiconductor IC packaging using modular optical components**, David R. Rolston, Robert B. Coenen, Reflex Photonics, Inc. (Canada) . [7607-09]

Lunch Break 12:10 to 1:30 pm

SESSION 3

Room: 222 (Mezzanine) Mon. 1:30 to 3:00 pm

Optical Interconnects: Integration and Packaging I

Session Chair: **Ray T. Chen**, The Univ. of Texas at Austin

1:30 pm: **True bidirectional optical interconnects over multimode fiber** (*Invited Paper*), Rainer Michalzik, Alexander Kern, Martin Stach, Fernando Rinaldi, Dietmar Wahl, Univ. Ulm (Germany) . . . [7607-10]

2:00 pm: **Thermally tunable SOI CMOS photonics circuits**, Ivan N. Shubin, Xuezhe Zheng, Hiren Thacker, Jin Yao, Joannes Costa, Guoliang Li, Ashok Krishnamoorthy, John Cunningham, Sun Microsystems, Inc. (USA); Thierry Pinguet, Luxtera (USA) . . . [7607-11]

2:20 pm: **Ultra-compact silicon nanophotonic modulator based on electro-optic polymer infiltrated slot photonic crystal waveguide**, Che-Yun Lin, Beomsuk Lee, The Univ. of Texas at Austin (USA); Alan X. Wang, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA); Jingdong Luo, Alex K. Jen, Univ. of Washington (USA) . . . [7607-48]

2:40 pm: **Converging technologies and demands toward high-bandwidth optical interconnects**, Tolga Tekin, TU Berlin Microperipheral Technologies (Germany) . . . [7607-13]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 222 (Mezzanine) Mon. 3:30 to 5:00 pm

Optical Interconnects: Integration and Packaging II

Session Chair: **Hyo-Hoon Park**, Information and Communications Univ. (Korea, Republic of)

3:30 pm: **New options for chip-to-chip photonic packaging by using thin glass-based waveguide substrates on board and module level** (*Invited Paper*), Henning Schröder, Lars Brusberg, Norbert Arndt-Staufenbiel, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany) . [7607-14]

4:00 pm: **Packaging of opto-electronic devices for flexible applications**, Erwin Bosman, Geert Van Steenberge, Jeroen Missine, Bram Van Hoe, Peter Van Daele, Univ. Gent (Belgium) . . . [7607-15]

4:20 pm: **Modulation-enabled tapered remote coupler: all-optical communication on and off-chip**, Tian Gu, Rohit Nair, Michael W. Haney, Univ. of Delaware (USA) . . . [7607-16]

4:40 pm: **Heterogeneous integration of thin film compound semiconductor lasers and Su-8 waveguides on SiO₂/Si**, Sabarni Palit, Duke Univ. (USA); Jeremy Kirch, Luke Mawst, Thomas F. Kuech, Univ. of Wisconsin-Madison (USA); Nan M. Jokerst, Duke Univ. (USA) . . . [7607-17]

Tuesday 26 January

OPTO Plenary Session
Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am
Session Chairs: E. Fred Schubert, Rensselaer Polytechnic Institute;
Liang-Chy Chien, Kent State Univ.
 8:30 am: **Introduction and Opening Remarks**
 8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)
 9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 222 (Mezzanine) Tues. 10:30 am to 12:10 pm

Electro-optic Printed Circuit Boards I

Session Chair: Bert-Jan Offrein,
 IBM Zürich Research Lab. (Switzerland)

10:30 am: **Design and implementation of an electro-optical backplane with pluggable in-plane connectors** (*Invited Paper*), Richard C. A. Pitwon, Ken M. Hopkins, Xyratex Technology Ltd. (United Kingdom); Kai Wang, David R. Selviah, Hadi Baghsiahi, Univ. College London (United Kingdom); Bert-Jan Offrein, Roger Dangel, Folkert Horst, IBM Zürich Research Lab. (Switzerland); Markus Halter, Max Gmür, Varioprint AG (Switzerland) [7607-18]

11:00 am: **Polymer waveguide-based multilayer optical connector**, Daniel Jubin, Roger Dangel, Norbert Meier, Folkert Horst, Tobias Lamprecht, Jonas Weiss, René Beyeler, Bert-Jan Offrein, IBM Zürich Research Lab. (Switzerland); Markus Halter, Romeo Stieger, Felix Betschon, Varioprint AG (Switzerland) [7607-19]

11:20 am: **Compact electro-optical module with polymer waveguides on a flexible substrate for high-density board-level communication**, Jonas Weiss, Tobias Lamprecht, Norbert Meier, Roger Dangel, Folkert Horst, Daniel Jubin, René Beyeler, Bert J. Offrein, IBM Zürich Research Lab. (Switzerland) . [7607-20]

11:40 am: **Mass production of planar polymer waveguides and their applications** (*Invited Paper*), Felix Betschon, Varioprint AG (Switzerland); Markus Michler, Interstaatliche Hochschule für Technik Buchs NTB (Switzerland); Markus Halter, Varioprint AG (Switzerland); Johannes Kremmel, Klaus Dietrich, Interstaatliche Hochschule für Technik Buchs NTB (Switzerland); Max Gmür, Stephan Paredes, Varioprint AG (Switzerland); Daniel Craiovan, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [7607-21]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 6

Room: 222 (Mezzanine) Tues. 1:30 to 3:20 pm

Electro-optic Printed Circuit Boards II

Session Chair: Ray T. Chen, The Univ. of Texas at Austin

1:30 pm: **Chip-level optical I/O for FPGA on optical PCB** (*Invited Paper*), Shigeru Nakagawa, IBM Japan, Ltd. (Japan) [7607-22]

2:00 pm: **Simplex optical transceiver integrated on PCB using novel connectors compatible with pick-and-place assembly technology**, Nikolaos Bamiedakis, Joseph Beals IV, Affeendi H. Hashim, Richard V. Penty, Ian H. White, Univ. of Cambridge (United Kingdom) [7607-23]

2:20 pm: **Point-to-point waveguide array with buried mirrors for board-level optical interconnect**, Xinyuan Dou, The Univ. of Texas at Austin (USA); Alan X. Wang, Omega Optics, Inc. (USA); Haiyu Huang, Ray T. Chen, The Univ. of Texas at Austin (USA) [7607-24]

2:40 pm: **Optical link between FPGA microprocessors using a fiber-embedded rigid PCB**, Do-Won Kim, Tae-Woo Lee, Mu Hee Cho, Min-Hyuk Lee, Dong-Min Im, Korea Advanced Institute of Science and Technology (Korea, Republic of); Jae-bong Choi, Ki-Do Chun, LG Micron Ltd. (Korea, Republic of); Hyo-Hoon Park, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7607-25]

3:00 pm: **Flexible polymer optical layer for board-level optical interconnects by highly durable metal imprinting method**, Xiaolong Wang, Omega Optics, Inc. (USA); Xinyuan Dou, Ray T. Chen, The Univ. of Texas at Austin (USA) [7607-26]

Coffee Break 3:20 to 3:50 pm

SESSION 7

Room: 222 (Mezzanine) Tues. 3:50 to 5:30 pm

Materials for Optical Interconnects

Session Chair: Ruth Houbertz-Krauss,
 Fraunhofer-Institut für Silicatiforschung (Germany)

3:50 pm: **Optical and electrical hybrid flexible printed circuit boards with unique photo-defined polymer waveguide layers** (*Invited Paper*), Koji Choki, SUMITOMO BAKELITE Co., Ltd (Japan); Tetsuya Mori, Keizo Takahama, Makoto Fujiwara, Kei Watanabe, Hiroshi Owari, Yoji Shirato, Shinsuke Terada, Mariko Sakamoto, SUMITOMO BAKELITE Co., Ltd. (Japan) [7607-27]

4:20 pm: **Optical interface devices applying UV curable resin for flexible optical interconnection** (*Invited Paper*), Osamu Mikami, Masahiro Kanda, Tokai Univ. (Japan) [7607-28]

4:50 pm: **Correlation of organic cross-linking behavior and optical properties of inorganic-organic hybrid polymers**, Anne Bock, Ruth Houbertz-Krauss, Fraunhofer-Institut für Silicatiforschung (Germany); Gerhard Sextl, Fraunhofer-Institut für Silicatiforschung (Germany) and Julius-Maximilians-Universität Würzburg (Germany) [7607-29]

5:10 pm: **Thermally stable and lowloss optical waveguide using optical-fiber-embedded epoxy matrix for optical printed-circuit board applications**, Dong-min Im, Jong-Hun Kim, Do-Won Kim, Mu Hee Cho, Hyo-Hoon Park, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7607-30]

Wednesday 27 January

SESSION 8

Room: 222 (Mezzanine) Wed. 8:10 to 10:00 am

Active Components for Optical Interconnects

Session Chair: Alan Xiaolong Wang, Omega Optics, Inc.

8:10 am: **Cost-effective DWDM optical interconnects enabled by quantum dot comb laser** (*Invited Paper*), Alexey R. Kovsh, Greg L. Wojcik, Dongliang Yin, Innolume Inc. (USA); Alexey E. Gubenko, Igor L. Krestnikov, Sergey S. Mikhrin, Daniil A. Livshits, Innolume GmbH (Germany) [7607-31]

8:40 am: **Bias-free Y-branch waveguide modulator based on domain-inverted modulation of electro-optic polymer**, Beomsuk Lee, Che-Yun Lin, The Univ. of Texas at Austin (USA); Alan X. Wang, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) [7607-32]

9:00 am: **Surface-normal asymmetric Fabry-Perot quantum-confined Stark effect electro-absorption modulator on silicon**, Ross M. Audet, Stephanie A. Claussen, Elizabeth H. Edwards, Shen Ren, Rebecca K. Schaevitz, Emel Tasyurek, Stanford Univ. (USA); Olufemi I. Dosunmu, M. Selim Ünlü, Boston Univ. (USA); David A. B. Miller, Stanford Univ. (USA) [7607-33]

9:20 am: **Improved silicon light emission for reach- and punch-through devices in standard CMOS**, Petrus J. Venter, Monuko du Plessis, Univ. of Pretoria (South Africa) and INSiAVA (Pty) Ltd (South Africa) [7607-34]

9:40 am: **Design of a 7GHz SiGe HBT EO modulator**, Shengling Deng, Tuhin Guha Neogi, John F. McDonald, Joseph M. Novak, Z.Rena Huang, Rensselaer Polytechnic Institute (USA) [7607-35]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 222 (Mezzanine)Wed. 10:30 am to 12:10 pm

EO Component Integration and Packaging

Session Chair: David R. Rolston, Reflex Photonics, Inc. (Canada)

10:30 am: **Laser-formed bumps on glass for precision alignment of planar optical components**, James S. Sutherland, Alexander M. Streltsov, Richard R. Grzybowski, B. Roe Hemenway, Corning Inc. (USA)[7607-36]

10:50 am: **Life-stress relationship for thin film transistor gate line interconnects on flexible substrates**, Thomas Martin, L-3 Display Systems (USA); Aris Christou, Univ. of Maryland, College Park (USA)[7607-37]

11:10 am: **Silicon-integrated photonic circuit for a single-stage large-angle beam steering optical phased array**, David N. Kwong, Amir Hosseini, Che-Yun Lin, Beomsuk Lee, YaZhao Liu, Ray T. Chen, The Univ. of Texas at Austin (USA)[7607-38]

11:30 am: **Differential photo-acoustic gas cell based on LTCC for ppm gas sensing**, Kimmo Keränen, Kari Kautio, Jyrki Ollila, Mikko Heikkinen, VTT Elektronikka (Finland); Ismo Kauppinen, Gasera Oy (Finland); Tom Kuusela, Univ. of Turku (Finland); Boris Matveev, Ioffe Physico-Technical Institute (Russian Federation); Pentti Karioja, VTT Elektronikka (Finland)[7607-39]

11:50 am: **Micro-optics packaging and integration for structured laser beam shaping**, Yakov G. Soskind, David H. Pollock Consultants, Inc. (USA)[7607-40]

Lunch/Exhibition Break12:10 to 1:30 pm

SESSION 10

Room: 200 (Mezzanine)Wed. 1:30 to 3:30 pm

Fiber Optics Links and Devices

Joint Session with conference 7621: Optical Metro Networks and Short-Haul Systems II

Session Chair: Yakov G. Soskind, David H. Pollock Consultants, Inc.

1:30 pm: **Evolution of optical access network technologies** (*Invited Paper*), Thomas Pfeiffer, Alcatel-Lucent Deutschland AG (Germany)[7607-41]

2:00 pm: **Optical fiber interconnects: physical design for reliability** (*Invited Paper*), Ephraim Suhir, Univ. of California, Santa Cruz (USA) and Univ. of Maryland, College Park (USA) and ERS Co. (USA); Allen M. Earman, Arasor (USA)[7607-42]

2:30 pm: **Active and tunable waveguide devices based on silicon and silica for use in optical communication systems** (*Invited Paper*), Ernst Brinkmeyer, Technische Univ. Hamburg-Harburg (Germany)[7621-01]

3:00 pm: **Optical transceivers for short and medium reach optical networks** (*Invited Paper*), Bernd Huebner, Finisar Corp (USA)[7621-02]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level)Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Analytical formula for output phase of symmetrically excited one-to-N multimode interference coupler, Amir Hosseini, David Kwong, Ray T. Chen, The Univ. of Texas at Austin (USA)[7607-43]

Optimum operation of single-cavity photonic switches, Ali Naqavi, Zahra Monem Haghdoost, Masoud Edalatipour, Sina Khorasani, Khashayar Mehrany, Sharif Univ. of Technology (Iran, Islamic Republic of)[7607-44]

Electro-optic co-site interference mitigation, Jonathan R. Bruno, U.S. Army CERDEC Intelligence and Information Warfare Directorate (USA)[7607-45]

Design of analog-type high-speed SerDes using digital components for optical chip-to-chip link, Jamshid Sangirov, Nga Nguyen, Trong-Hieu Ngo, Ikechi A. Ukaegbu, Tae-Woo Lee, Mu Hee Cho, Hyo-Hoon Park, Korea Advanced Institute of Science and Technology (Korea, Republic of)[7607-47]

Quantum Sensing and Nanophotonic Devices VII

Conference Chair: **Manijeh Razeghi**, Northwestern Univ.

Conference Co-Chairs: **Rengarajan Sudharsanan**, Spectrolab, Inc.; **Gail J. Brown**, Air Force Research Lab.

Program Committee: **Jagmohan Bajaj**, Teledyne Imaging Sensors; **Alexei N. Baranov**, Univ. Montpellier 2 (France); **David A. Cardimona**, Air Force Research Lab.; **Raffaele Colombelli**, Univ. Paris-Sud 11 (France); **Mohamed A. Diagne**, MIT Lincoln Lab.; **Jean-Christophe Harmand**, Ctr. National de la Recherche Scientifique (France); **Jean-Pierre Huignard**, Thales Research & Technology (France); **Mark A. Itzler**, Princeton Lightwave, Inc.; **Christine A. Jhabvala**, NASA Goddard Space Flight Ctr.; **François H. Julien**, Univ. Paris-Sud 11 (France); **Ki-Bum Kim**, Seoul National Univ. (Korea, Republic of); **Armin Lambrecht**, Fraunhofer-Institut für Physikalische Messtechnik (Germany); **Aizhen Li**, Shanghai Institute of Microsystem and Information Technology (China); **Ryan P. McClintock**, Northwestern Univ.; **Jerry R. Meyer**, Naval Research Lab.; **Konstantin D. Moiseev**, Ioffe Physico-Technical Institute (Russian Federation); **Vaidya Nathan**, Air Force Research Lab.; **Joseph G. Pellegrino**, U.S. Army Night Vision & Electronic Sensors Directorate; **Abderrahim Ramdane**, Ctr. National de la Recherche Scientifique (France); **Robert R. Rice**, Northrop Grumman Space Technology; **Antoni Rogalski**, Military Univ. of Technology (Poland); **Donald J. Silversmith**, Air Force Office of Scientific Research; **Steven Slivken**, Northwestern Univ.; **Marija Strojnik**, Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Ferechteh Hosseini Teherani**, Nanovation SARL (France); **Meimei Z. Tidrow**, U.S. Army Night Vision & Electronic Sensors Directorate; **Miriam Serena Vitiello**, Univ. degli Studi di Bari (Italy); **Jerry A. Wilson**, Cyan Systems; **Michael Wraback**, Army Research Lab.; **Franco Zappa**, Politecnico di Milano (Italy)

Sunday 24 January

Opening Remarks

Room: 236 (Mezzanine) Sun. 8:55 to 9:00 am

Manijeh Razeghi, Northwestern Univ.

Note the upcoming special Keynote Session on Monday at 8:00 am

SESSION 1

Room: Room 236 (Mezzanine) Sun. 9:00 to 10:30 am

QC Lasers and Applications I

Session Chairs: **Joseph G. Pellegrino**, U.S. Army Night Vision & Electronic Sensors Directorate; **Armin Lambrecht**, Fraunhofer-Institut für Physikalische Messtechnik (Germany)

9:00 am: **Quantum-dot mode-locked lasers with optical injection** (*Invited Paper*), Guillaume Huyet, Cork Institute of Technology (Ireland) and Tyndall National Institute (Ireland); Tatiana Habruseva, Tyndall National Institute (Ireland); Shane O'Donoghue, Natalia Rebrova, Cork Institute of Technology (Ireland) and Tyndall National Institute (Ireland); Stephen P. Hegarty, Cork Institute of Technology (Ireland); Dmitrii I. Rachinskii, Univ. College Cork (Ireland)[7608-02]

9:25 am: **Semiconductor quantum light emitters and sensors** (*Invited Paper*), Sven Höfling, Tobias Heindel, Caroline Kistner, Christian Schneider, Matthias Lermer, Stephan Reitzenstein, Martin Kamp, Alfred W. B. Forchel, Julius-Maximilians-Univ. Würzburg (Germany)[7608-03]

9:50 am: **Quantum-cascade-laser-based optoacoustic detection: application to nitric oxide and formaldehyde** (*Invited Paper*), Vincenzo Spagnolo, Angela Elia, Cinzia Di Franco, Pietro M. Lugarà, Gaetano Scamarcio, Univ. degli Studi di Bari (Italy)[7608-05]

10:15 am: **High power photonic crystal distributed feedback quantum cascade lasers emitting at 4.5 μm**, Burc Gökden, Steven Slivken, Manijeh Razeghi, Northwestern Univ. (USA)[7608-95]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: Room 236 (Mezzanine) Sun. 11:00 am to 12:30 pm

QC Lasers and Applications II

Session Chairs: **John M. Zavada**, U.S. Army Research Office; **Jae Su Yu**, Kyung Hee Univ. (Korea, Republic of)

11:00 am: **Fiber sensor for QCL-based glucose measurement** (*Invited Paper*), Carina Herrmann, Christian Vrancic, Norbert Gretz, Sabine Hoecker, Annemarie Pucci, Wolfgang Petrich, Ruprecht-Karls-Univ. Heidelberg (Germany)[7608-06]

11:25 am: **Infrared laser-based sensing in medical applications** (*Invited Paper*), Markus W. Sigrist, Richard Bartlome, Michele Gianella, ETH Zürich (Switzerland)[7608-07]

11:50 am: **Imaging stand-off detection of explosives using tunable MIR quantum cascade lasers** (*Invited Paper*), Frank Fuchs, Jan Kaster, Boris Hinkov, Quankui K. Yang, Wolfgang Bronner, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany)[7608-08]

12:15 pm: **Novel broadband amplifier for mid-infrared semiconductor laser and applications in spectroscopy**, Sheng Wu, California Institute of Technology (USA)[7608-10]

Lunch Break 12:30 to 1:30 pm

SESSION 3

Room: Room 236 (Mezzanine) Sun. 1:30 to 2:55 pm

QC Lasers and Applications III

Session Chairs: **Jerry R. Meyer**, U.S. Naval Research Lab.; **Didier J. Decoster**, Univ. des Sciences et Technologies de Lille (France)

1:30 pm: **Current status and potential of high-power mid-infrared intersubband lasers** (*Invited Paper*), Steven Slivken, Yanbo Bai, Burc Gökden, Tuo Huang, Shaban R. Darvish, Manijeh Razeghi, Northwestern Univ. (USA)[7608-11]

1:55 pm: **Low-power laser-based carbon monoxide sensor for fire and post-fire detection using a compact Herriott multipass cell**, David M. Thomazy, Rice Univ. (USA); Stephen G. So, Princeton Univ. (USA); Anatoly A. Kosterev, Rafal Lewicki, Ardan A. Sani, Frank K. Tittel, Rice Univ. (USA)[7608-12]

2:10 pm: **Design and performance of a sensor system for detection of multiple chemicals using an external cavity quantum cascade laser**, Mark C. Phillips, Matthew S. Taubman, Bruce E. Bernacki, Bret D. Cannon, John Schiffen, Tanya L. Myers, Pacific Northwest National Lab. (USA)[7608-13]

2:25 pm: **Quantum cascade laser absorption spectroscopy of UF6 at 7.74 μm for analytical uranium enrichment measurements**, Rafal Lewicki, Anatoly A. Kosterev, Rice Univ. (USA); Fatima Toor, Yu Yao, Claire F. Gmachl, Princeton Univ. (USA); Xiaojun Wang, Mary Fong, AdTech Optics, Inc. (USA); Frank K. Tittel, Rice Univ. (USA)[7608-14]

2:40 pm: **Very high wall plug efficiency of quantum cascade lasers**, Yanbo Bai, Burc Gökden, N. Bandyopadhyay, A. Haddadi, Steven Slivken, Shaban R. Darvish, Manijeh Razeghi, Northwestern Univ. (USA)[7608-96]

Coffee Break 2:55 to 3:20 pm

SESSION 4

Room: Room 236 (Mezzanine) Sun. 3:20 to 6:05 pm

Quantum Structures and Devices I

Session Chairs: François H. Julien, Univ. Paris-Sud 11 (France); Miriam Serena Vitiello, Univ. degli Studi di Bari (Italy)

- 3:20 pm: **Recent developments on non-polar cubic group III nitrides for optoelectronic applications** (*Invited Paper*), Donat J. As, Univ. Paderborn (Germany) [7608-15]
- 3:45 pm: **Growth of intersubband GaN/AlGaN heterostructures** (*Invited Paper*), Nicolas Grandjean, Amélie Dussaigne, Sylvain Nicolay, Denis Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7608-16]
- 4:10 pm: **Resonant tunneling diode opto-electronic integrated circuits** (*Invited Paper*), Charles N. Ironside, Univ. of Glasgow (United Kingdom); Jose M. L. Figueiredo, Bruno Romeira, Univ. do Algarve (Portugal); Thomas J. Slight, Liqun Wang, Edward Wasige, Univ. of Glasgow (United Kingdom) . . . [7608-17]
- 4:35 pm: **Silicon photonics: optical modulators** (*Invited Paper*), Graham T. Reed, David J. Thomson, Frederic Y. Gardes, William R. Headley, Goran Z. Mashanovich, Univ. of Surrey (United Kingdom) [7608-18]
- 5:00 pm: **III-V quantum dot lasers: progress and challenges** (*Invited Paper*), Mohamed Henini, The Univ. of Nottingham (United Kingdom) [7608-19]
- 5:25 pm: **Tuning quantum dot states with optical fields** (*Invited Paper*), Glenn S. Solomon, Joint Quantum Institute (USA) [7608-92]
- 5:50 pm: **Coupled plasmonic quantum bits**, Amin Eftekharian, Majid Sodagar, Milad Khoshnagar, Sina Khorasani, Sharif Univ. of Technology (Iran, Islamic Republic of) [7608-20]

Monday 25 January

Keynote Session

Room: Room 236 (Mezzanine) Mon. 8:00 to 8:40 am

Session Chairs: Manijeh Razeghi, Northwestern Univ.; Jean-Pierre Huignard, Thales Research & Technology (France)

- 8:00 am: **Lifetime of digital media: is optics the solution?**, Erich Spitz, Academie des Sciences (France) and Academie des Technologies (France) and Thales Research & Technology (France); Jean-Charles Hourcade, RedCat Technology LLC (France) and Academie des Technologies (France); Franck Laloë, Lab. Kastler Brossel, Univ. Pierre et Marie Curie, CNRS (France) [7608-01]

SESSION 5

Room: Room 236 (Mezzanine) Mon. 8:40 to 10:20 am

Quantum Structures and Devices II

Session Chairs: Raffaele Colombelli, Univ. Paris-Sud 11 (France); Konstantin D. Moiseev, Ioffe Physico-Technical Institute (Russian Federation)

- 8:40 am: **Intersubband device applications of nitride quantum structures** (*Invited Paper*), Roberto Paiella, Kristina Driscoll, Yan Li, Yitao Liao, Anirban Bhattacharyya, Christos Thomidis, Boston Univ. (USA); Lin Zhou, David J. Smith, Arizona State Univ. (USA); Enrico Bellotti, Theodore D. Moustakas, Boston Univ. (USA) [7608-21]
- 9:05 am: **Probe of coherent and quantum states in narrow-gap semiconductors in the presence of strong spin-orbit coupling** (*Invited Paper*), Giti A. Khodaparast, Matthew Frazier, Mithun Bhowmick, Rajeev N. Kini, Kanokwan Nontapot, Virginia Tech (USA); Michael R. Santos, Univ. of Oklahoma (USA); Bruce W. Wessels, Northwestern Univ. (USA) [7608-22]
- 9:30 am: **Entanglement enhanced quantum sensing** (*Invited Paper*), Harald Weinfurter, Ludwig-Maximilians-Univ. München (Germany) [7608-23]
- 9:55 am: **A numerical tool for analyzing light propagation in photonic-crystal waveguides in the presence of fabrication imperfections** (*Invited Paper*), Philippe Lalanne, Institut d'Optique (France) [7608-24]
- Coffee Break 10:20 to 10:50 am

SESSION 6

Room: Room 236 (Mezzanine) Mon. 10:50 am to 12:20 pm

Nanophotonic Devices I

Session Chairs: Alexei N. Baranov, Univ. Montpellier 2 (France); Eva Monroy, Commissariat à l'Énergie Atomique (France)

- 10:50 am: **Catalyst-free and position-controlled formation of III-V semiconductor nanowires for optical device applications** (*Invited Paper*), Shinjiro Hara, Junichi Motohisa, Katsuhiro Tomioka, Kenji Hiruma, Takashi Fukui, Hokkaido Univ. (Japan) [7608-25]
- 11:15 am: **Cavity polaritons for new photonic devices** (*Invited Paper*), Jacqueline I. Bloch, Ctr. National de la Recherche Scientifique (France); Daniele Bajoni, Univ degli Studi di Pavia (Italy); Esther Wertz, Lydie Ferrier, Pascale Senellart, Audrey Miard, Aristide Lemaitre, Isabelle Sagnes, Sophie Boucoule, Ctr. National de la Recherche Scientifique (France) [7608-26]
- 11:40 am: **Quantum optics with single nanowires and quantum dots** (*Invited Paper*), Nikolay Akopian, Technische Univ. Delft (Netherlands) . [7608-27]
- 12:05 pm: **Nanoparticle for active plasmonic device**, Julie Delahaye, Samuel Grésillon, Emmanuel Fort, Ecole Supérieure de Physique et de Chimie Industrielles (France) [7608-28]
- Lunch Break 12:20 to 1:40 pm

SESSION 7

Room: Room 236 (Mezzanine) Mon. 1:40 to 3:10 pm

Nanophotonic Devices II

Session Chairs: Jean-Christophe Harmand, Ctr. National de la Recherche Scientifique (France); Graham T. Reed, Univ. of Surrey (United Kingdom)

- 1:40 pm: **Near-field analysis of surface waves generated by nanostructures** (*Invited Paper*), Lionel Aigouy, Loïc Lalouat, LPEM / CNRS / ESPCI (France) [7608-29]
- 2:05 pm: **Enhancement of light-matter interaction using surface states in photonic crystal structures** (*Invited Paper*), Marco Liscidini, Univ. of Pavia (Italy) [7608-30]
- 2:30 pm: **Microwave technology applied to terahertz quantum cascade lasers** (*Invited Paper*), Stefano Barbieri, Wilfried Maineult, Lu Ding, Pierre Gellie, Pascal Filloux, Carlo Sirtori, Univ. Paris Diderot (France); Jean-Francois Lampin, Tahsin Akalin, Univ. des Sciences et Technologies de Lille (France); Isabelle Sagne, Ctr. National de la Recherche Scientifique (France); Harvey E. Beere, David Ritchie, Cavendish Lab. (United Kingdom) [7608-31]
- 2:55 pm: **Single-spin microscope with sub-nanoscale resolution based on optically detected magnetic resonance**, Gennady P. Berman, Boris M. Chernobrod, Los Alamos National Lab. (USA) [7608-32]
- Coffee Break 3:10 to 3:40 pm

SESSION 8

Room: Room 236 (Mezzanine) Mon. 3:40 to 6:00 pm

Nanophotonic Devices III

- Session Chairs: Abderrahim Ramdane, Ctr. National de la Recherche Scientifique (France); Mohamed A. Diagne, Lincoln Lab.*
- 3:40 pm: **Raman scattering in submicron and nanoscale structures** (*Invited Paper*), Nathalie Vermeulen, Christof Debaes, Hugo Thienpont, Vrije Univ. Brussel (Belgium) [7608-33]
 - 4:05 pm: **Strain-induced self-rolling III-V tubular nanostructures: formation process and photonic applications** (*Invited Paper*), Xiuling Li, Ik Su Chun, Kevin Bassett, Univ. of Illinois at Chicago (USA) [7608-34]
 - 4:30 pm: **Carrier-induced optical index variations in InP waveguide diodes: the thermal effects contribution** (*Invited Paper*), N. Saadsaoud, Malek Zegaoui, Didier J. Decoster, E. Dogheche, Xavier Wallart, Univ. des Sciences et Technologies de Lille (France); Jean Chazelas, Univ. des Sciences et Technologies de Lille (France) and Thales Airborne Systems (France) . [7608-35]
 - 4:55 pm: **Subwavelength antireflection structures and their device applications** (*Invited Paper*), Jae Su Yu, Kyung Hee Univ. (Korea, Republic of); Young Min Song, Gwangju Institute of Science and Technology (Korea, Republic of); Jung Woo Leem, Kyung Hee Univ. (Korea, Republic of); Yong Tak Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [7608-36]

5:20 pm: **Optical near field interactions** (*Invited Paper*), Frederique A. de Formel, Benoit Cluzel, Loic Lalouat, Damien Brissinger, Kevin Foubert, Laurent Salomon, Institut Carnot de Bourgogne (France)[7608-37]

5:45 pm: **Near-field optical imaging of polarization-dependent plasmonic resonance in metal nanoparticle pairs**, Hsing-Ying Lin, Chen-Han Huang, Chih-Han Chang, Yun-Chiang Lan, Hsiang-Chen Chui, National Cheng Kung Univ. (Taiwan)[7608-38]

Tuesday 26 January

OPTO Plenary Session
Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am
Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute;
Liang-Chy Chien, Kent State Univ.
 8:30 am: **Introduction and Opening Remarks**
 8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)
 9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break10:00 to 10:30 am

SESSION 9

Room: Room 236 (Mezzanine) Tues. 10:30 am to 12:15 pm

Nanophotonic Devices IV

Session Chairs: **Michael Wraback**, Army Research Lab.;
Antoni Rogalski, Military Univ. of Technology (Poland)

10:30 am: **Advances in III-V based photonic crystals for integrated optical processing** (*Invited Paper*), Sylvain Combrié, Thales Research & Technology (France); Quynh Tran, Unité Mixte de Physique CNRS/Thales (France) and Nanyang Technological Univ. (Singapore); Chad A. Husko, Columbia Univ. (USA) and Thales Research & Technology (France); Pierre Colman, Unité Mixte de Physique CNRS/Thales (France); Alfredo De Rossi, Thales Research & Technology (France)[7608-40]

10:55 am: **Efficient terahertz mixer from plasma wave downconversion in InGaAs HEMT** (*Invited Paper*), Laurent Chusseau, Jérémie Torres, Philippe Nouvel, Hugues Marinchio, Luca Varani, Univ. Montpellier 2 (France); Jean-François Lampin, Sylvain Bollaert, Yannick Roellens, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France); Daniel Dolfi, Thales Research & Technology (France)[7608-41]

11:20 am: **Interference effects in a photonic crystal cavity** (*Invited Paper*), David A. Cardimona, Paul Alsing, Henry Mozer, Casey Rhodes, Air Force Research Lab. (USA)[7608-42]

11:45 am: **Iteratively optimized nonperiodic plasmon resonant nanostructures**, Prathamesh Pavaskar, Stephen Cronin, The Univ. of Southern California (USA)[7608-43]

12:00 pm: **Semiconductor nanowire optical antenna: controlling light absorption, scattering, and emission**, Linyou Cao, Mark L. Brongersma, Stanford Univ. (USA)[7608-91]

Lunch/Exhibition Break12:15 to 1:30 pm

SESSION 10

Room: Room 236 (Mezzanine) Tues. 1:30 to 3:15 pm

Nanophotonic Devices V

Session Chairs: **Christine A. Jhavalala**, NASA Goddard Space Flight Ctr.; **Ferechteh Hosseini Teherani**, Nanovation (France)

1:30 pm: **Advances in 3D photonic crystal nanocavity with quantum dots** (*Invited Paper*), Yasuhiko Arakawa, Aniwatt Tандаecharurat, Satoshi Iwamoto, Masahiro Nomura, Denis Guimard, The Univ. of Tokyo (Japan)[7608-44]

1:55 pm: **QD laser on InP substrate for 1.55 μm emission and beyond** (*Invited Paper*), Nicolas Bertru, Institut National des Sciences Appliquées de Rennes (France)[7608-45]

2:20 pm: **Growth of heterostructured III-V nanowires by molecular beam epitaxy for photonic applications** (*Invited Paper*), Helge Weman, Norwegian Univ. of Science and Technology (Norway)[7608-46]

2:45 pm: **Characterization and physics of top-down silicon nanowire phototransistors**, Arthur Zhang, James Cheng, Hongkwon Kim, Univ. of California, San Diego (USA); Yisi Liu, Agiltron, Inc. (USA); Yu-Hwa Lo, Univ. of California, San Diego (USA)[7608-47]

3:00 pm: **Near-field characterization of the optical properties in higher order plasmonic resonances**, Chen-Han Huang, Hsing-Ying Lin, Yun-Chiang Lan, Chih-Han Chang, Hsiang-Chen Chui, National Cheng Kung Univ. (Taiwan)[7608-39]

Coffee Break3:15 to 3:50 pm

SESSION 11

Room: Room 236 (Mezzanine) Tues. 3:50 to 5:50 pm

Nanophotonic Devices VI

Session Chairs: **Mark A. Itzler**, Princeton Lightwave, Inc.;
Wenquan Ma, Institute of Semiconductors (China);
Marija Strojnik, Ctr. de Investigaciones en Óptica, A.C. (Mexico)

3:50 pm: **Radiation damage effects on detectors from the IR to x-rays** (*Invited Paper*), Melville P. Ulmer, Northwestern Univ. (USA)[7608-48]

4:15 pm: **Polar and semipolar III-nitrides for long wavelength intersubband devices** (*Invited Paper*), Eva Monroy, Prem Kumar Kandaswamy, CEA-Grenoble (France); Houssaine Machhadani, Université Paris-Sud (France); Alexander Wirthmüller, CEA-Grenoble (France); Salam Sakr, Université Paris-Sud (France); Lise Lahourcade, Aparna Das, CEA-Grenoble (France); Maria Tchernycheva, François H. Julien, Université Paris-Sud (France)[7608-50]

4:40 pm: **Optical characteristics of surface plasmon resonance based on ZnO and metallic nanograting structures**, Doo-Gun Kim, Seon Hoon Kim, Hyun Chul Ki, Hyo Jin Kim, Hang Ju Ko, Myung-Soo Han, Swook Hann, Tae Un Kim, Hwe-Jong Kim, Korea Photonics Technology Institute (Korea, Republic of); Geum-Yoon Oh, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of)[7608-51]

4:55 pm: **III-nitride nanostructures for energy generation** (*Invited Paper*), Hongxing Jiang, Jingyu Lin, Texas Tech Univ. (USA)[7608-52]

5:10 pm: **One-dimensional characters of excitons in carbon nanotubes** (*Invited Paper*), Seiji Uryu, Iwate Univ. (Japan); Tsuneya Ando, Tokyo Institute of Technology (Japan)[7608-53]

5:35 pm: **Nanoscale metallic annular structures designed and simulation for surface-enhanced Raman scattering**, Shu-Sheng Lee, Chen-Yu Wu, National Taiwan Ocean Univ. (Taiwan); Ding-Zheng Lin, Jen-Yu Chu, Industrial Technology Research Institute (Taiwan)[7608-54]

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Wednesday 27 January

SESSION 12

Room: Room 236 (Mezzanine) Wed. 8:00 to 10:05 am

Superlattice and Quantum Detectors I

Session Chairs: **David A. Cardimona**, Air Force Research Lab.;
Joseph G. Pellegrino, U.S. Army Night Vision & Electronic Sensors Directorate

8:00 am: **Update on the type II strained layer superlattice progress and discussion of its development strategy** (*Invited Paper*), Meimei Z. Tidrow, U.S. Army Night Vision & Electronic Sensors Directorate (USA) [7608-55]

8:25 am: **Performance analysis of InAs/Ga(In)Sb strained layer superlattice detectors and focal plane arrays** (*Invited Paper*), Sumith V. Bandara, U.S. Army Night Vision & Electronic Sensors Directorate (USA) [7608-56]

8:50 am: **Mid-infrared quantum cascade detectors for applications in spectroscopy and pyrometry** (*Invited Paper*), Daniel Hofstetter, Univ. of Neuchâtel (Switzerland) [7608-93]

9:15 am: **High operating temperature MWIR detectors** (*Invited Paper*), Herbert F. Schaake, DRS Sensors & Targeting Systems, Inc. (USA) . . . [7608-58]

9:40 am: **Comparison of nBn and nBp mid-wave barrier infrared photodetectors** (*Invited Paper*), John F. Klem, Jin K. Kim, Michael J. Cich, Samuel D. Hawkins, Sandia National Labs. (USA); Torben R. Fortune, Sandia Staffing Alliance (USA) [7608-59]

Coffee Break 10:05 to 10:35 am

SESSION 13

Room: Room 236 (Mezzanine) Wed. 10:35 am to 12:05 pm

Superlattice and Quantum Detectors II

Session Chairs: **Meimei Z. Tidrow**,
U.S. Army Night Vision & Electronic Sensors Directorate;
David A. Cardimona, Air Force Research Lab.

10:35 am: **High-operating temperature MWIR photon detectors based on type II InAs/GaSb superlattice** (*Invited Paper*), Manijeh Razeghi, Binh-Minh Nguyen, Pierre-Yves Delaunay, Edward K. Huang, Siamak Abdollahi Pour, Paritosh Manukar, Simeon Bogdanov, Northwestern Univ. (USA) [7608-60]

11:00 am: **Type II heterostructures with InSb quantum dots inserted into p-n InAs(Sb,P) junction** (*Invited Paper*), Konstantin D. Moiseev, Maya P. Mikhailova, Edward V. Ivanov, Yana A. Parkhomenko, Sergey S. Kizhaev, Vladimir N. Nevedomsky, Nikolay A. Bert, Yury P. Yakovlev, Ioffe Physico-Technical Institute (Russian Federation) [7608-61]

11:25 am: **Composition and strain mapping of interfaces in InAs/GaSb superlattices by aberration-corrected high-resolution transmission electron microscopy** (*Invited Paper*), Krishnamurthy Mahalingam, Air Force Research Lab. (USA) and Universal Technology Corp. (USA); Heather Haugan, Gail J. Brown, Kurt G. Eyink, Frank Szmulowicz, Air Force Research Lab. (USA) [7608-71]

11:50 am: **Dark current and noise measurements in InAs/GaSb superlattice detectors**, Katarzyna Jaworowicz, ONERA (France); Cyril Cervera, Univ. Montpellier 2 (France); Olivier Gravrand, Commissariat à l'Énergie Atomique (France); Jean-Baptiste Rodriguez, Philippe Christol, Univ. Montpellier 2 (France); Isabelle Ribet-Mohamed, ONERA (France) [7608-63]

Lunch/Exhibition Break 12:05 to 1:35 pm

SESSION 14

Room: Room 236 (Mezzanine) Wed. 1:35 to 3:05 pm

Superlattice and Quantum Detectors III

Session Chairs: **Martin Walther**, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); **Jean-Pierre Huignard**, Thales Research & Technology (France)

1:35 pm: **Electronic properties of InAs/GaSb superlattice detectors to evaluate high-temperature operation** (*Invited Paper*), Philippe Christol, Cyril Cervera, Radhouane Chaghi, Hocine Ait-Kaci, Jean Baptiste Rodriguez, Leszek Konczewicz, Sylvie Contreras, Univ. Montpellier 2 (France); Katarzyna Jaworowicz, Isabelle Ribet-Mohamed, ONERA (France) [7608-64]

2:00 pm: **"XBn" barrier detectors for high operating temperatures** (*Invited Paper*), Philip C. Klipstein, Olga Klin, Steve Grossman, Noam Snapi, Barak Yaacobovitz, Maya Brumer, Inna Lukomsky, Michael Yassen, Boris Yofis, Alex Glozman, Tal Fishman, Eyal Berkowitz, Osnat Magen, Itay Shtrichman, Eliezer Weiss, SCD Semiconductor Devices (Israel) [7608-65]

2:25 pm: **High operating temperature (HOT) MWIR Quantum Dot Infrared Photodetector** (*Invited Paper*), Jarrod N. Vaillancourt, Applied NanoFemto Technologies (USA); Xuejun Lu, Univ. of Massachusetts Lowell (USA) . [7608-66]

2:50 pm: **Interband cascade infrared photodetectors**, Zhaobing Tian, Zhihua Cai, Rui Q. Yang, Tetsuya Mishima, Michael R. Santos, Matthew B. Johnson, Univ. of Oklahoma (USA); John F. Klem, Sandia National Labs. (USA) . [7608-72]

Coffee Break 3:05 to 3:35 pm

SESSION 15

Room: Room 236 (Mezzanine) Wed. 3:35 to 5:05 pm

Superlattice and Quantum Detectors IV

Session Chairs: **Ki-Bum Kim**, Seoul National Univ. (Korea, Republic of); **Jagmohan Bajaj**, Teledyne Imaging Sensors

3:35 pm: **Improving the operating temperature of quantum dots in a well detectors** (*Invited Paper*), Sanjay Krishna, The Univ. of New Mexico (USA) [7608-68]

4:00 pm: **InAs/GaSb type II superlattices for advanced 2nd and 3rd generation detectors** (*Invited Paper*), Martin Walther, Robert H. Rehm, Johannes Schmitz, Joachim Fleissner, Frank Rutz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Ralf Scheibner, Joachim Wendler, Johann Ziegler, AIM INFRAROT-MODULE GmbH (Germany) [7608-69]

4:25 pm: **Non-cryogenic operation of HgCdTe infrared detectors** (*Invited Paper*), Christoph H. Grein, Silviu Velicu, Pete Dreiske, Michael Carmody, EPIR Technologies, Inc. (USA); Jamie D. Phillips, Univ. of Michigan (USA) . . [7608-70]

4:50 pm: **A LWIR Quantum Dot Infrared Photodetector working at 298K**, Jarrod Vaillancourt, Applied NanoFemto technologies LLC (USA); Xuejun Lu, Univ. of Massachusetts Lowell (USA) [7608-67]

Thursday 28 January

SESSION 16

Room: Room 236 (Mezzanine)Thurs. 8:00 to 9:55 am

Superlattice and Quantum Detectors V

Session Chairs: **Donald J. Silversmith**, Air Force Office of Scientific Research; **Philippe Christol**, Univ. Montpellier 2 (France)

8:00 am: **Infrared detector epitaxial designs for suppression of surface leakage current** (*Invited Paper*), Gary W. Wicks, Gregory R. Savich, Janet R. Pedrazzani, Shimon Maimon, Univ. of Rochester (USA)[7608-74]

8:25 am: **GaAs and GaN based high operating temperature spin split-off band infrared detectors** (*Invited Paper*), A. G. Unil Perera, S. G. Matsik, Manmohan S. Shishodia, P. K. D. D. P. Pitigala, Department of Physics and Astronomy, Georgia State University, Atlanta, GA 30303 (USA)[7608-75]

8:50 am: **Defect states in type-II strained-layer superlattices** (*Invited Paper*), Michael E. Flatté, Craig E. Pryor, The Univ. of Iowa (USA)[7608-76]

9:15 am: **Minority electron unipolar photodetectors based on type II InAs/GaSb/AlSb superlattices for very long wavelength infrared detection**, Manijeh Razeghi, Binh-Minh Nguyen, Siamak Abdollahi Pour, Simeon Bogdanov, Northwestern Univ. (USA)[7608-94]

9:40 am: **Quantum dot photodetectors based on structures with collective potential barriers**, Andrei Antipov, Gottfried Strasser, Andrei V. Sergeev, Li-Hsin Chien, Nizami Z. Vagidov, Vladimir V. Mitin, Univ. at Buffalo (USA)[7608-73]

Coffee Break9:55 to 10:25 am

SESSION 17

Room: Room 236 (Mezzanine)Thurs. 10:25 pm to 12:05 am

Single Photon Detectors and Sources I

Session Chairs: **Philip C. Klipstein**, SCD Semiconductor Devices (Israel); **Jerry A. Wilson**, Cyan Systems

10:25 pm: **Photon-counting detectors for space-based laser receivers** (*Invited Paper*), Michael A. Krainak, Anthony W. Yu, Steven X. Li, Guangning Yang, Xiaoli Sun, NASA Goddard Space Flight Ctr. (USA)[7608-79]

10:50 pm: **Utilization of 3D imaging flash lidar technology for autonomous safe landing on planetary bodies** (*Invited Paper*), Farzin Amzajerdian, Michael D. Vanek, Larry B. Petway, NASA Langley Research Ctr. (USA); Diego F. Pierrottet, Coherent Applications, Inc (USA); George E. Busch, Coherent Applications, Inc. (USA)[7608-80]

11:15 pm: **Progress in self-quenching InP-based single photon detectors** (*Invited Paper*), Mark A. Itzler, Princeton Lightwave, Inc. (USA)[7608-81]

11:40 pm: **Large format avalanche photodiode imaging arrays** (*Invited Paper*), Ping Yuan, Rengarajan Sudharsanan, Xiaogang Bai, Joseph Boisvert, Paul McDonald, James Chang, William Hong, Spectrolab, Inc. (USA)[7608-82]

Lunch/Exhibition Break12:05 to 1:35 pm

SESSION 18

Room: Room 236 (Mezzanine)Thurs. 1:35 to 3:05 pm

Single Photon Detectors and Sources II

Session Chairs: **Franco Zappa**, Politecnico di Milano (Italy); **Vaidya Nathan**, Air Force Research Lab.

1:35 pm: **Model for passive quenching of SPADs** (*Invited Paper*), Majeed M. Hayat, The Univ. of New Mexico (USA); Mark A. Itzler, Princeton Lightwave, Inc. (USA); David A. Ramirez, The Univ. of New Mexico (USA); Graham J. Rees, University of Sheffield (United Kingdom)[7608-83]

2:00 pm: **Single-photon avalanche diode arrays and CMOS microelectronics for counting, timing, and imaging quantum events** (*Invited Paper*), Franco Zappa, Politecnico di Milano (Italy) and Micro Photon Devices S.r.l. (Italy); Alberto Tosi, Alberto Dalla Mora, Fabrizio Guerrieri, Politecnico di Milano (Italy); Simone Tisa, Micro Photon Devices S.r.l. (Italy)[7608-84]

2:25 pm: **High-throughput single-molecule fluorescence spectroscopy using parallel detection** (*Invited Paper*), Xavier Michalet, Ryan A. Colyer, Giuseppe Scalia, Univ. of California, Los Angeles (USA); Taiho Kim, Neshor Technologies Inc. (USA); Moran Levi, Daniel B. Aharoni, Adrian M. Cheng, Katsushi Arisaka, Jacques E. Millaud, Univ. of California, Los Angeles (USA); Ivan Rech, Stefano Marangoni, Massimo Ghioni, Sergio D. Cova, Politecnico di Milano (Italy); Shimon Weiss, Univ. of California, Los Angeles (USA)[7608-85]

2:50 pm: **Engineering of InAsP/InP quantum dot emission for long-distance quantum communications**, Richard Hostein, Remy Braive, Matthieu Larque, Timothy J. Karle, Noelle Gogneau, Grégoire Beaudoin, Luc Le Gratiet, Aristide Lemaître, Olivier Krebs, Jan Suffczynski, Paul Voisin, Edmond Cambriil, Isabelle Robert-Philip, Isabelle Sagnes, Alexios Beveratos, Ctr. National de la Recherche Scientifique (France)[7608-86]

Coffee Break3:05 to 3:35 pm

SESSION 19

Room: Room 236 (Mezzanine)Thurs. 3:35 to 5:40 pm

Single Photon Detectors and Sources III

Session Chairs: **Aizhen Li**, Shanghai Institute of Microsystem and Information Technology (China); **Krishnamurthy Mahalingam**, Air Force Research Lab.

3:35 pm: **High-sensitivity visible and IR (1550nm) Si nanowire photodetectors** (*Invited Paper*), Yu-Hwa Lo, Univ. of California, San Diego (USA)[7608-87]

4:00 pm: **Scalable routes to single and entangled photon pair sources: tailored InAs/InP quantum dots in photonic crystal microcavities** (*Invited Paper*), Robin L. Williams, Khaled Mnaymneh, Vera Sazonova, Dan Dalacu, Philip J. Poole, Geoffrey C. Aers, Ross Cheriton, Michael Reimer, Jean Lapointe, Pawel Hawrylak, Marek Korkusinski, Eugene Kadantsev, National Research Council Canada (Canada)[7608-88]

4:25 pm: **Digital-pixel focal plane array development** (*Invited Paper*), Matthew G. Brown, MIT Lincoln Lab. (USA)[7608-89]

4:50 pm: **Blinking suppression and anti-bunching of quantum dots as single-photon sources** (*Invited Paper*), Jau Tang, Academia Sinica (Taiwan)[7608-90]

5:15 pm: **Engineering vertical emission in THz quantum cascade lasers** (*Invited Paper*), Alessandro Tredicucci, NEST, CNR-INFM (Italy) and Scuola Normale Superiore (Italy)[7608-09]

Photonics West maps:

- Moscone Maps pp. 2-5
- Hilton Hotel Map p. 3
- Area Map p. 322

OPTO

Photonic and Phononic Crystal Materials and Devices IX

Conference Chairs: **Ali Adibi**, Georgia Institute of Technology; **Shawn-Yu Lin**, Rensselaer Polytechnic Institute; **Axel Scherer**, California Institute of Technology

Program Committee: **Shanhui Fan**, Stanford Univ.; **Abdelkrim Khelif**, Georgia Institute of Technology; **Maryanne C. J. Large**, The Univ. of Sydney (Australia); **Susumu Noda**, Kyoto Univ. (Japan); **Masaya Notomi**, NTT Basic Research Labs. (Japan); **Ekmel Özbay**, Bilkent Univ. (Turkey); **Domenico Pacifici**, California Institute of Technology; **Dennis W. Prather**, Univ. of Delaware; **William J. Wadsworth**, Univ. of Bath (United Kingdom); **Yong Xu**, Virginia Polytechnic Institute and State Univ.; **Eli Yablonovitch**, Univ. of California, Berkeley

Tuesday 26 January

OPTO Plenary Session	
Room: 102 (Exhibit Level)	Tues. 8:30 to 10:00 am
<i>Session Chairs:</i> E. Fred Schubert , Rensselaer Polytechnic Institute; Liang-Chy Chien , Kent State Univ.	
8:30 am:	Introduction and Opening Remarks
8:40 am:	GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth , Shuji Nakamura, Univ. of California, Santa Barbara (USA)
9:20 am:	Solid-state lighting: science, technology and economic perspectives , Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 1

Room: 234 (Mezzanine) **Tues. 10:30 am to 12:30 pm**

Special Review Session: Present and Future of Photonic Crystals

Session Chair: **Ali Adibi**, Georgia Institute of Technology

10:30 am: **Ultrafast switching and nonlinear response of quantum dots in a photonic band gap** (*Invited Paper*), Sajeev John, Univ. of Toronto (Canada) [7609-01]

11:00 am: **All-optical switch and memory based on photonic crystal nanocavities** (*Invited Paper*), Masaya Notomi, NTT Basic Research Labs. (Japan) [7609-02]

11:30 am: **The evolution of nanocavities for efficient optical field enhancement** (*Invited Paper*), Axel Scherer, California Institute of Technology (USA) [7609-03]

12:00 pm: **Design and fabrication of three-dimensional rhombicuboctahedral photonic quasicrystals** (*Invited Paper*), Georg von Freymann, Alexandra Ledermann, Martin Wegener, Karlsruhe Institute of Technology (Germany) [7609-67]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 2

Room: 234 (Mezzanine) **Tues. 1:30 to 3:00 pm**

Photonic Crystal Cavities I

Session Chair: **Axel Scherer**, California Institute of Technology

1:30 pm: **Reconfigurable optical filters and cavity QED with photonic crystal nanobeam cavities** (*Invited Paper*), Marko Loncar, Harvard Univ. (USA) [7609-04]

2:00 pm: **Stretch-tuneable optical microcavities**, Nicholas Gibbons, Bo Zheng, Mathias Kolle, Ullrich Steiner, Jeremy J. Baumberg, Univ. of Cambridge (United Kingdom) [7609-05]

2:20 pm: **High-frequency tuning of photonic crystal defect cavity modes using surface acoustic waves**, Daniel A. Fuhrmann, Hubert J. Krenner, Univ. Augsburg (Germany); Jens Ebbecke, Univ. of Southern Denmark (Denmark); Joachim Jambreck, Univ. Augsburg (Germany); Hyochul Kim, Susanna Thon, Dirk Bouwmeester, Pierre M. Petroff, Univ. of California, Santa Barbara (USA); Achim Wixforth, Univ. Augsburg (Germany) [7609-06]

2:40 pm: **1D Si₃N₄ nanobeam cavities**, Mughees M. Khan, Thomas Babinec, Murray McCutcheon, Parag B. Deotare, Marko Loncar, Harvard Univ. (USA) [7609-07]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Room: 234 (Mezzanine) **Tues. 3:30 to 5:50 pm**

Photonic Crystal Cavities II

Session Chair: **Marko Loncar**, Harvard Univ.

3:30 pm: **Active photonic crystal devices: from switches and modulators controlled with sub-fJ energies to silicon-based light sources** (*Invited Paper*), Jelena Vuckovic, Andrei Faraon, Arka Majumdar, Dirk R. Englund, Maria O. Makarova, Yiyang Gong, Stanford Univ. (USA) [7609-08]

4:00 pm: **Plasmonic-photonic hybrid cavity for tailored light-matter coupling** (*Invited Paper*), Michael Barth, Stefan Schietinger, Thomas Aichele, Humboldt-Univ. zu Berlin (Germany); Nils C. Nüsse, Bernd Loechel, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Oliver Benson, Humboldt-Univ. zu Berlin (Germany) [7609-09]

4:30 pm: **Dynamically reconfigurable nanobeam photonic crystal cavities**, Ian W. Frank, Parag B. Deotare, Murray W. McCutcheon, Mughees Khan, Marko Loncar, Harvard School of Engineering and Applied Sciences (USA) . . [7609-10]

4:50 pm: **Observations of fast light and Hartman effect in photonic crystal lattices and nanocavities**, Tingyi Gu, Serdar Kocaman, Columbia Univ. (USA); Mingbin Yu, A*STAR Institute of Microelectronics (Singapore); Xiaodong Yang, Univ. of California, Berkeley (USA); Dim-Lee Kwong, A*STAR Institute of Microelectronics (Singapore); Chun Jiang, Shanghai Jiao Tong Univ. (China); Chee Wei Wong, Columbia Univ. (USA) [7609-11]

5:10 pm: **Direct measurement of spectrally selective absorption enhancement in Fano resonance photonic crystal cavities on plastic substrates**, Li Chen, Hongjun Yang, Zexuan Qiang, The Univ. of Texas at Arlington (USA); Lei Sun, Zhenqiang Ma, Univ. of Wisconsin-Madison (USA); Ryan Pate, Adrienne Stiff-Roberts, Duke Univ. (USA); Jian Xu, The Pennsylvania State Univ. (USA); Gail J. Brown, Air Force Research Lab. (USA); Weidong Zhou, The Univ. of Texas at Arlington (USA) [7609-12]

5:30 pm: **An analytical approach for evaluating the optical spectrum emitted from a strongly coupled single quantum dot photonic-crystal cavity system**, Elahe Ahmadi, Hamid Reza Chalabi, Mina Bayat, Sina Khorasani, Sharif Univ. of Technology (Iran, Islamic Republic of) [7609-13]

Wednesday 27 January

SESSION 4

Room: 234 (Mezzanine) **Wed. 8:00 to 9:50 am**

Photonic Crystal Light Emitters

Session Chair: **Babak Momeni**, Georgia Institute of Technology

8:00 am: **Watt level performance of photonic crystal distributed feedback quantum cascade laser** (*Invited Paper*), Manijeh Razeghi, Burc Gokden, Yanbo Bai, Shaban R. Darvish, Steven Slivken, Northwestern Univ. (USA) [7609-14]

8:30 am: **High extraction efficiency LED based on embedded 2D air-gap GaN photonic crystals**, Elison Matori, Liz Rangel, Evelyn L. Hu, James S. Speck, Univ. of California, Santa Barbara (USA); Claude Weisbuch, Genewave (France) [7609-15]

8:50 am: **InGaAsSb LED arrays ($\lambda = 3.7 \mu\text{m}$) with photonic crystals**, Boris A. Matveev, Yurii M. Zadiranov, Aleksandr L. Zakgeim, Natalya Il'inskaya, Sergey Karandashev, Maxim Remenny, Nicolay Stus', Anna A. Usikova, Anton E. Cherniakov, Andrey Fedorov, Ioffe Physico-Technical Institute (Russian Federation) [7609-16]

9:10 am: **Optical characteristics of one-dimensional photonic crystal waist cavity laser**, Ju-Hyung Kang, Byeong-Hyeon Ahn, Myung-Ki Kim, Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7609-17]

9:30 am: **Comparisons between defect and band-edge modes of GaN photonic crystal membrane laser structures**, Cheng-Hung Lin, Jyh-Yang Wang, Cheng-Yen Chen, Kun-Ching Shen, Dong-Ming Yeh, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [7609-18]

Coffee Break 9:50 to 10:20 am

SESSION 5

Room: 234 (Mezzanine)Wed. 10:20 am to 12:00 pm

Dispersive and Nonlinear Properties of Photonic Crystals

Session Chair: Abdelkrim Khelif, Georgia Institute of Technology

10:20 am: **Cascaded silicon-nitride integrated spectrometers for wideband high-resolution spectral interrogation**, Babak Momeni, Ehsan Shah Hosseini, Ali Adibi, Georgia Institute of Technology (USA)[7609-19]

10:40 am: **An efficient self-collimating photonic crystal coupling technique in the RF regime**, Jerico N. Sabas, Iftekhar O. Mirza, Shouyuan Shi, Dennis W. Prather, Univ. of Delaware (USA)[7609-20]

11:00 am: **A photonic crystal flat lens at optical frequencies**, Frederique A. de Fornel, Loic Lalouat, Benoit Cluzel, Univ. de Bourgogne (France); Nathalie Fabre, Olivier Vanbesien, Didier Lippens, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France)[7609-21]

11:20 am: **Chip-scale photonic interconnects for reconfigurable computing**, Ahmed S. Sharkawy, EM Photonics, Inc. (USA); Mathew J. Zablocki, Shouyuan Shi, Univ. of Delaware (USA); Ozgenc Ebil, EM Photonics, Inc. (USA); Dennis W. Prather, Univ. of Delaware (USA)[7609-22]

11:40 am: **Compact Mach-Zehnder interferometer based on self-collimation of light in a compact photonic crystal**, Hoang Nguyen, Technische Univ. Delft (Netherlands)[7609-23]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 6

Room: 234 (Mezzanine)Wed. 1:30 to 3:10 pm

Three-dimensional Photonic Crystal Structures

1:30 pm: **Conformal coating of 3D polymeric photonic crystals fabricated by multiphoton lithography** (*Invited Paper*), Vincent W. Chen, Yunnan Fang, Ken H. Sandhage, Joseph W. Perry, Georgia Institute of Technology (USA)[7609-24]

2:00 pm: **Templating highly robust 3D photonic crystals** (*Invited Paper*), Shu Yang, Univ. of Pennsylvania (USA)[7609-25]

2:30 pm: **Five-beam holographic fabrication of 3D photonic crystal templates using a single diffractive optical element**, Yuankun Lin, Ahmad Harb, Karen Lozano, The Univ. of Texas-Pan American (USA); Di Xu, Kevin Chen, Univ. of Pittsburgh (USA)[7609-26]

2:50 pm: **GaAs-based woodpile photonic crystal fabricated by two-directional etching method**, Lingling Tang, Tomoyuki Yoshie, Duke Univ. (USA)[7609-27]

Coffee Break3:10 to 3:40 pm

SESSION 7

Room: 234 (Mezzanine)Wed. 3:40 to 5:40 pm

Phononic Crystal Structures

Session Chair: Shu Yang, Univ. of Pennsylvania

3:40 pm: **Optomechanical crystals** (*Invited Paper*), Oskar J. Painter, California Institute of Technology (USA)[7609-28]

4:10 pm: **Photonic crystal assisted high-efficiency photovoltaic generation** (*Invited Paper*), Ihab F. El-Kady, Sandia National Labs. (USA); Mehmet F. Su, B. Farfan, Mahmoud R. Taha, The Univ. of New Mexico (USA); Ting-Shan Luk, Sandia National Labs. (USA)[7609-29]

4:40 pm: **Compact high-Q phononic crystal resonators for wireless communications and sensing applications** (*Invited Paper*), Saeed Mohammadi, Ali Asghar Eftekhar, Abdelkrim Khelif, Ali Adibi, Georgia Institute of Technology (USA)[7609-30]

5:10 pm: **Elastic filter based on coupled resonator waveguides in phononic crystal slabs** (*Invited Paper*), Abdelkrim Khelif, Saeed Mohammadi, Ali Adibi, Georgia Institute of Technology (USA)[7609-31]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level)Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Large translation blueshift of the bandgap in the nonlinear photonic structures, Leila Dekkiche, Rafah Naoum, Lab. of Optical Communication and Microwaves (Algeria)[7609-53]

Simultaneous two-dimensional nanometric-scale position monitoring by probing a two-dimensional photonic crystal plate, Kuei-Chu Hsu, Chii-Chang Chen, Chia-Hua Chan, National Central Univ. (Taiwan); Pei-Fang Chung, Yin-Chieh Lai, National Chiao Tung Univ. (Taiwan)[7609-54]

Refraction properties of fcc and hcp SiO₂-based colloidal crystals, Juan C. Salcedo-Reyes, Pontificia Univ. Javeriana (Colombia)[7609-55]

Tunable birefringent selectively liquid-filled photonic bandgap fibers, Jia-Hong Liou, Sheng-Shuo Huang, Chin-Ping Yu, National Sun Yat-Sen Univ. (Taiwan)[7609-56]

Loss-reduced internally liquid-filled photonic crystal fibers, Jin-Hui Liu, Chin-Ping Yu, National Sun Yat-Sen Univ. (Taiwan)[7609-57]

2D periodic array of convex and concave nanostructures for the efficient SERS templates, Akira Zenidaka, Yuto Tanaka, Tomoya Miyanishi, Tetsuo Sakai, Minoru Obara, Keio Univ. (Japan)[7609-58]

Direct demonstration of photonic band-edge shift in a randomly mixed photonic crystal system, Sunghwan Kim, Hyojun Seok, Jeongkug Lee, Heonsu Jeon, Seoul National Univ. (Korea, Republic of)[7609-60]

Refractive index sensor based on fiber-coupled photonic crystal band-edge laser, Sunghwan Kim, Jeongkug Lee, Heonsu Jeon, Seoul National Univ. (Korea, Republic of)[7609-61]

Numerical investigation of photonic crystal microcavities in silicon-on-insulator waveguides, Sven Burger, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Frank Schmidt, Lin Zschiedrich, JCMwave GmbH (Germany)[7609-62]

Photonic band structure in a one-dimensional photonic crystal containing single-negative materials, Chien-Jang Wu, National Taiwan Normal University (Taiwan)[7609-65]

Negative refraction of Rayleigh waves through 2-D phononic crystals, Bernard Bonello, L. Belliard, J. Pierre, O. Boyko, Univ. Pierre et Marie Curie (France)[7609-66]

Thursday 28 January

SESSION 8

Room: 234 (Mezzanine)Thurs. 8:00 to 10:00 am

Photonic Crystal Fibers

Session Chair: Christian Grillet, The Univ. of Sydney (Australia)

8:00 am: **Recent applications of photonic crystal fibers** (*Invited Paper*), Philip S. J. Russell, The International Max-Planck Research School for Optics and Imaging (Germany)[7609-32]

8:30 am: **Double bandgap hollow-core photonic crystal fiber** (*Invited Paper*), Fetah A. Benabid, Francois Couny, Philip S. Light, Univ. of Bath (United Kingdom)[7609-33]

9:00 am: **Highly nonlinear photonic crystal fiber with high relative index core for dental OCT applications**, Taito Koga, Yoshinori Namihira, Tatsuya Kinjo, Shinya Nozaki, Univ. of the Ryukyus (Japan)[7609-34]

9:20 am: **Long-period fiber gratings based on liquid-filled photonic crystal fibers**, Chi-Ping Chen, Chin-Ping Yu, National Sun Yat-Sen Univ. (Taiwan)[7609-35]

9:40 am: **As₃S₂ suspended core microstructured optical fibers for mid-IR supercontinuum generation: modeling and experimental results**, Gilles Renversez, Univ. d'Aix-Marseille (France); Marcin Szpulak, Wroclaw Univ. of Technology (Poland); Mohammed El-Amraoui, Jean-Charles Jules, Gregory Gadret, Univ. de Bourgogne (France); Laurent Brilland, Johann Troles, Univ. de Rennes 1 (France); I. Skripatchev, C. Polacchini, Younes Messadeq, State Univ. of São Paulo (Brazil); Frédéric Smektala, Univ. de Bourgogne (France) .[7609-36]

Coffee Break10:00 to 10:30 am

SESSION 9

Room: 234 (Mezzanine)Thurs. 10:30 am to 12:20 pm

Novel Effects and Applications in Photonic Crystal Structures

Session Chair: Fetah A. Benabid, Univ. of Bath (United Kingdom)

10:30 am: **Chalcogenide glass photonic crystals: progress and prospects** (*Invited Paper*), Christian Grillet, Benjamin J. Eggleton, Michael W. Lee, The Univ. of Sydney (Australia); Xin Gai, Steve J. Madden, The Australian National Univ. (Australia); Christelle Monat, Snjezana Tomljenovic-Hanic, Eric C. Mägi, David J. Moss, The Univ. of Sydney (Australia); Duk-Yong Choi, Douglas Bulla, Barry Luther-Davies, The Australian National Univ. (Australia)[7609-37]

11:00 am: **Photonic crystal optofluidics for electrochromatography on a chip**, Moez Haque, Nicole Zacharia, Tariq Rafique, Stephen Ho, Ladan E. Abolghasemi, Peter R. Herman, Univ. of Toronto (Canada)[7609-38]

11:20 am: **Photonic crystal switching by the electrophoretic movement of dye ions**, Joshua D. Krabbe, Univ. of Alberta (Canada); Michael J. Brett, Univ. of Alberta (Canada) and National Institute for Nanotechnology (Canada) .[7609-39]

11:40 am: **Structural color printing: full color printing with single ink**, Hyoki Kim, Seoul National Univ. (Korea, Republic of); Jianping Ge, Univ. of California, Riverside (USA); Junhoi Kim, Sung-Eun Choi, Hosuk Lee, Howon Lee, Wook Park, Seoul National Univ. (Korea, Republic of); Yadong Yin, Univ. of California, Riverside (USA); Sunghoon Kwon, Seoul National Univ. (Korea, Republic of)[7609-40]

12:00 pm: **Photonic crystal filter integrated with photodiodes**, Chii-Chang Chen, Wei-Yu Chiu, National Central Univ. (Taiwan)[7609-41]

Lunch/Exhibition Break12:20 to 1:40 pm

SESSION 10

Room: 234 (Mezzanine)Thurs. 1:40 to 3:00 pm

Photonic Crystal Waveguides

Session Chair: Ali Adibi, Georgia Institute of Technology

1:40 pm: **Wide bandwidth photonic crystal waveguide bends** (*Invited Paper*), Murtaza Askari, Ali Adibi, Georgia Institute of Technology (USA)[7609-42]

2:00 pm: **Implementation scheme for phase switching through quantum dots in slow-light photonic crystal waveguide**, Jie Gao, Chee Wei Wong, Columbia Univ. (USA)[7609-43]

2:20 pm: **Low-dispersion slow-light in silicon-on-insulator slot photonic crystal waveguide**, Amir Hosseini, Ray T. Chen, Harish Subbaraman, David N. Kwong, The Univ. of Texas at Austin (USA)[7609-44]

2:40 pm: **Compact couplers for overmoded three-dimensional photonic crystal waveguides**, Benjamin Cowan, Ming-Chieh Lin, Tech-X Corp. (USA); Christopher McGuinness, Eric R. Colby, Robert J. England, Robert J. Noble, James E. Spencer, SLAC National Accelerator Lab. (USA); Robert L. Byer, Stanford Univ. (USA)[7609-45]

Coffee Break3:00 to 3:30 pm

SESSION 11

Room: 234 (Mezzanine)Thurs. 3:30 to 5:30 pm

Modeling and Simulation of Photonic Crystal Structures

Session Chair: Murtaza Askari, Georgia Institute of Technology

3:30 pm: **Metamaterial-inspired high-absorption surfaces for thermal infrared applications**, David W. Peters, Paul Davids, Joel R. Wendt, Alvaro A. Cruz-Cabrera, Sally Samora, Sandia National Labs. (USA)[7609-46]

3:50 pm: **Propagation loss analysis in photonic crystal waveguides using a complex-band technique**, Charles M. Reinke, Ali Asghar Eftekhar, Babak Momeni, Ali Adibi, Georgia Institute of Technology (USA); Xiaoguang Zhang, Oak Ridge National Lab. (USA)[7609-48]

4:10 pm: **A stable semi-analytical method for analysis of plasmonic propagation on periodically patterned metallic thin films**, Navid Yasrebi, Sina Khorasani, Hossein Karami Taheri, Bizhan Rashidian, Sharif Univ. of Technology (Iran, Islamic Republic of)[7609-49]

4:30 pm: **Surface modes of 1D photonic crystals in the regime of transmission and guidance**, Natalia Malkova, Sergey Polyakov, Alan Migdall, Garnett W. Bryant, National Institute of Standards and Technology (USA)[7609-50]

4:50 pm: **Influence of asymmetry on the band structure of photonic crystals**, Sina Khorasani, Seyyed Hesam Mousavi Mehr, Sharif Univ. of Technology (Iran, Islamic Republic of)[7609-51]

5:10 pm: **Ultracompact wave plates by air holes periodic dielectric waveguides**, Wenfu Zhang, Xi'an Institute of Optics and Precision Mechanics (China); Jihong Liu, Xi'an Institute of Post and Telecommunications (China); Wei-Ping Huang, McMaster Univ. (Canada); Wei Zhao, Xi'an Institute of Optics and Precision Mechanics (China)[7609-52]



Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling VII

Conference Chairs: **Kurt G. Eyink**, Air Force Research Lab.; **Frank Szmulowicz**, Univ. of Dayton Research Institute; **Diana L. Huffaker**, Univ. of California, Los Angeles

Program Committee: **Pallab K. Bhattacharya**, Univ. of Michigan; **C. Jeffrey Brinker**, Sandia National Labs.; **Dennis G. Deppe**, CREOL, The College of Optics and Photonics, Univ. of Central Florida; **Alfred W. B. Forchel**, Julius-Maximilians-Univ. Würzburg (Germany); **L. Jay Guo**, Univ. of Michigan; **Axel G. Hoffmann**, Technische Univ. Berlin (Germany); **Yong-Hee Lee**, Korea Advanced Institute of Science and Technology (Korea, Republic of); **Luke F. Lester**, The Univ. of New Mexico; **James A. Lott**, VI Systems GmbH (Germany); **Manijeh Razeghi**, Northwestern Univ.; **Kevin L. Silverman**, National Institute of Standards and Technology; **Jian Xu**, The Pennsylvania State Univ.

Sunday 24 January

SESSION 1

Room: 224 (Mezzanine) Sun. 8:00 to 10:10 am

Colloidal Quantum Dots I

8:00 am: **Quantum dot to high mobility charge carrier channel nonradiative resonant energy transfer: a new paradigm for solar energy conversion** (*Invited Paper*), Anupam Madhukar, Siyuan Lu, The Univ. of Southern California (USA) [7610-01]

8:30 am: **Exciton transfer for light harvesting and light emitting applications** (*Invited Paper*), Pavlos G. Lagoudakis, Univ. of Southampton (United Kingdom) [7610-02]

9:00 am: **Nonradiative energy transfer to colloidal nanocrystal quantum dots** (*Invited Paper*), Jian Xu, The Pennsylvania State Univ. (USA) . . . [7610-03]

9:30 am: **Numerical evidence of phonon memory effect in PbSe and CdSe quantum dots: ab initio and model calculations of carrier relaxation**, Dmitri S. Kilin, Univ. of Florida (USA) [7610-04]

9:50 am: **Effect of surface states on excitons in HgS dots**, Natalia Malkova, Garnett Bryant, National Institute of Standards and Technology (USA) . [7610-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 224 (Mezzanine) Sun. 10:40 am to 12:00 pm

Colloidal Quantum Dots II

10:40 am: **Quantum dot sensitized solar cells** (*Invited Paper*), Xiaowei Sun, Nanyang Technological Univ. (Singapore) [7610-06]

11:10 am: **Energy transfer and plasmon-exciton interaction in hybrid organic/inorganic nanocomposites** (*Invited Paper*), Thilo Stöferle, G. Raino, IBM Zürich Research Lab. (Switzerland); Ho-Cheol Kim, IBM Almaden Research Ctr. (USA); Rainer F. Mahrt, IBM Zürich Research Lab. (Switzerland) . . [7610-07]

11:40 am: **Luminescent thiol capped colloidal PbTe quantum dots synthesized using laser ablation**, Diogo Burigo Almeida, Eugenio Rodriguez, André A. de Thomaz, Luiz C. Barbosa, Univ. Estadual de Campinas (Brazil); Ernesto Villar Jiménez, Univ. de València (Spain); Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) [7610-08]

Lunch Break 12:00 to 1:20 pm

SESSION 3

Room: 224 (Mezzanine) Sun. 1:20 to 3:10 pm

Quantum Dot Growth

1:20 pm: **InGaAsSb quantum dots** (*Invited Paper*), Alfonso G. Taboada, Jose M. Ripalda, D. Alonso-Álvarez, B. Alén, A. Rivera, J. M. Llorens, J. Martin-Sanchez, Jorge M. García, Y. Gonzalez, L. Gonzalez, Instituto de Microelectrónica de Madrid (Spain); A. M. Sánchez, A. M. Beltrán, D. L. Sales, T. Ben, P. L. Galindo, S. I. Molina, Univ. de Cádiz (Spain); Robert Kudrawiec, Marcin Syperek, Jan Misiewicz, Wrocław Univ. of Technology (Poland); Murat Bozkurt, Jose María M. Ulloa, Paul M. Koenraad, Technische Univ. Eindhoven (Netherlands) [7610-09]

1:50 pm: **Capping effect of GaAsSb and InGaAsSb on the optical properties of type II GaSb/GaAs quantum dots**, J. He, C. J. Reyner, Anthony T. Lin, K. Nunna, Baolai Liang, Diana L. Huffaker, Univ. of California, Los Angeles (USA) [7610-10]

2:10 pm: **Change of InAs/GaAs quantum dot shape and composition during capping**, Holger Eisele, Andrea Lenz, Rainer Timm, Mario Dähne, Technische Univ. Berlin (Germany) [7610-11]

2:30 pm: **Growth of InAs/Sb:GaAs quantum dots by the antimony surfactant mediated metal organic chemical vapor deposition for laser fabrication in the 1.3 μm band**, Denis Guimard, The Univ. of Tokyo (Japan) and QD Laser Inc. (Japan); Damien Bordel, The Univ. of Tokyo (Japan) and LIMMS/CNRS-IIS (UMI 2820) (Japan); Mitsuru Ishida, Masao Nishioka, Yuki Wakayama, The Univ. of Tokyo (Japan); Yu Tanaka, Hisao Sudo, Tsuyoshi Yamamoto, Fujitsu Labs., Ltd. (Japan); Hayato Kondo, QD Laser Inc. (Japan); Mitsuru Sugawara, QD Laser Inc. (Japan) and Fujitsu Labs., Ltd. (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan) and Institute of Industrial Science (Japan) and LIMMS/CNRS-IIS (UMI 2820) (Japan) [7610-12]

2:50 pm: **The critical thickness of the 2D \rightarrow 3D transition of GaSb/GaAs quantum dots**, Holger Eisele, Rainer Timm, Andrea Lenz, Lena Ivanova, Mario Dähne, Technische Univ. Berlin (Germany) [7610-13]

Coffee Break 3:10 to 4:00 pm

SESSION 4

Room: 224 (Mezzanine) Sun. 4:00 to 5:30 pm

Laser I

4:00 pm: **Flying Q-bits and entangled photons** (*Invited Paper*), Dieter Bimberg, Anatol Lochmann, Irina A. Ostapenko, Gerald Höning, Sven Rodt, Andrei Schliwa, Erik Stock, Jan A. Töfflinger, Waldemar Unrau, Till Warming, Momme Winkelkemper, Technische Univ. Berlin (Germany); Vladimir A. Haisler, Aleksandr I. Toropov, Ashkat K. Bakarov, A. P. Moschenko, D. V. Dimitriev, Aleksandr K. Kalagin, Institute of Semiconductor Physics (Russian Federation) [7610-15]

4:30 pm: **Quantum dot photonic crystal waist cavity lasers**, Byeong-Hyeon Ahn, Ju-Hyung Kang, Myung-Ki Kim, Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7610-16]

4:50 pm: **Nonpolar InGaN quantum dots for semiconductor quantum light sources**, Yuh-Renn Wu, National Taiwan Univ. (Taiwan); Pei-Cheng Ku, Univ. of Michigan (USA) [7610-17]

5:10 pm: **Remote pumping of self-assembled quantum post using surface acoustic waves**, Hubert J. Krenner, Stefan Völkl, Florian Knall, Univ. Augsburg (Germany); Hyochul Kim, Jun He, Pierre M. Petroff, Univ. of California, Santa Barbara (USA); Achim Wixforth, Univ. Augsburg (Germany) [7610-18]

Monday 25 January

SESSION 5

Room: 224 (Mezzanine) Mon. 8:00 to 10:00 am

Ordered Structures

8:00 am: **Spatial and spectral control of individual quantum dots** (*Invited Paper*), Oliver G. Schmidt, Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden (Germany) [7610-19]

8:30 am: **Influence of ex-situ AFM treatment on epitaxial growth of self-organized InAs quantum dots** (*Invited Paper*), Nikita Y. Gordeev, Ioffe Physico-Technical Institute (Russian Federation) and St. Petersburg Physics and Technology Ctr. for Research and Education (Russian Federation); Vadim K. Goncharov, Vladimir M. Lantratov, Nikolay Kalyuzhnyy, Sergey Mintairov, Ioffe Physico-Technical Institute (Russian Federation); Pavel N. Brunkov, Ioffe Physico-Technical Institute (Russian Federation) and St. Petersburg State Polytechnical Univ. (Russian Federation) [7610-20]

9:00 am: **Surface plasmon resonance tunable and linear and nonlinear large responses of colloidal gold nanoparticles**, Eduardo J. S. Fonseca, Márcio A. R. C. Alencar, Cássio E. A. Santos, Sara F. A. Morais, Marcos A. Gelesky, Mario R. Meneghetti, Jandir M. Hickmann, Univ. Federal de Alagoas (Brazil)[7610-21]

9:20 am: **1.55- μm InAs quantum dot number and size control on truncated InP pyramids and integration by selective area epitaxy**, Hao Wang, Jiayue Yuan, Peter J. van Veldhoven, Richard Nötzel, Technische Univ. Eindhoven (Netherlands)[7610-37]

9:40 am: **Shape changes in patterned planar InAs as a function of thickness and temperature**, Kurt G. Eyink, Air Force Research Lab. (USA); Lawrence Grazulis, Univ. of Dayton Research Institute (USA); Krishnamurthy Mahalingam, Universal Technology Corp. (USA); Marlon Twyman, Jodie Shoaf, Southwestern Ohio Council for Higher Education (USA); John Hoelscher, Bruce Clafflin, Wright State Univ. (USA); David H. Tomich, Air Force Research Lab. (USA) ... [7610-22]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 224 (Mezzanine) Mon. 10:30 am to 12:10 pm

Laser II

10:30 am: **Submonolayer quantum dots for 850 nm-range VCSELs**, James A. Lott, VI Systems GmbH (Germany); Sergey A. Blokhin, Alexander Mutig, Gerrit Fiol, Technische Univ. Berlin (Germany); Vitaly A. Shchukin, Nikolay N. Ledentsov, VI Systems GmbH (Germany); Dieter Bimberg, Technische Univ. Berlin (Germany)[7610-23]

10:50 am: **Vertical-geometry all-optical switches based on InAs/GaAs quantum dots in a cavity**, Chaoyuan Jin, Osamu Kojima, Takashi Kita, Osamu Wada, Kobe Univ. (Japan); Mark Hopkinson, The Univ. of Sheffield (United Kingdom); Kouichi Akahane, National Institute of Information and Communications Technology (Japan)[7610-24]

11:10 am: **Theory of relaxation oscillations and modulation response of a quantum dot laser**, Levon V. Asryan, Virginia Polytechnic Institute and State Univ. (USA); Robert A. Suris, Ioffe Physico-Technical Institute (Russian Federation)[7610-25]

11:30 am: **Emission dynamic of the InAs quantum dots coupled to InGaAs quantum well**, Tomasz J. Ochalski, Nicola Pavarelli, Kamil Gradkowski, Guillaume Huyet, Tyndall National Institute (Ireland); Baolai Liang, Diana L. Huffaker, Univ. of California, Los Angeles (USA)[7610-26]

11:50 am: **Tunneling injection quantum dot laser: effect of the wetting layer**, Dae-Seob Han, Levon V. Asryan, Virginia Polytechnic Institute and State Univ. (USA)[7610-27]

Lunch Break 12:10 to 1:40 pm

SESSION 7

Room: 224 (Mezzanine) Mon. 1:40 to 3:20 pm

Quantum Wires and Additional Topics

1:40 pm: **Charge injection and transport in nanowires** (*Invited Paper*), Francois Leonard, Sandia National Labs., California (USA)[7610-28]

2:10 pm: **Lithography-free synthesis of 1D Au nanoparticle arrays encapsulated within freestanding silica nanowires** (*Invited Paper*), Theresa S. Mayer, Wenchong Hu, Bangzhi Liu, Yuwen Yu, Suzanne E. Mohney, The Pennsylvania State Univ. (USA)[7610-29]

2:40 pm: **The in-situ formation and electrical characterization of GaAs nanopillar P-N junctions on nanopatterned GaAs surfaces by MOCVD**, Ping-Show Wong, Andrew Lin, Giacomo Mariani, Pradeep N. Senanayake, Baolai Liang, Diana L. Huffaker, Univ. of California, Los Angeles (USA)[7610-30]

3:00 pm: **Coupled thermo-electromechanical effects in quantum dots and nanowires**, Roderick V. N. Melnik, Sunil R. Patil, Wilfrid Laurier Univ. (Canada); Olena Tsviliuk, JSC Rodovid Bank (Ukraine)[7610-31]

Coffee Break 3:20 to 3:50 pm

SESSION 8

Room: 224 (Mezzanine) Mon. 3:50 to 4:50 pm

Additional Topics

3:50 pm: **Controlling exciton states of self-assembled InAs/GaAs quantum dots with applied strain**, Natalia Malkova, Garnett W. Bryant, James S. Sims, National Institute of Standards and Technology (USA)[7610-32]

4:10 pm: **The effects of electric and magnetic field on the hydrogenic donor impurity in GaN/Al_xGa_{1-x}N spherical quantum dot**, Hailong Wang, Huiting Wu, Qufu Normal Univ. (China); Qian Gong, Songlin Feng, Shanghai Institute of Microsystem and Information Technology (China)[7610-33]

4:30 pm: **Purely radiative recombination up to room temperature in GaN/AlN QDs with microsecond decay times**, Bruno Gayral, Julien Renard, Commissariat à l'Énergie Atomique (France); Henri Mariette, Commissariat à l'Énergie Atomique (France) and Institut NEEL (France); Eva Monroy, Commissariat à l'Énergie Atomique (France)[7610-34]

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: E. Fred Schubert, Rensselaer Polytechnic Institute; **Liang-Chy Chien**, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Wednesday 27 January

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Optical characterization of ZnO nanoparticles and nanorods prepared by wet chemical technique at low temperature, Ravi Kumar, Krishna Murari, Ctr. of Excellence in Lasers and Optoelectronic Sciences (India) and Cochin Univ. of Science & Technology (India); Madana Kailasnath, International School of Photonics (India) and Cochin Univ. of Science & Technology (India); Padmanabhan Radhakrishnan, Ctr. of Excellence in Lasers and Optoelectronic Sciences (India) and Cochin Univ. of Science & Technology (India); Vadakedathu P. N. Nampoori, International School of Photonics (India) and Cochin Univ. of Science & Technology (India)[7610-35]

Optical properties in InGaAs quantum dots on SiO₂-patterned vicinal (001) GaAs substrate, Hyo Jin J. Kim, Sou Young Yoo, Hang Ju Ko, Myung-Soo Han, Doo-Gun Kim, Swook Hann, Seon Hoon Kim, Hyun Chul Ki, Korea Photonics Technology Institute (Korea, Republic of)[7610-36]

Ultrafast optical response of luminescent magnetic nanocomposites: CdSe/ZnS quantum dots encapsulated in gamma-Fe₂O₃ nanotubes, Guanjun You, Haiming Fan, Qinghua Xu, Singhai Tang, Thirumalai Venkatesan, National Univ. of Singapore (Singapore)[7610-38]

Possible integration of Ti-catalyzed silicon nanowires using APCVD method in silicon based electronics, Mohammad A. U. Usman, Mentor Graphics Corp. (USA) and Portland State Univ. (USA); Brady Smith, GE Healthcare (USA)[7610-39]

Advances in Photonics of Quantum Computing, Memory, and Communication III

Conference Chairs: **Zameer U. Hasan**, Temple Univ.; **Alan E. Craig**, Montana State Univ.; **Philip R. Hemmer**, Texas A&M Univ.; **Charles M. Santori**, Hewlett-Packard Labs.

Program Committee: **Dmitry Budker**, Univ. of California, Berkeley; **Jonathan P. Dowling**, Louisiana State Univ.; **Gurudev Dutt**, Univ. of Pittsburgh; **James D. Franson**, Univ. of Maryland, Baltimore County; **David H. Hughes**, Air Force Research Lab.; **Fedor Jelezko**, Univ. Stuttgart (Germany); **Hwang Lee**, Louisiana State Univ.; **Seth Lloyd**, Massachusetts Institute of Technology; **Aleksander K. Rebane II**, Montana State Univ., Bozeman; **Selim M. Shahriar**, Northwestern Univ.; **Alan Eli Willner**, Univ. of Southern California; **Joerg Wrachtrup**, Univ. Stuttgart (Germany); **Horace P. Yuen**, Northwestern Univ.; **M. Suhail Zubairy**, Texas A&M Univ.

Wednesday 27 January

SESSION 1

Room: 238 (Mezzanine)Wed. 8:00 to 10:30 am

Quantum Computation with Ions and Solid-State Impurities I

Session Chair: **Charles M. Santori**, Hewlett-Packard Labs.

8:00 am: **What is a quantum computer and how do we build one?** (*Invited Paper*), Pieter Kok, The Univ. of Sheffield (United Kingdom) . . .[7611-01]

8:25 am: **LPCVD of rare earth-doped multilayer structures for spectral storage applications** (*Invited Paper*), Francisco J. Bezares, Zameer U. Hasan, Temple Univ. (USA)[7611-02]

8:50 am: **Engineering and coherent control of single spins in diamond** (*Invited Paper*), David D. Awschalom, Univ. of California, Santa Barbara (USA)[7611-03]

9:15 am: **Intrinsic properties of the NV center in diamond** (*Invited Paper*), Neil B. Manson, Lachlan Rogers, Roger McMurtrie, The Australian National Univ. (Australia)[7611-04]

9:40 am: **Recent progress in quantum information processing with trapped ions** (*Invited Paper*), David Hanneke, National Institute of Standards and Technology (USA)[7611-05]

10:05 am: **Demonstration of an efficient quantum memory for light** (*Invited Paper*), Morgan P. Hedges, Matthew J. Sellars, Jevon J. Longdell, The Australian National Univ. (Australia)[7611-06]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: 238 (Mezzanine)Wed. 11:00 am to 12:05 pm

Quantum Computation with Ions and Solid-State Impurities II

Session Chair: **Hwang Lee**, Louisiana State Univ.

11:00 am: **Observation of the dynamic Jahn-Teller effect in the excited states of nitrogen-vacancy centers in diamond**, Kai-Mei C. Fu, Charles M. Santori, Paul E. Barclay, Hewlett-Packard Labs. (USA); Lachlan Rogers, Neil B. Manson, The Australian National Univ. (Australia); Raymond G. Beausoleil, Hewlett-Packard Labs. (USA)[7611-07]

11:15 am: **NV centers in diamond nanopillars** (*Invited Paper*), Nima Dinyari, Hailin Wang, Univ. of Oregon (USA)[7611-08]

11:40 am: **High-Q microcavities coupled to NV-centers in single crystal diamond** (*Invited Paper*), Paul E. Barclay, Kai-Mei C. Fu, Charles M. Santori, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA)[7611-09]

Lunch/Exhibition Break 12:05 to 1:40 pm

SESSION 3

Room: 238 (Mezzanine)Wed. 1:40 to 3:10 pm

Quantum Communication

Session Chair: **Zameer U. Hasan**, Temple Univ.

1:40 pm: **Optimization of linear optical quantum computing circuits** (*Invited Paper*), Jonathan Dowling, Louisiana State Univ. (USA)[7611-10]

2:05 pm: **Approaches to Heisenberg-limited quantum sensing using coherent states** (*Invited Paper*), Christopher C. Gerry, Lehman College (USA)[7611-11]

2:30 pm: **Noiseless linear amplification and distillation of entanglement** (*Invited Paper*), Geoff J. Pryde, Griffith Univ. (Australia)[7611-12]

2:55 pm: **Quantum tripwire**, Petr M. Anisimov, Blane McCracken, Daniel Lum, Jonathan P. Dowling, Louisiana State Univ. (USA)[7611-14]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 238 (Mezzanine)Wed. 3:40 to 4:55 pm

Tailoring Quantum States for Computing

Session Chair: **Jelena Vuckovic**, Stanford Univ.

3:40 pm: **Photonic quantum circuits and its application** (*Invited Paper*), Shigeki Takeuchi, Hokkaido Univ. (Japan)[7611-15]

4:05 pm: **Tailored state preparation for solid-state quantum memory** (*Invited Paper*), Elizabeth A. Goldschmidt, Joint Quantum Institute (USA); Sarah E. Beavan, The Australian National Univ. (Australia); Jingyun Fan, Sergey V. Polyakov, Joint Quantum Institute (USA); Alan L. Migdall, National Institute of Standards and Technology (USA)[7611-16]

4:30 pm: **Maximum coherence in optical transitions in rare earth ion-activated solids** (*Invited Paper*), Aleksander K. Rebane II, Rupavatharam Krishna Mohan, Charles W. Thiel, Montana State Univ. (USA)[7611-17]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level)Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Tapered fiber coupling to microspheres at cryogenic temperature, Hideaki Takashima, Hokkaido Univ. (Japan) and The Institute of Scientific and Industrial Research (Japan); Kiyota Toubaru, The Institute of Scientific and Industrial Research (Japan); Masazumi Fujiwara, Hokkaido Univ. (Japan) and The Institute of Scientific and Industrial Research (Japan); Hideki Fujiwara, Keiji Sasaki, Hokkaido Univ. (Japan); Shigeki Takeuchi, Hokkaido Univ. (Japan) and The Institute of Scientific and Industrial Research (Japan)[7611-34]

Thursday 28 January

SESSION 5

Room: 238 (Mezzanine)Thurs. 8:00 to 9:55 am

Integrated Quantum Information Processing in Semiconductors I

Session Chair: Philip R. Hemmer, Texas A&M Univ.

8:00 am: **Fast optically driven spin qubit gates in an InAs quantum dot** (*Invited Paper*), Erik D. Kim, Univ. of Michigan (USA) and Stanford Univ. (USA); Katherine Smirl, Xiaodong Xu, Bo Sun, Paul R. Berman, Duncan G. Steel, Univ. of Michigan (USA); Allan S. Bracker, Daniel G. Gammon, Naval Research Lab. (USA); Lu Jeu Sham, Univ. of California, San Diego (USA)[7611-20]

8:25 am: **Ultrafast optical spin echo for electron spins in semiconductors** (*Invited Paper*), Susan M. Clark, Stanford Univ. (USA); Kai-Mei C. Fu, Hewlett-Packard Labs (USA); Qiang Zhang, Thaddeus D. Ladd, Stanford Univ. (USA) and National Institute of Informatics (Japan); Colin R. Stanley, Univ. of Glasgow (United Kingdom); Yoshihisa Yamamoto, Stanford Univ. (USA) and National Institute of Informatics (Japan)[7611-21]

8:50 am: **Ultrafast optical spin echo of a single electron spin in a quantum dot**, Kristiaan De Greve, David L. Press, Stanford Univ. (USA); Thaddeus Ladd, Stanford Univ. (USA) and National Institute of Informatics (Japan); Benedikt Friess, Julius-Maximilians-Univ. Würzburg (Germany); Peter McMahon, Julius-Maximilians-Univ. Würzburg (USA); Christian Schneider, Martin Kamp, Sven Hoefling, Alfred W. B. Forchel, Julius-Maximilians-Univ. Würzburg (Germany); Yoshihisa Yamamoto, Stanford Univ. (USA) and National Institute of Informatics (Japan)[7611-22]

9:05 am: **Optical manipulation of quantum dot excitons strongly coupled to photonic crystal cavities** (*Invited Paper*), Jelena Vuckovic, Stanford Univ. (USA); Andrei Faraon, HP Labs. (USA); Arka Majumdar, Carter Lin, Stanford Univ. (USA); Dirk R. Englund, Columbia Univ. (USA)[7611-23]

9:30 am: **Optically probing and controlling two coupled quantum dots** (*Invited Paper*), Daniel G. Gammon, Naval Research Lab. (USA)[7611-24]

Coffee Break9:55 to 10:25 am

SESSION 6

Room: 238 (Mezzanine)Thurs. 10:25 to 11:45 am

Integrated Quantum Information Processing in Semiconductors II

Session Chair: Philip R. Hemmer, Texas A&M Univ.

10:25 am: **Direct measurement of quantum dot spin dynamics using resonance fluorescence** (*Invited Paper*), Mete Atature, Univ. of Cambridge (United Kingdom)[7611-25]

10:50 am: **Coherent control of quantum emitters in cavities** (*Invited Paper*), Chih-Kang Shih, A. Muller, Edward B. Flagg, The Univ. of Texas at Austin (USA); Dennis G. Deppe, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Gregory J. Salamo, Univ. of Arkansas (USA)[7611-26]

11:15 am: **Integrated photonic crystal networks with coupled quantum dots**, Andrei Faraon, Arka Majumdar, Stanford Univ. (USA); Dirk R. Englund, Harvard Univ. (USA); Ziliang Lin, Jelena Vuckovic, Stanford Univ. (USA)[7611-27]

11:30 am: **Optimal pulse to generate non-classical photon states via photon blockade**, Arka Majumdar, Andrei Faraon, Jelena Vuckovic, Stanford Univ. (USA)[7611-28]

Lunch/Exhibition Break11:45 am to 1:15 pm

SESSION 7

Room: 238 (Mezzanine)Thurs. 1:15 to 3:15 pm

Quantum Imaging and Metrology

Session Chair: Jonathan P. Dowling, Louisiana State Univ.

1:15 pm: **Quantum metrology with cold atoms** (*Invited Paper*), Mark A. Kasevich, Stanford Univ. (USA)[7611-29]

1:40 pm: **Optimal quantum measurements for optical phase** (*Invited Paper*), Hwang Lee, Louisiana State Univ. (USA)[7611-30]

2:05 pm: **Imaging by means of quantum nonlinear optics** (*Invited Paper*), Robert W. Boyd, Univ. of Rochester (USA)[7611-31]

2:30 pm: **Entanglement-boosted bright-source interferometry**, William N. Plick, Petr M. Anisimov, Jonathan P. Dowling, Hearne Institute for Theoretical Physics (USA)[7611-32]

2:45 pm: **Sub-Rayleigh quantum imaging** (*Presentation Only*), Lorenzo Maccone, Massachusetts Institute of Technology (USA)[7611-33]

3:00 pm: **Single photon detection system based on superconducting nanowires for quantum communication**, Labao Zhang, Lin Kang, Jian Chen, Weiwei Xu, Peiheng Wu, Nanjing Univ. (China)[7611-35]

Advances in Slow and Fast Light III

Conference Chairs: **Selim M. Shahriar**, Northwestern Univ.; **Philip R. Hemmer**, Texas A&M Univ.

Program Committee: **Raymond G. Beausoleil**, Hewlett-Packard Labs.; **Alan E. Craig**, Montana State Univ.; **Shanhui Fan**, Stanford Univ.; **Daniel J. Gauthier**, Duke Univ.; **Kohzo Hakuta**, The Univ. of Electro-Communications (Japan); **Ortwin Hess**, Univ. of Surrey (United Kingdom); **John C. Howell**, Univ. of Rochester; **Jacob B. Khurgin**, The Johns Hopkins Univ.; **Jacob Scheuer**, Tel Aviv Univ. (Israel); **Holger Schmidt**, Univ. of California, Santa Cruz; **M. Suhail Zubairy**, Texas A&M Univ.

Monday 25 January

SESSION 1

Room: 232 (Mezzanine) Mon. 8:00 to 10:20 am

Slow Light in Optical Fibers

Session Chair: **Jacob Scheuer**, Tel Aviv Univ. (Israel)

- 8:00 am: **EIT-based slow and fast light in an all-fiber system** (*Invited Paper*), Fetah A. Benabid, Univ. of Bath (United Kingdom) [7612-01]
- 8:25 am: **All-optical SBS avalanche detector** (*Invited Paper*), Michael J. Steiner, U.S. Naval Research Lab. (USA) [7612-02]
- 8:50 am: **Optical fiber microcoil delay line** (*Invited Paper*), Mikhail Sumetsky, OFS (USA) [7612-03]
- 9:15 am: **Slow light propagation using optical nanofibers** (*Invited Paper*), Kohzo Hakuta, The Univ. of Electro-Communications (Japan) [7612-04]
- 9:40 am: **Slow light applications of forward stimulated Brillouin scattering** (*Invited Paper, Presentation Only*), Daniel J. Gauthier, Duke Univ. (USA) [7612-05]
- 10:05 am: **Spatial and temporal evolution of transient stimulated-Brillouin-scattering slow-light pulse in an optical fiber**, Liyong Ren, Xi'an Institute of Optics and Precision Mechanics (China); Yasuo Tomita, The Univ. of Electro-Communications (Japan) [7612-06]
- Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 232 (Mezzanine) Mon. 10:50 to 11:55 am

Slow Light in Atomic Vapor and Cavity QED

Session Chair: **Gour Shyam Pati**, Northwestern Univ.

- 10:50 am: **Electromagnetically-induced transparency and slow and fast light in a room-temperature vapor of 4He*** (*Invited Paper*), Rupamanjari Ghosh, Jawaharlal Nehru Univ. (India); F. Goldfarb, Fabien Bretenaker, Univ. Paris-Sud 11 (France); Joyee Ghosh, Jawaharlal Nehru Univ. (India) [7612-07]
- 11:15 am: **Recent developments in the study of slow and fast light in a vapor** (*Invited Paper*), Ronald Walsworth, Harvard-Smithsonian Ctr. for Astrophysics (USA); Yanhong Xiao, Fudan Univ. (China) [7612-08]
- 11:40 am: **Slow light in Cesium vapor: pulse delay measurements and predicted delay**, Monte D. Anderson, Glen P. Perram, Air Force Institute of Technology (USA) [7612-10]
- Lunch Break 11:55 am to 1:30 pm

SESSION 3

Room: 232 (Mezzanine) Mon. 1:30 to 3:00 pm

Application of Slow and Fast Light I

Session Chair: **Jacob B. Khurgin**, The Johns Hopkins Univ.

- 1:30 pm: **Coupled resonator gyroscopes: what works and what does not** (*Invited Paper*), Michel J. F. Digonnet, Matthew A. Terrel, Shanhui Fan, Stanford Univ. (USA) [7612-11]
- 1:55 pm: **Symmetry induced modal dispersion in CROWs** (*Invited Paper*), Jacob Scheuer, Tel Aviv Univ. (Israel) [7612-12]
- 2:20 pm: **Prospect for development of pulsed CPT Raman-Ramsey clock using atomic vapor** (*Invited Paper*), Gour S. Pati, Northwestern Univ. (USA); Fredrik K. Fatemi, Mark Bashkansky, U.S. Naval Research Lab. (USA); Selim M. Shahriar, Northwestern Univ. (USA) [7612-13]
- 2:45 pm: **Simulated investigation of high-sensitive slow light interferometer**, Yun-Dong Zhang, Yuanxue Cai, Chaobo Yang, Harbin Institute of Technology (China); Yuhua Zhang, Harbin Normal Univ. (China); Boshi Dang, Ping Yuan, Sheng Qiang, Harbin Institute of Technology (China) [7612-14]
- Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 232 (Mezzanine) Mon. 3:30 to 4:45 pm

Application of Slow and Fast Light II

Session Chair: **Thomas F. Krauss**, Univ. of St. Andrews (United Kingdom)

- 3:30 pm: **Slow and stopped images** (*Invited Paper*), John C. Howell, Univ. of Rochester (USA) [7612-15]
- 3:55 pm: **New applications of slow and fast light** (*Invited Paper*), Robert W. Boyd, Univ. of Rochester (USA) [7612-16]
- 4:20 pm: **Superluminal laser: properties and applications** (*Invited Paper*), Honam Yum, Texas A&M Univ. (USA) and Northwestern Univ. (USA); Ye Wang, Northwestern Univ. (USA); Philip R. Hemmer, Texas A&M Univ. (USA); Selim M. Shahriar, Northwestern Univ. (USA) [7612-17]

SESSION 5

Room: 232 (Mezzanine) Mon. 4:45 to 5:50 pm

Theoretical Issues in Slow and Fast Light

- 4:45 pm: **Nonanalytical points and the speed of information in a fast light medium**, Wagner F. Silva, Márcio A. R. C. Alencar, Dilson Pereira Caetano, Jandir M. Hickmann, Optics and Materials Group (Brazil) [7612-18]
- 5:00 pm: **Why slow light and fast light are different** (*Invited Paper*), Jacob B. Khurgin, The Johns Hopkins Univ. (USA) [7612-19]
- 5:25 pm: **Non-linear interactions in electromagnetically induced transparency and related pump-probe optical phenomena in moving atomic systems** (*Invited Paper*), Verne L. Jacobs, U.S. Naval Research Lab. (USA) [7612-20]

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Liang-Chy Chien**, Kent State Univ.

- 8:30 am: **Introduction and Opening Remarks**
- 8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)
- 9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 232 (Mezzanine) Tues. 10:30 am to 12:00 pm

Slow Light in Photonic Crystals and Waveguides

Session Chair: Robert W. Boyd, Univ. of Rochester

10:30 am: **Understanding the rich physics of light propagation in slow photonic crystal waveguides** (*Invited Paper*), Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) [7612-21]

10:55 am: **Coupled cavities and band-edge slow-light in periodic waveguides** (*Invited Paper*), Andrey A. Sukhorukov, The Australian National Univ. (Australia) [7612-22]

11:20 am: **On-chip studies of slow and fast light** (*Invited Paper*), Michal F. Lipson, Cornell Univ. (USA) [7612-23]

11:45 am: **Fast optical correlator via thermal delay tuning in photonic crystal coupled waveguide**, Norihiro Ishikura, Jun Adachi, Toshihiko Baba, Yokohama National Univ. (Japan) and JST-CREST (Japan) [7612-24]

Lunch/Exhibition Break 12:00 to 1:00 pm

SESSION 7

Room: 232 (Mezzanine) Tues. 1:00 to 2:30 pm

Slow Light in Microresonators and Semiconductor Structures

Session Chair: John C. Howell, Univ. of Rochester

1:00 pm: **High-Q passive and active microresonators for dispersion and delay line applications** (*Invited Paper*), Yannick Dumeige, Stephane Trébaol, Patrice Féron, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) [7612-25]

1:25 pm: **Tuning of microring resonators** (*Invited Paper*), Shayan Mookherjee, Univ. of California, San Diego (USA) [7612-26]

1:50 pm: **Slow and fast light propagation in bulk semiconductors: spectral averaging and pulse distortion effects** (*Invited Paper*), Rolf H. Binder, Baijie Gu, Nai-Hang Kwong, College of Optical Sciences, The Univ. of Arizona (USA) [7612-27]

2:15 pm: **Nonlinear distortion and spurious-free dynamic range of a tunable delay line based on slow light in SOA**, Perrine Berger, Thales Research & Technology (France) and Laboratoire Aimé Cotton (France); Jérôme Bourderionnet, Thales Research & Technology (France); Mehdi Alouini, Institut de Physique de Rennes (France) and Thales Research & Technology (France); Daniel Dolfi, Thales Research & Technology (France); Fabien Bretenaker, Laboratoire Aimé Cotton (France) [7612-28]

SESSION 8

Room: 232 (Mezzanine) Tues. 2:30 to 3:45 pm

Slow Light in Metamaterials and Other Complex Media

Session Chair: Uriel Levi, The Hebrew Univ. of Jerusalem (Israel)

2:30 pm: **Control of group velocity in metamaterials** (*Invited Paper*), Meir Orenstein, Gilad Rosenblatt, Pavel Ginzburg, Technion-Israel Institute of Technology (Israel) [7612-29]

2:55 pm: **Recent developments in the study of slow light in complex photonic materials** (*Invited Paper*), Ortwin Hess, Univ. of Surrey (United Kingdom) [7612-30]

3:20 pm: **Silicon photonics and silicon plasmonics for slow light applications** (*Invited Paper*), Uriel Levi, The Hebrew Univ. of Jerusalem (Israel) [7612-31]

Coffee Break 3:45 to 4:00 pm

SESSION 9

Room: 232 (Mezzanine) Tues. 4:00 to 6:05 pm

Slow Light for Quantum Optics, Microwave Photonics and Other Topics

Session Chair: Kohzo Hakuta, The Univ. of Electro-Communications (Japan)

4:00 pm: **Modulation of single photons** (*Invited Paper*), Chih-Sung Chuu, Chinmay Belthangady, Guang-Yu Yin, Stephen E. Harris, Stanford Univ. (USA) [7612-32]

4:25 pm: **Disorder-immune slow light with topological electromagnetic modes** (*Invited Paper*), Zheng H. Wang, Massachusetts Institute of Technology (USA) [7612-33]

4:50 pm: **Raman amplification in light-stopping systems** (*Invited Paper*), Michelle L. Povinelli, Stanford Univ. (USA) [7612-34]

5:15 pm: **Recent advances in slow and fast light for applications in microwave photonics** (*Invited Paper*), Jesper Mørk, Weiqi Xue, Yaohui Chen, Soeren Blaaberg, Technical Univ. of Denmark (Denmark); Salvador Sales, Jose Capmany, Univ. Politécnic de Valencia (Spain) [7612-35]

5:40 pm: **Pulse propagation in two-photon resonance media** (*Invited Paper*), Aleksander K. Rebane II, Montana State Univ. (USA) [7612-36]



Complex Light and Optical Forces IV

Conference Chair: Enrique J. Galvez, Colgate Univ. **Conference Co-Chairs:** David L. Andrews, Univ. of East Anglia Norwich (United Kingdom); Jesper Glückstad, Technical Univ. of Denmark (Denmark)

Program Committee: Nicholas P. Bigelow, Univ. of Rochester; Shu-Chun Chu, National Cheng Kung Univ. (Taiwan); Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Wolfgang A. Ertmer, Leibniz Univ. Hannover (Germany); Jean-Marc R. Fournier, Ecole Polytechnique Fédérale de Lausanne (Switzerland); David G. Grier, New York Univ.; Gerard Nienhuis, Leiden Univ. (Netherlands); Miles J. Padgett, Univ. of Glasgow (United Kingdom); Monika A. Ritsch-Marte, Innsbruck Medical Univ. (Austria); Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia); Marat S. Soskin, Institute of Physics (Ukraine); Grover A. Swartzlander, Jr., Rochester Institute of Technology; Juan P. Torres, ICFO - Instituto de Ciencias Fotónicas (Spain); Ewan M. Wright, College of Optical Sciences, The Univ. of Arizona

Wednesday 27 January

SESSION 1

Room: 226 (Mezzanine)Wed. 8:00 to 10:20 am

New Complex Light Beams

Session Chair: Enrique J. Galvez, Colgate Univ.

8:00 am: **Generation of structured beams in large-Fresnel number degenerate cavities and beam transformation with orbital angular momentum** (*Invited Paper*), Ting-Hua Lu, National Taiwan Normal Univ. (Taiwan); Yu-Chieh Lin, Yung-Fu Chen, Kai-Feng Huang, National Chiao Tung Univ. (Taiwan)[7613-01]

8:40 am: **Selective excitation of high-order laser modes and its application to vortex array laser beams generation** (*Invited Paper*), Shu-Chun Chu, National Cheng Kung Univ. (Taiwan); Kenju Otsuka, Tokai Univ. (Japan)[7613-02]

9:20 am: **Optical twists in both phase and amplitude profile** (*Invited Paper*), Vincent R. Daria, The Australian National Univ. (Australia); Darwin Palima, Peter John L. Rodrigo, Jesper Glückstad, Technical Univ. of Denmark (Denmark)[7613-03]

10:00 am: **Stokes polarimetry of a hybrid vector polarization beam from a spun optical fiber**, Giovanni Milione, Henry I. Sztul, Robert R. Alfano, The City College of New York (USA); Daniel A. Nolan, Xi Chen, Joohyun Koh, Corning Inc. (USA)[7613-04]

Coffee Break10:20 to 10:50 am

SESSION 2

Room: 226 (Mezzanine)Wed. 10:50 am to 12:10 pm

Complex Light Generation

Session Chair: David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

10:50 am: **Optical singularities induced in a nematic-cell doped by carbon nanotubes** (*Invited Paper*), Vladislav V. Ponevchinsky, Institute of Physics (Ukraine); Andrey N. Goncharuk, F. D. Ovcharenko Institute of Biocolloidal Chemistry (Ukraine); Vasilii Vasil'ev, Institute of Physics (Ukraine); Nikolay Lebovka, F. D. Ovcharenko Institute of Biocolloidal Chemistry (Ukraine); Marat S. Soskin, Institute of Physics (Ukraine)[7613-05]

11:30 am: **Generic dark hollow beams using negative cones chemically etched in fiber tips**, Nirmal K. Viswanathan, Geo M. Philip, Univ. of Hyderabad (India)[7613-06]

11:50 am: **Orbital angular momentum experiments with broadband few cycle pulses**, Asmus N. Richter, Martin Bock, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Juergen Jahns, FernUniv. in Hagen (Germany); Ruediger Grunwald, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany)[7613-07]

Lunch/Exhibition Break12:10 to 1:30 pm

SESSION 3

Room: 226 (Mezzanine)Wed. 1:30 to 3:30 pm

Optical Forces

Session Chair: Marat S. Soskin, Institute of Physics (Ukraine)

1:30 pm: **The electrodynamic mechanisms of optical binding** (*Invited Paper*), David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)[7613-08]

2:10 pm: **Non-conservative forces in optical tweezers and Brownian vortexes**, Bo Sun, Alexander Y. Grosberg, David G. Grier, New York Univ. (USA)[7613-09]

2:30 pm: **Fast and precise measurements of particle charge with optical trapping electrophoresis**, Filip Beunis, Univ. Gent (Belgium) and ICFO - Instituto de Ciencias Fotónicas (Spain); Dmitri Petrov, ICFO - Instituto de Ciencias Fotónicas (Spain); Bart Verboven, Filip Strubbe, Kristiaan Neyts, Univ. Gent (Belgium)[7613-10]

2:50 pm: **Spiral imaging of a sphere**, Dmitri Petrov, Nicolas Rahuel, Lluis Torner, ICFO - Institut de Ciencias Fotónicas (Spain)[7613-11]

3:10 pm: **NanoTracker: force-sensing optical tweezers for quantitative single-molecule nanomanipulation**, Helge Eggert, Joost van Mameren, Anna Wozniak, Torsten Jaehnke, JPK Instruments AG (Germany)[7613-12]

Coffee Break3:30 to 4:00 pm

SESSION 4

Room: 226 (Mezzanine)Wed. 4:00 to 5:20 pm

Topological Phases and Effects

Session Chair: Wolfgang A. Ertmer, Leibniz Univ. Hannover (Germany)

4:00 pm: **Observation of linear, nonlinear, and singular behavior of the Pancharatnam-Berry phase** (*Invited Paper*), Taco D. Visser, Delft Univ. of Technology (Netherlands); Thomas van Dijk, Hugo F. Schouten, Vrije Univ. Amsterdam (Netherlands)[7613-13]

4:40 pm: **Geometric phases in astigmatic paraxial modes of all orders**, Steven J. M. Habraken, Gerard Nienhuis, Leiden Univ. (Netherlands)[7613-14]

5:00 pm: **New polarization singularities of partially coherent light beams**, Marat S. Soskin, Institute of Physics (Ukraine); Peter V. Polyanskii, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine)[7613-15]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level)Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Optimisation of sub-micron optical waveguides for propulsion of nanoparticles and nanowires, Olav G. Hellesø, Univ. of Tromsø (Norway); Delphine Neel, Institut d'Electronique Fondamentale (France); Stéphane Gétin, Lab. d'Electronique de Technologie de l'Information (France); Balpreet S. Ahluwalia, Univ. of Tromsø (Norway)[7613-31]

Creating optical vortex modes with a single cylinder lens, Hamsa Sridhar, Martin G. Cohen, John W. Noe, Stony Brook Univ. (USA)[7613-33]

Thursday 28 January

SESSION 5

Room: 226 (Mezzanine)Thurs. 8:30 to 10:10 am

Propagation in Media

Session Chair: Gerard Nienhuis, Leiden Univ. (Netherlands)

- 8:30 am: **Spin-orbit interactions of light** (*Invited Paper*), Konstantin Y. Bliokh, National Univ. of Ireland, Galway (Ireland)[7613-16]
- 9:10 am: **Propagation of a hybrid vector polarization beam in a uniaxial crystal**, Giovanni Milione, Henry I. Sztul, Robert R. Alfano, The City College of New York (USA)[7613-17]
- 9:30 am: **Rotational frequency shift in cylindrical vector beam due to skew rays in few-mode optical fibers**, Nirmal K. Viswanathan, Krishna V. Inavalli, Univ. of Hyderabad (India)[7613-18]
- 9:50 am: **Singular trajectories space-time domain topology of developing speckle field**, Vasilii Vasil'ev, Marat S. Soskin, Institute of Physics (Ukraine)[7613-19]
- Coffee Break10:10 to 10:40 am

SESSION 6

Room: 226 (Mezzanine)Thurs. 10:40 am to 12:00 pm

Quantum Effects

Session Chair: Marat S. Soskin, Institute of Physics (Ukraine)

- 10:40 am: **Quantum imaging and orbital angular momentum** (*Invited Paper*), Jonathan Leach, Barry Jack, Jacqui Romero, Sonja Franke-Arnold, Univ. of Glasgow (United Kingdom); Anand Jha, Robert W. Boyd, Univ. of Rochester (USA); Stephen M. Barnett, Univ. of Strathclyde (United Kingdom); Monika Ritsch-Marte, Medizinische Univ. Innsbruck (Austria); Miles Padgett, Univ. of Glasgow (United Kingdom)[7613-20]
- 11:20 am: **Extending optical entanglement into higher dimensions**, Charles C. Harb, The Univ. of New South Wales (Australia); Jiri Janousek, Katherine Wagner, Hans A. Bachor, The Australian National Univ. (Australia)[7613-21]
- 11:40 am: **Helical-mode interference of photons and biphotons**, Enrique J. Galvez, Laura E. Coyle, Erik Johnson, Benjamin Reschovsky, Colgate Univ. (USA)[7613-22]
- Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 7

Room: 226 (Mezzanine)Thurs. 1:30 to 3:10 pm

Optical Manipulation

Session Chair: David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

- 1:30 pm: **Off-axis binding and induced circulation in counter-propagating beam traps** (*Invited Paper*), Gordon D. Love, Jonathan M. Taylor, Durham Univ. (United Kingdom)[7613-23]
- 2:10 pm: **Geometrical configurations in optical binding**, Luciana C. Davila Romero, David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)[7613-24]
- 2:30 pm: **Optical forces in biophotonics: transfection and cell sorting**, Wolfgang A. Ertmer, Leibniz Univ. Hannover (Germany); Heiko Meyer, Raoul Lorbeer, Gerald Bergmann, Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany); Hugo Murua Escoboar, Ingo Nolte, Stiftung Tierärztliche Hochschule Hannover (Germany); Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany)[7613-25]
- 2:50 pm: **Integrated platform based on high-refractive index contrast waveguide for optical guiding and sorting**, Balpreet Singh Ahluwalia, Olav Gaute Hellesø, Univ. of Tromsø (Norway); Ananth Z. Subramanian, James S. Wilkinson, Univ. of Southampton (United Kingdom); Jie Chen, Xuyuan Chen, Vestfold Univ. College (Norway)[7613-26]
- Coffee Break3:10 to 3:40 pm

SESSION 8

Room: 226 (Mezzanine)Thurs. 3:40 to 5:20 pm

Complex Light in Free Space

Session Chair: Enrique J. Galvez, Colgate Univ.

- 3:40 pm: **A new twist on three-dimensional light fields** (*Invited Paper*), Rafael Piestun, Univ. of Colorado at Boulder (USA)[7613-27]
- 4:20 pm: **Velocity of optical Airy beams**, Henry I. Sztul, Giovanni Milione, Robert R. Alfano, The City College of New York (USA)[7613-28]
- 4:40 pm: **Collinear non-diffracting beams: classification and properties**, Balpreet S. Ahluwalia, Univ. of Tromsø (Norway); Woei M. Lee, Univ. of St. Andrews (United Kingdom)[7613-29]
- 5:00 pm: **Noise-reduction for fringe analysis using the empirical-mode decomposition with the generalized analysis model**, Chen-Wei Lee, Wei-Hung Su, Chao-Kuei Lee, National Sun Yat-Sen Univ. (Taiwan)[7613-30]

Laser Refrigeration of Solids III

Conference Chairs: **Richard I. Epstein**, Los Alamos National Lab.; **Mansoor Sheik-Bahae**, The Univ. of New Mexico

Program Committee: **Rolf H. Binder**, College of Optical Sciences, The Univ. of Arizona; **Zameer U. Hasan**, Temple Univ.; **Jacob B. Khurgin**, The Johns Hopkins Univ.; **Yong-Hang Zhang**, Arizona State Univ.

Wednesday 27 January

Posters–Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Light-down versus light-up conversion in radiative cooling of semiconductors, Volodymyr K. Malyutenko, V. Lashkaryov Institute of Semiconductor Physics (Ukraine) [7614-14]

Thursday 28 January

SESSION 1

Room: 232 (Mezzanine) Thurs. 8:30 to 10:00 am

Solid-State Laser Cooling I

Session Chair: **Kent L. Miller**, Air Force Office of Scientific Research

8:30 am: **Laser cooling with real and virtual transitions: comparative analysis** (*Invited Paper*), Jacob B. Khurgin, The Johns Hopkins Univ. (USA) [7614-01]

9:00 am: **Optical refrigeration breaks the Peltier barrier: cooling Yb:YLF to 155K** (*Invited Paper*), Denis Seletskiy, Seth Melgaard, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA); Stefano Bigotta, Alberto Di Lieto, Mauro Tonelli, Univ. di Pisa (Italy); Richard Epstein, Los Alamos National Lab. (USA) [7614-02]

9:30 am: **Crystal-field effects in fluoride crystals for optical refrigeration** (*Invited Paper*), Markus P. Hehlen, Los Alamos National Lab. (USA) [7614-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 232 (Mezzanine) Thurs. 10:30 am to 12:10 pm

Solid-State Laser Cooling II

Session Chair: **Joaquín Fernández**, Univ. del País Vasco (Spain)

10:30 am: **Lasng without heat generation** (*Invited Paper*), Steven R. Bowman, U.S. Naval Research Lab. (USA); Shawn P. O'Connor, Nicholas Condon, Subrat Biswal, Armand Rosenberg, Naval Research Laboratory (USA) [7614-04]

11:00 am: **High-power fiber lasers with integrated rare-earth optical cooler**, Galina Nemova, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) [7614-05]

11:20 am: **Spectroscopy of Yb-doped YLF crystals for laser cooling**, Seth Melgaard, Denis Seletskiy, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA); Stefano Bigotta, Alberto Di Lieto, Mauro Tonelli, Univ. di Pisa (Italy); Richard Epstein, Los Alamos National Lab. (USA) [7614-06]

11:40 am: **Laser cooling in erbium-based solids** (*Invited Paper*), Zameer U. Hasan, Zhengle Qiu, Temple Univ. (USA); Imran Khan, Temple University (USA) [7614-07]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 3

Room: 232 (Mezzanine) Thurs. 1:40 to 3:20 pm

Solid-State Laser Cooling III

Session Chair: **Markus P. Hehlen**, Los Alamos National Lab.

1:40 pm: **Laser cooling of a semiconductor load using a Yb:YLF optical refrigerator**, Denis Seletskiy, Seth Melgaard, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA); Stefano Bigotta, Alberto Di Lieto, Mauro Tonelli, Univ. di Pisa (Italy) [7614-08]

2:00 pm: **Local internal and bulk optical cooling in Nd-doped crystals and nanocrystalline powders** (*Invited Paper*), Angel J. Garcia-Adeva, Rolindes Balda, Mohammed Al Saleh, Joaquin Fernandez, Univ. del País Vasco (Spain) [7614-09]

2:30 pm: **Progress in laser cooling of semiconductors**, Chengao Wang, Chia-Yeh Li, Michael Hasselbeck, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [7614-10]

2:50 pm: **Practical devices for semiconductor luminescent refrigeration** (*Invited Paper*), Song-Nan Wu, Arizona State Univ. (USA); Shui-Qing Yu, Univ. of Arkansas (USA); Shane R. Johnson, Ding Ding, Yong-Hang Zhang, Arizona State Univ. (USA) [7614-11]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: 232 (Mezzanine) Thurs. 3:50 to 5:00 pm

Solid-State Laser Cooling IV

Session Chair: **Denis Seletskiy**, The Univ. of New Mexico

3:50 pm: **Theory of time-resolved photo-luminescence and carrier lifetime measurements in GaAs/GaNP heterostructures** (*Invited Paper*), Greg Rupper, Nai-Hang Kwong, Rolf H. Binder, College of Optical Sciences, The Univ. of Arizona (USA) [7614-12]

4:20 pm: **Characterization of GaAs double-heterostructures grown by phosphorous MBE**, Chia-Yeh Li, Chengao Wang, Michael Hasselbeck, Mansoor Sheik-Bahae, Kevin J. Malloy, The Univ. of New Mexico (USA) [7614-13]

4:40 pm: **A thermophotonic heat pump**, Jani Oksanen, Jukka Tulkki, Helsinki Univ. of Technology (Finland) [7614-15]

Vertical-Cavity Surface-Emitting Lasers XIV

Conference Chairs: **James K. Guenter**, Finisar Corp.; **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign

Program Committee: **Kent M. Geib**, Sandia National Labs.; **Martin Grabherr**, ULM Photonics GmbH (Germany); **Luke A. Graham**, JDSU; **Jeong-Ki Hwang**, Avago Technologies, Ltd.; **Fumio Koyama**, Tokyo Institute of Technology (Japan); **Kevin L. Lear**, Colorado State Univ.; **Chun Lei**, EMCORE Corp.; **James A. Lott**, VI Systems GmbH (Germany) and Technische Univ. Berlin (Germany); **Krassimir Panayotov**, Vrije Univ. Brussel (Belgium); **Jean-Francois Seurin**, Princeton Optronics, Inc.; **Noriyuki Yokouchi**, The Furukawa Electric Co., Ltd. (Japan)

Wednesday 27 January

SESSION 1

Room: 220 (Mezzanine)Wed. 8:30 to 10:00 am

Commercial VCSEL Development

Session Chair: **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign

8:30 am: **Experimental demonstration of low-jitter performance and high-reliable 1060nm VCSEL arrays for 10Gx12ch optical interconnection** (*Invited Paper*), Keishi Takaki, Norihiro Iwai, Shinichi Kamiya, Hitoshi Shimizu, Koji Hiraiwa, Suguru Imai, Yasumasa Kawakita, Takeo Kageyama, Takuya Ishikawa, Naoki Tsukiji, Akihiko Kasukawa, The Furukawa Electric Co., Ltd. (Japan)[7615-01]

9:00 am: **Manufacturability of 850nm data communication VCSELs in high volume** (*Invited Paper*), Terry E. Sale, Gim-Hong Koh, Jason Tan, Jeong-ki Hwang, Rashit Nabiev, Avago Technologies Singapore (Singapore); Laura Giovane, Ramana Murty, Avago Technologies Ltd. (USA); Chu Chen, Avago Technologies Singapore (Singapore)[7615-02]

9:30 am: **Emcore VCSEL failure mechanism and resolution** (*Invited Paper*), Chun Lei, Neinyi Li, Chuan Xie, Richard F. Carson, Xinyu Sun, Wenlin Luo, Livia Zhao, EMCORE Corp. (USA)[7615-03]

Coffee Break10:00 to 10:30 am

SESSION 2

Room: 220 (Mezzanine)Wed. 10:30 am to 12:00 pm

High-Speed 850nm VCSELs

Session Chair: **Kevin L. Lear**, Colorado State Univ.

10:30 am: **High-speed low current density 850 nm VCSELs** (*Invited Paper*), Anders G. Larsson, Petter Westbergh, Johan S. Gustavsson, Asa Haglund, Chalmers Univ. of Technology (Sweden)[7615-04]

11:00 am: **Emerging VCSEL technologies at Finisar**, Jim A. Tatum, Deepa Gazula, James K. Guenter, Ralph H. Johnson, Gary D. Landry, Andrew N. MacInnes, Gyoungwon Park, Kent Wade, Finisar Corp. (USA)[7615-05]

11:20 am: **120 Gbps VCSEL arrays: fabrication and quality aspects**, Martin Grabherr, Steffan Intemann, Lin R. Borowski, Roger King, Dieter Wiedenmann, Roland Jaeger, Philips Technologie GmbH U-L-M Photonics (Germany)[7615-06]

11:40 am: **Optimizing 10Gbps VCSEL for real-world laser driver in parallel optical transceiver**, Chuan Xie, Neinyi Li, Chun Lei, Wenlin Luo, Xinyu Sun, EMCORE Corp. (USA)[7615-07]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 3

Room: 220 (Mezzanine)Wed. 1:30 to 3:10 pm

VCSEL Sensors and Applications

Session Chair: **James K. Guenter**, Finisar Corp.

1:30 pm: **VCSEL-based Faraday rotation spectroscopy at 762nm for battery-powered trace molecular oxygen detection**, Stephen G. So, Gerard Wysocki, Princeton Univ. (USA)[7615-08]

1:50 pm: **Polymer-coated vertical-cavity surface-emitting laser diode vapor sensor**, Thor Ansbæk, Claus H. Nielsen, Niels B. Larsen, Søren Dohn, Anja Boisen, Il-Sug Chung, David Larsson, Kresten Yvind, Technical Univ. of Denmark (Denmark)[7615-09]

2:10 pm: **Non-mechanical beam steering of high-speed VCSEL arrays**, John Joseph, Rashid Safaisini, Colorado State Univ. (USA); Gerard T. Dang, Army Research Lab. (USA); Kevin L. Lear, Colorado State Univ. (USA)[7615-10]

2:30 pm: **Position sensing using integrated VCSEL/PIN microsystem**, Antonios V. Giannopolous, Anas Matthias Kasten, Nickolas Hardy, Tom Jefvert, Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (USA)[7615-11]

2:50 pm: **Fabrication of an integrated 670nm VCSEL-based sensor for miniaturized fluorescence sensing**, Thomas D. O'Sullivan, Stanford Univ. (USA); Elizabeth A. Munro, Univ. of Toronto (Canada); James S. Harris, Jr., Stanford Univ. (USA); Ofer Levi, Univ. of Toronto (Canada)[7615-12]

Coffee Break3:10 to 3:40 pm

SESSION 4

Room: 220 (Mezzanine)Wed. 3:40 to 5:30 pm

High-Output Power VCSELs

Session Chair: **James A. Lott**, VI Systems GmbH (Germany)

3:40 pm: **High power VCSELs for miniature optical sensors** (*Invited Paper*), Jon Geske, Aerius Photonics, LLC (USA)[7615-13]

4:10 pm: **High-brightness pump sources using 2D VCSEL arrays**, Jean-Francois Seurin, Guoyang Xu, Qing Wang, Baiming Guo, Robert Van Leeuwen, Alexander Miglo, Prachi Pradhan, James D. Wynn, Viktor Khalfin, Chuni Ghosh, Princeton Optronics, Inc. (USA)[7615-14]

4:30 pm: **Advanced characterization techniques for high-power VCSELs**, Holger Moench, Johanna Kolb, Pavel Pekarski, Uwe Schulz, Philips Research (Germany); Michael Miller, Philips Technologie GmbH U-L-M Photonics (Germany); Adriaan Valster, Philips Lighting B.V. (Netherlands); Stephan Gronenborn, Philips Extreme UV GmbH (Germany)[7615-15]

4:50 pm: **High-power low-noise VCSEL seed laser for fiber laser applications**, Baiming Guo, Qing Wang, Bing Xu, Robert van Leeuwen, Jean-Francois Seurin, Guoyang Xu, Chuni Ghosh, Princeton Optronics, Inc. (USA)[7615-16]

5:10 pm: **Dynamics of the angular emission spectrum of broad-area VCSELs**, Stephan Gronenborn, RWTH Aachen (Germany); Holger Moench, Philips Research (Germany); Michael Miller, Philipp Gerlach, Philips Technologie GmbH U-L-M Photonics (Germany); Peter Loosen, Fraunhofer-Institut für Lasertechnik (Germany)[7615-17]

Thursday 28 January

SESSION 5

Room: 220 (Mezzanine)Thurs. 8:30 to 9:50 am

Innovative VCSEL Structures

Session Chair: Martin Grabherr,

Philips Technologie GmbH U-L-M Photonics (Germany)

8:30 am: **High-index-contrast subwavelength grating VCSEL**, Philippe Gilet, Nicolas Olivier, Philippe Grosse, Karen Gilbert, Alexei Chelnokov, Lab. d'Electronique de Technologie de l'Information (France); Il-Sug Chung, Jesper Mork, Technical Univ. of Denmark (Denmark).[7615-18]

8:50 am: **80nm-tunable high-index-contrast subwavelength grating long-wavelength VCSEL: proposal and numerical simulations**, Il-Sug Chung, Jesper Moerk, Technical Univ. of Denmark (Denmark); Alexei Sirbu, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Vladimir Iakovlev, Beam Express S.A. (Switzerland); Alexandru Mereuta, Andrei Caliman, Kapon Elyahou, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7615-19]

9:10 am: **Thermal resistance reduction in 670nm vertical-cavity surface-emitting lasers**, Rashid Safaisini, Colorado State Univ. (USA); Klein Johnson, Vixar (USA); Kevin Lear, Colorado State Univ. (USA)[7615-20]

9:30 am: **Photonic crystal single mode red VCSELS**, Ansas Matthias Kasten, Levi Naden, Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (USA); Klein Johnson, Mary Hibbs Brenner, Vixar (USA)[7615-21]

Coffee Break9:50 to 10:30 am

SESSION 6

Room: 220 (Mezzanine)Thurs. 10:30 am to 12:00 pm

Novel High Speed VCSEL Modulation

Session Chair: Chun Lei, EMCORE Corp.

10:30 am: **High-speed 850nm oxide confined VCSELS for DATACOM applications** (*Invited Paper*), Alex Mutig, Technische Univ. Berlin (Germany); Sergey S. Blokhin, Alexey A. Nadtochiy, Ioffe Physico-Technical Institute (Russian Federation); Gerrit Fiol, Technische Univ. Berlin (Germany); James A. Lott, Vitaly A. Shchukin, Nikolai N. Ledentsov, VI Systems GmbH (Germany); Dieter Bimberg, Technische Univ. Berlin (Germany)[7615-22]

11:00 am: **High-speed VCSELS beyond 10 Gb/s development at Emcore**, Neinyi Li, Chuan Xie, Chun Lei, Xinyu Sun, Wenlin Luo, EMCORE Corp. (USA); Daniel Kuchta, Clint L. Schow, Fuad E. Doany, IBM Thomas J. Watson Research Ctr. (USA)[7615-23]

11:20 am: **High-speed 980nm VCSELS with integrated distributed losses for mode control**, Ahmad N. Al-Omari, Yarmouk Univ. (Jordan); Kevin L. Lear, Colorado State Univ. (USA)[7615-24]

11:40 am: **Dynamics of 1.55 μm buried tunnel junction VCSELS under optical injection around threshold**, Aidan J. Daly, Brendan J. Roycroft, Tyndall National Institute (Ireland); Frank H. Peters, Univ. College Cork (Ireland); Markus Ortsiefer, Vertilas GmbH (Germany); Brian Corbett, Tyndall National Institute (Ireland)[7615-25]



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Novel In-Plane Semiconductor Lasers IX

Conference Chairs: **Alexey A. Belyanin**, Texas A&M Univ.; **Peter M. Smowton**, Cardiff Univ. (United Kingdom)

Program Committee: **Martin Achtenhagen**, Photodigm, Inc.; **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan); **Dan Botez**, Univ. of Wisconsin-Madison; **David Bour**, Palo Alto Research Center, Inc.; **Federico Capasso**, Harvard Univ.; **Claire F. Gmachl**, Princeton Univ.; **Michael Kneissl**, Technische Univ. Berlin (Germany); **Hui Chun Liu**, National Research Council Canada (Canada); **Luke J. Mawst**, Univ. of Wisconsin-Madison; **Jerry R. Meyer**, Naval Research Lab.; **Jesper Mørk**, Technical Univ. of Denmark (Denmark); **Mario J. Paniccia**, Intel Corp.; **Richard V. Penty**, Univ. of Cambridge (United Kingdom); **Johann Peter Reithmaier**, Univ. Kassel (Germany); **Nelson Tansu**, Lehigh Univ.

Monday 25 January

SESSION 1

Room: 206 (Mezzanine) Mon. 8:30 to 10:20 am

Low Dimensional Material

Session Chair: **Luke F. Lester**, The Univ. of New Mexico

8:30 am: **Unique lasing mechanism of localized dispersive nanostructures in InAs/InGaAlAs quantum dash-broad interband laser**, Chee-Loon Tan, Lehigh Univ. (USA); Hery S. Djie, JDS Uniphase Corp. (USA); Chee-Keong Tan, The Univ. of Sheffield (United Kingdom); Boon-Siew Ooi, Lehigh Univ. (USA) [7616-01]

8:50 am: **Temperature and threshold characteristics of quantum dot laser diodes (Invited Paper)**, Dennis G. Deppe, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [7616-02]

9:20 am: **High-power 1060-nm quantum dot laser with improved characteristic temperature by tunneling injection**, Emil-Mihai Pavelescu, Christian Gilfert, Johann P. Reithmaier, Univ. Kassel (Germany) [7616-03]

9:40 am: **Random population of InAs/GaAs quantum dots**, Ian P. O'Driscoll, Matthew Hutchings, Peter M. Smowton, Peter Blood, Cardiff Univ. (United Kingdom) [7616-04]

10:00 am: **Dual-state lasing and the case against the phonon bottleneck**, Peter Spencer, E. Clarke, Ray Murray, Imperial College London (United Kingdom); Muhammad Majid, David T. D. Childs, Richard A. Hogg, The Univ. of Sheffield (United Kingdom) [7616-05]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 206 (Mezzanine) Mon. 10:50 am to 12:40 pm

Materials + Mode-Locking

Session Chair: **Nelson Tansu**, Lehigh Univ.

10:50 am: **Pulse characteristics of passively mode-locked quantum dot lasers (Invited Paper)**, Luke F. Lester, The Univ. of New Mexico (USA); Daniel J. Kane, Mesa Photonics, LLC (USA); Nicholas G. Usechak, Air Force Research Lab. (USA); Chang-Yi Lin, Yan Li, The Univ. of New Mexico (USA); Yong-Chun Xin, IBM Corp. (USA); Vassilios I. Kovanis, Air Force Research Lab. (USA) [7616-06]

11:20 am: **Improved performance of GaAsSb/GaAs SQW lasers**, Nadir Hossain, S. R. Jin, Stephen J. Sweeney, Univ. of Surrey (United Kingdom); S. Q. Yu, Shane R. Johnson, Ding Ding, Yong-Hang Zhang, Arizona State Univ. (USA) [7616-07]

11:40 am: **Diode lasers emitting above 3 μm at room temperature with more than hundred of mW of continuous wave output power**, Leon Shterengas, Gela Kipshidze, Takashi Hosoda, Gene Tsvid, Gregory Belenky, Stony Brook Univ. (USA) [7616-66]

12:00 pm: **A platform for GaAs opto-electronic integrated circuits based on GaAs/AlGaAs regrowth upon patterned InGaP**, Kristian M. Groom, David T. D. Childs, Punima D. L. Greenwood, Benjamin J. Stevens, John S. Roberts, Maxime Hugues, Mark Hopkinson, Richard A. Hogg, The Univ. of Sheffield (United Kingdom) [7616-10]

12:20 pm: **The potential of Bismide alloys for efficient near- and mid-infrared semiconductor lasers**, Stephen J. Sweeney, Univ. of Surrey (United Kingdom) [7616-11]

Lunch Break 12:40 to 2:00 pm

SESSION 3

Room: 206 (Mezzanine) Mon. 2:00 to 3:30 pm

Mode-Locking and Dynamics

Session Chair: **Johann Peter Reithmaier**, Univ. Kassel (Germany)

2:00 pm: **Progress on compact ultrafast quantum dot based lasers (Invited Paper)**, Edik U. Rafailov, Maria-Ana Cataluna, Univ. of Dundee (United Kingdom) [7616-12]

2:30 pm: **Double-interval harmonic mode-locking technique for diverse waveform generation**, Yan Li, Furqan L. Chiragh, Chang-Yi Lin, The Univ. of New Mexico (USA); Yong-Chun Xin, IBM Corp. (USA); Luke F. Lester, The Univ. of New Mexico (USA) [7616-13]

2:50 pm: **Pulse picking from 4GHz pulse trains generated by mode locking of 1cm-long monolithic 1060nm DBR lasers**, Andreas Klehr, Armin Liero, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany); Thomas Hoffmann, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany); Sven Schwertfeger, Hans Wenzel, Götz Erbert, Wolfgang Heinrich, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7616-14]

3:10 pm: **Linewidth enhancement factor and dynamical response of an injection-locked quantum dot Fabry-Perot laser at 1310nm**, Michael C. Pochet, Nader A. Naderi, The Univ. of New Mexico (USA); Nathan B. Terry, Vassilios I. Kovanis, Air Force Research Lab. (USA); Luke F. Lester, The Univ. of New Mexico (USA) [7616-15]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 206 (Mezzanine) Mon. 4:00 to 5:50 pm

Nitrides

Session Chair: **Michael Kneissl**, Technische Univ. Berlin (Germany)

4:00 pm: **Progress of blue and green InGaN laser diodes (Invited Paper)**, Stephan Lutgen, Adrian Avramescu, Teresa Lerner, Désirée Queren, Jens Müller, Andreas Breidenassel, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) [7616-16]

4:30 pm: **Lasing of semipolar InGaN/GaN(11̄bar{2}2) heterostructures grown on m-plane sapphire substrates**, Andre Strittmatter, Mark Teepe, Zhihong H. Yang, Christopher L. Chua, John Northrup, Noble M. Johnson, Palo Alto Research Center, Inc. (USA); Vladimir A. Ivantsov, Alexander Syrkina, Lisa Shapovalov, Alexander S. Usikov, Technologies and Devices International, Inc. (USA); Robert G. W. Brown, Ostendo Technologies, Inc. (USA) [7616-17]

4:50 pm: **Nitride-based laser diodes with InAlN cladding layers (Invited Paper)**, Nicolas Grandjean, Antonino Castiglia, Eric Feltin, Gatién Cosendey, Alexei Altoukhov, Jean-François Carlin, Raphaël Butté, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7616-18]

5:20 pm: **Nonpolar and semipolar InGaN beyond blue region and its device application (Invited Paper)**, Hiroaki Ohta, James S. Speck, Steven P. DenBaars, Shuji Nakamura, Univ. of California, Santa Barbara (USA) [7616-19]

Tuesday 26 January

OPTO Plenary Session
Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am
Session Chairs: E. Fred Schubert, Rensselaer Polytechnic Institute; Liang-Chy Chien, Kent State Univ.
 8:30 am: **Introduction and Opening Remarks**
 8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)
 9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 206 (Mezzanine) Tues. 10:30 am to 12:20 pm

QCLs I

Session Chair: Hui Chun Liu, National Research Council Canada (Canada)

10:30 am: **Quantum cascade lasers: an enabling technology for mid-infrared photonics (Keynote Presentation)**, Federico Capasso, Harvard Univ. (USA) [7616-20]

11:10 am: **Quantum cascade lasers: ab initio design and circuit resonators (Invited Paper)**, Jerome Faist, ETH Zürich (Switzerland) [7616-21]

11:40 am: **An aluminum-free mid-infrared quantum cascade laser**, Gottfried Strasser, Technische Univ. Wien (Austria) and Univ. at Buffalo (USA); Michele Nobile, Hermann Detz, Aaron M. Andrews, Pavel Klang, Werner Schrenk, Technische Univ. Wien (Austria) [7616-22]

12:00 pm: **Suppression of carrier leakage in 4.8 µm emitting quantum cascade lasers**, Dan Botez, Jae-Cheol Shin, Luke J. Mawst, Univ. of Wisconsin-Madison (USA); Igor Vurgaftman, Jerry R. Meyer, U.S. Naval Research Lab. (USA) [7616-23]

Lunch/Exhibition Break 12:20 to 1:40 pm

SESSION 6

Room: 206 (Mezzanine) Tues. 1:40 to 3:30 pm

QCLs II (THz QCLs)

Session Chair: Gottfried Strasser, Technische Univ. Wien (Austria)

1:40 pm: **Tunable and high-temperature THz quantum-cascade lasers (Invited Paper)**, Qing Hu, Massachusetts Institute of Technology (USA) [7616-24]

2:10 pm: **Physics of terahertz quantum cascade lasers (Invited Paper)**, Hui Chun Liu, National Research Council Canada (Canada) [7616-25]

2:40 pm: **Terahertz quantum cascade lasers: current challenges in design and implementations (Invited Paper)**, Dragan Indjin, Paul Harrison, Zoran Ikonik, Craig A. Evans, Leon J. Lever, Alexander Valavanis, Univ. of Leeds (United Kingdom); Nenad V. Vukmirovic, Lawrence Berkeley National Lab. (USA); Robert W. Kelsall, Edmund H. Linfield, Paul Dean, Suraj P. Khanna, Nicholas Hinchcliffe, Alexander G. Davies, Univ. of Leeds (United Kingdom) [7616-26]

3:10 pm: **Gain competition in two-color quantum cascade lasers**, Christian J. Pflügl, Markus Geiser, Harvard Univ. (USA); Alexey A. Belyanin, Texas A&M Univ. (USA); Qi Jie Wang, Nanfang Yu, Harvard Univ. (USA); Tadanaka Edamura, Hirofumi Kan, Hamamatsu Photonics K.K. (Japan); Federico Capasso, Harvard Univ. (USA) [7616-27]

Coffee Break 3:30 to 4:00 pm

SESSION 7

Room: 206 (Mezzanine) Tues. 4:00 to 6:00 pm

Silicon Photonics

Joint Session with Conference 7606

Session Chair: Mario J. Paniccia, Intel Corp.

4:00 pm: **Thin film III-V edge emitting lasers integrated onto silicon (Invited Paper)**, Nan M. Jokerst, Sabarni Palit, Duke Univ. (USA); Jeremy Kirch, Gene Tsvid, Luke J. Mawst, Thomas F. Kuech, Univ. of Wisconsin-Madison (USA) [7616-28]

4:30 pm: **Compact hybrid Si microring lasers (Invited Paper)**, Di Liang, John E. Bowers, Univ. of California, Santa Barbara (USA); Marco Fiorentino, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) [7616-29]

5:00 pm: **Monolithic integration of the Ga(NAsP)-laser material lattice matched on (001) Si-substrate (Invited Paper)**, Wolfgang Stolz, Philipps-Univ. Marburg (Germany); Bernardette Kunert, NAsP III/V GmbH (Germany); Sven Liebich, Martin Zimprich, Steffen Zinnkann, Kerstin Volz, Philipps-Univ. Marburg (Germany) [7616-30]

5:30 pm: **Sb-based laser sources grown by molecular beam epitaxy on silicon substrates (Invited Paper)**, Jean-Baptiste Rodriguez, Laurent Cerutti, Pierre Grech, Guilhem Boissier, Gregoire Narcy, Eric Tournie, Univ. Montpellier 2 (France) [7616-31]

Wednesday 27 January

SESSION 8

Room: 206 (Mezzanine) Wed. 8:10 to 10:00 am

High Power / High Stability

Session Chair: Martin Achtenhagen, Photodigm, Inc.

8:10 am: **High-power spectrally-stable DBR semiconductor lasers designed for pulsing in the nanosecond regime**, Jason K. O'Daniel, Martin Achtenhagen, Photodigm, Inc. (USA) [7616-32]

8:30 am: **High-power ultralow-noise semiconductor external cavity lasers based on low-confinement optical waveguide gain media (Invited Paper)**, Paul W. Juodawlkis, William Loh, Frederick J. O'Donnell, Michael A. Brattain, Jason J. Plant, MIT Lincoln Lab. (USA) [7616-33]

9:00 am: **Ultra-high-power ultra-low RIN up to 20 GHz 1.55 µm DFB AlGaInAsP laser for analog applications**, Jean-René Burie, Gérard Beuchet, Malki Mimoun, Philippe Pagnod-Rossiaux, B. Ligat, Jean-Claude Bertreux, J.-M. Rousselet, J. Dufour, P. Rougeolle, François J. Laruelle, 3S PHOTONICS SA (France) [7616-34]

9:20 am: **High reliability and very low linewidth of 852nm DFB lasers for Cs pumping**, Charles Cayron, Vincent Ligeret, Patrick Resneau, Alcatel-Thales III-V Lab. (France); Julien Nagle, Shailendra Bansropun, Thales Research & Technology (France); Michel Lecomte, Michel Calligaro, Olivier Parillaud, Michel Krakowski, Alcatel-Thales III-V Lab. (France) [7616-35]

9:40 am: **High-power ridge-waveguide DFB-lasers and MOPAs emitting at 1064nm with a vertical far-field angle of 15°**, Olaf Brox, Frank Bugge, Arnim Ginolas, Andreas Klehr, Peter Ressel, Hans Wenzel, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7616-36]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 206 (Mezzanine) Wed. 10:30 am to 12:40 pm

QCLs III

Session Chair: Jerry R. Meyer, U.S. Naval Research Lab.

10:30 am: **Progress in InAs-based quantum cascade lasers** (*Invited Paper*), Alexei N. Baranov, Roland Teissier, Olivier Cathabard, Jan Devenson, Univ. Montpellier 2 (France) [7616-37]

11:00 am: **High performance short wavelength InP-based quantum cascade lasers** (*Invited Paper*), John W. Cockburn, Dmitry Revin, Paul Commin, Shiyong Zhang, Andrey B. Krysa, Kenneth Kennedy, The Univ. of Sheffield (United Kingdom) [7616-38]

11:30 am: **Interface roughness in QCLs: a new insight** (*Invited Paper*), Jacob B. Khurgin, The Johns Hopkins Univ. (USA) [7616-39]

12:00 pm: **Coherent transport in QCLs: a new theoretical approach**, Ariel Gordon, Daniel Majer, Optigo Systems, Ltd. (Israel) [7616-40]

12:20 pm: **Room-temperature surface-emitting distributed-feedback quantum cascade lasers without top cladding layers**, Adel Bousseksou, Jean-René Coudeville, Gangyi Xu, Raffaele Colombelli, Institut d'Électronique Fondamentale (France); Carlo Sirtori, Univ. Paris Diderot (France); Grégoire Beaudoin, Gilles Patriache, Isabelle Sagnes, Ctr. National de la Recherche Scientifique (France) [7616-41]

Lunch/Exhibition Break 12:40 to 2:00 pm

SESSION 10

Room: 206 (Mezzanine) Wed. 2:00 to 3:20 pm

QCLs IV

Session Chair: Daniel M. Wasserman, Univ. of Massachusetts Lowell

2:00 pm: **Highly power-efficient quantum cascade lasers** (*Invited Paper*), Peter Q. Liu, Anthony J. Hoffman, Matthew D. Escarra, Kale J. Franz, Princeton Univ. (USA); Jacob B. Khurgin, Yamac Dikmelik, Johns Hopkins University (USA); Xiaojun Wang, Jen-Yu Fan, AdTech Optics Inc. (USA); Claire F. Gmachl, Princeton Univ. (USA) [7616-42]

2:30 pm: **Heat transfer speed and phonon related phenomena in terahertz quantum cascade lasers** (*Invited Paper*), Gaetano Scamarcio, Miriam S. Vitiello, Univ. degli Studi di Bari (Italy) [7616-43]

3:00 pm: **Integrated tunable DBR quantum cascade lasers with ~0.03nm/mA tuning efficiency**, Liwei Cheng, Fow-Sen Choa, Univ. of Maryland, Baltimore County (USA) [7616-44]

Coffee Break 3:20 to 3:50 pm

SESSION 11

Room: 206 (Mezzanine) Wed. 3:50 to 5:50 pm

Novel MIR lasers

Session Chair: Dan Botez, Univ. of Wisconsin-Madison

3:50 pm: **Challenges for mid-IR interband cascade lasers** (*Invited Paper*), Jerry R. Meyer, U.S. Naval Research Lab. (USA) [7616-45]

4:20 pm: **Room-temperature mid-IR emission from intersubband transitions in InAs quantum dots** (*Invited Paper*), Daniel M. Wasserman, Troy Ribauto, David Adams, Univ. of Massachusetts Lowell (USA); Stephen A. Lyon, Princeton Univ. (USA); Eric A. Shaner, Brandon S. Passmore, Sungkwun K. Lyo, Sandia National Labs. (USA) [7616-46]

4:50 pm: **InAs-based plasmon waveguide interband cascade lasers**, Zhaobing Tian, Zhihua Cai, Rui Q. Yang, Tetsuya Mishima, Michael R. Santos, Matthew B. Johnson, Univ. of Oklahoma (USA); John F. Klem, Sandia National Labs. (USA) [7616-47]

5:10 pm: **Short-pulse high-power operation of GaSb-based diode lasers in the 1.9 to 2.3µm wavelength range**, Markus Müller, Marcel Rattunde, Gudrun Kaufel, Johannes Schmitz, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [7616-48]

5:30 pm: **Long-wavelength type-I Lasers on GaSb grown by molecular beam epitaxy**, James A. Gupta, Pedro J. Barrios, Philip Waldron, Geof C. Aers, Craig Storey, National Research Council Canada (Canada) [7616-49]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Coupled-cavity edge-emitting lasers for optical biosensing applications, Robert Thomas, Peter M. Smowton, Cardiff Univ. (United Kingdom); Huw D. Summers, Swansea Univ. (United Kingdom); Gareth T. Edwards, Cardiff Univ. (United Kingdom) [7616-64]

Manipulation of optical modes in quantum dot laser diodes by selective oxidation of high aluminum content AlGaAs layers, Gareth J. Mitchell, Cardiff Univ. (United Kingdom); Huw D. Summers, Swansea Univ. (United Kingdom); Peter M. Smowton, Cardiff Univ. (United Kingdom) [7616-65]

Thursday 28 January

SESSION 12

Room: 206 (Mezzanine) Thurs. 8:30 to 10:00 am

High Power I

Session Chair: Luke J. Mawst, Univ. of Wisconsin-Madison

8:30 am: **Simulation of high-brightness tapered lasers** (*Invited Paper*), Ignacio Esquivias, Helena Odriozola, José-Manuel G. Tijero, Luis Burrue, Alfredo Martin-Minguez, Univ. Politécnica de Madrid (Spain); Nicolas Michel, Michel Calligaro, Michel Lecomte, Oscar Parillaud, Michel Krakowski, Alcatel-Thales III-V Lab. (France) [7616-50]

9:00 am: **Two-sections tapered diode lasers for 1 Gbps free-space optical communications at 1060nm with high modulation efficiency of 17 W/A**, Nicolas Michel, Michel Calligaro, Yannick Robert, Michel Lecomte, Olivier Parillaud, Michel Krakowski, Alcatel-Thales III-V Lab. (France); Ignacio Esquivias, Helena Odriozola, Jose-Manuel Garcia-Tijero, Univ. Politécnica de Madrid (Spain); Owen C. H. Kwok, Richard Penty, Ian White, Univ. of Cambridge (United Kingdom) [7616-51]

9:20 am: **Catastrophic optical mirror damage in diode lasers monitored during single pulse operation**, Jens W. Tomm, Mathias Ziegler, Thomas Elsaesser, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Henning E. Larsen, Paul M. Petersen, Peter E. Andersen, Riso National Lab. (Denmark); Ute Zeimer, David Fendrich, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7616-52]

9:40 am: **Comparison of 650 nm tapered lasers with different lateral geometries at output powers up to 1W**, Bernd Sumpf, Pawel Adamiec, Jörg Fricke, Peter Ressel, Hans Wenzel, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7616-53]

Coffee Break 10:00 to 10:30 am

SESSION 13

Room: 206 (Mezzanine)Thurs. 10:30 am to 12:10 pm

High Power II

Session Chair: Gary A. Evans,
Photodigm, Inc. and Southern Methodist Univ.

- 10:30 am: **High-power high-brightness semiconductor lasers based on novel concepts** (*Invited Paper*), Dieter Bimberg, Kristijan Posilovic, Thorsten Kettler, Daniel Seidlitz, Vladimir Kalosha, Vitaly A. Shchukin, Nikolay N. Ledentsov, Technische Univ. Berlin (Germany); Nikita Y. Gordeev, Leonid Y. Karachinsky, Innokenty I. Novikov, Mikhail V. Maximov, Ioffe Physico-Technical Institute (Russian Federation); Dominic Schröder, Petra Hennig, JENOPTIK Laserdiode GmbH (Germany)[7616-54]
- 11:00 am: **High-peak-power pulse generation with GHz repetition rate using a Q-switched 1060nm DBR tapered laser**, Andreas Klehr, Bernd Sumpf, Karl-Heinz Hasler, Jörg Fricke, Armin Liero, Thomas Hoffmann, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany)[7616-55]
- 11:20 am: **Novel single-mode fiber coupled broadband seed source for pulsed fiber laser systems**, Evgeny A. Zibik, Boris N. Sverdlov, Stefan Mohrdiek, Joerg Troger, Susanne Pawlik, Hans-Ulrich Pfeiffer, Norbert Lichtenstein, Oclaro, Inc. (Switzerland)[7616-56]
- 11:40 am: **High-power high-brightness semiconductor tapered diode lasers for the red and near-infrared spectral range** (*Invited Paper*), Bernd Sumpf, Hans Wenzel, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany)[7616-57]
- Lunch/Exhibition Break12:10 to 1:30 pm

SESSION 14

Room: 206 (Mezzanine)Thurs. 1:30 to 3:30 pm

QCLs V

Session Chair: Christian J. Pflügl, Harvard Univ.

- 1:30 pm: **Room-temperature continuous operation of long-wavelength IR distributed feedback quantum cascade lasers**, Mariano Troccoli, Xiaojun Wang, Jenyu Fan, AdTech Optics, Inc. (USA)[7616-58]
- 1:50 pm: **High-performance long-wave infrared quantum cascade lasers at wavelength ~9 μm**, Xiaojun Wang, AdTech Optics, Inc. (USA)[7616-59]
- 2:10 pm: **Power-scaling of quantum cascade laser modules via multi-emitter beam combining**, Stefan Hugger, Rolf Aidam, Wolfgang Bronner, Frank Fuchs, Quankui K. Yang, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Eugen Romasew, Michael Raab, Hans D. Tholl, Diehl BGT Defence GmbH & Co. KG (Germany); Bernd Höfer, André Matthes, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)[7616-60]
- 2:30 pm: **High to ~460 K of 13.5μm quantum cascade lasers based on indirect pump scheme**, Kazuue Fujita, Masamichi Yamanishi, Tadataka Edamura, Shinichi Furuta, Atsushi Sugiyama, Takahide Ochiai, Akio Ito, Naota Akikusa, Hirofumi Kan, Hamamatsu Photonics K.K. (Japan)[7616-61]
- 2:50 pm: **Ring resonator-based surface emitting quantum cascade lasers**, Elvis Mujagic, Michele Nobile, Hermann Detz, Pavel Klang, Aaron M. Andrews, Werner Schrenk, Technische Univ. Wien (Austria); Gottfried Strasser, Technische Univ. Wien (Austria) and Univ. at Buffalo (USA); Christoph Deutsch, Karl Unterrainer, Technische Univ. Wien (Austria); Jianxin Chen, Claire F. Gmachl, Princeton Univ. (USA)[7616-62]
- 3:10 pm: **Near-infrared quenching effects on mid-infrared quantum cascade lasers**, Dingkai Guo, Fow-Sen Choa, Liwei Cheng, Xing Chen, Univ. of Maryland, Baltimore County (USA)[7616-63]



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Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIV

Conference Chairs: **Klaus P. Streubel**, OSRAM Opto Semiconductors GmbH (Germany); **Heonsu Jeon**, Seoul National Univ. (Korea, Republic of); **Li-Wei Tu**, National Sun Yat-Sen Univ. (Taiwan)

Conference Co-Chair: **Norbert Linder**, OSRAM Opto Semiconductors GmbH (Germany)

Program Committee: **Gerd Bacher**, Univ. Duisburg-Essen (Germany); **Michael Heuken**, AIXTRON AG (Germany); **Zhaoran Rena Huang**, Rensselaer Polytechnic Institute; **Satoshi Kamiyama**, Meijo Univ. (Japan); **Markus Klein**, OSRAM Opto Semiconductors GmbH (Germany); **Michael R. Krames**, Philips Lumileds Lighting Co.; **Kei May Lau**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Kurt J. Linden**, Spire Corp.; **Hans Nikol**, Philips Lighting B.V. (Netherlands); **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Jerry A. Simmons**, Sandia National Labs.; **Ross P. Stanley**, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland)

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Liang-Chy Chien**, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 1

Room: 304 (Esplanade). Tues. 10:30 am to 12:00 pm

Progress in LEDs and OLEDs

Session Chair: **Klaus P. Streubel**, OSRAM Opto Semiconductors GmbH (Germany)

10:30 am: **En route to 100% external quantum efficiency nitride-based LEDs over the full visible and UV spectrum region** (*Invited Paper*), Hiroshi Amano, Satoshi Kamiyama, Motoaki Iwaya, Isamu Akasaki, Meijo Univ. (Japan)[7617-01]

11:00 am: **progress in nonpolar and semipolar GaN-based materials and devices** (*Invited Paper*), James S. Speck,[7617-02]

11:30 am: **Phosphorescent OLEDs: status and opportunities for solid state lighting** (*Invited Paper*), Michael G. Hack, Peter Levermore, Chun Lin, Sean Xia, Michael S. Weaver, Raymond C. Kwong, Julie J. Brown, Universal Display Corp. (USA)[7617-03]

Lunch/Exhibition Break 12:00 to 1:10 pm

SESSION 2

Room: 304 (Esplanade). Tues. 1:10 to 3:00 pm

LED Applications and SSL I

Session Chairs: **Heonsu Jeon**, Seoul National Univ. (Korea, Republic of); **Norbert Linder**, OSRAM Opto Semiconductors GmbH (Germany)

1:10 pm: **Trend of LED backlight technologies for LCD** (*Invited Paper*), Byungchoon Yang, Taeseok Jang, Samsung Electronics Co., Ltd. (Korea, Republic of)[7617-04]

1:40 pm: **LED wafer level integration for BLU and lighting applications**, Cheng-Nan Han, Tsung-Xian Lee, Hsin-Mao Liu, Steve M. Hong, Min-hsun Hsieh, Ming-Jiunn Jou, Epistar Corp. (Taiwan).[7617-05]

2:00 pm: **Planar lighting by blue LEDs array with remote phosphor**, Chung-Hao Tien, Chien-Hsiang Hung, Bo-Wen Xiao, Hsin-Tao Huang, Yi-Pai Huang, Chuang-Chuang Tsai, National Chiao Tung Univ. (Taiwan)[7617-06]

2:20 pm: **An innovative technical design to decrease LED lamps fabrication cost considerably in compare with state-of-the-art common LED lamps**, Akbar Rahmani Nejad, Independent Researcher (Iran, Islamic Republic of)[7617-07]

2:40 pm: **Effect of metal-core LED substrate dimensions on heat-dissipation performance**, Chun-Ting Yang, Chengyi Liu, National Central Univ. (Taiwan)[7617-09]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Room: 304 (Esplanade). Tues. 3:30 to 6:00 pm

LED Design and Fabrication I

Session Chairs: **Michael Heuken**, AIXTRON AG (Germany); **Ching-Cherng Sun**, National Central Univ. (Taiwan)

3:30 pm: **Enhancement of angular flux utilization and light extraction efficiency based on micro array in GaN LEDs** (*Invited Paper*), Ching-Cherng Sun, Shang-Yu Tsai, National Central Univ. (Taiwan); Tsung-Xian Lee, Epistar Corp. (Taiwan); Wei-Ting Chien, National Central Univ. (Taiwan)[7617-10]

4:00 pm: **Ultra-high extraction efficiency of a semiconductor hemisphere for LED applications**, Song-Nan Wu, Arizona State Univ. (USA); Shui-Qing Yu, Univ. of Arkansas (USA); Shane R. Johnson, Ding Ding, Yong-Hang Zhang, Arizona State Univ. (USA)[7617-11]

4:20 pm: **Patterned-sapphire substrate fabricated by simple wet-etching processes**, Yijun Chen, Chengyi Liu, National Central Univ. (Taiwan)[7617-12]

4:40 pm: **Application of transverse junction structure in white-light generation devices: light-emitting diodes and superluminescent diodes**, Shi Hao Guol, National Taiwan Univ. (Taiwan); Ming Zhe Zhou, Hong Wen Huang, Jin-Wei Shi, National Central Univ. (Taiwan)[7617-13]

5:00 pm: **Enhanced thermal stability of Ag-based ohmic contacts to p-type GaN using Ni/Ag multilayer structure**, Jun Ho Son, Yang Hee Song, Buem Joon Kim, Jong-Lam Lee, Pohang Univ. of Science and Technology (Korea, Republic of)[7617-14]

5:20 pm: **Nanostructure Pt alloy contact to p-type GaN**, Cheng-Chieh Chang, Chengyi Liu, National Central Univ. (Taiwan)[7617-15]

5:40 pm: **Abbreviated GaN metalorganic vapor phase epitaxy growth mode on nano-patterned sapphire for enhanced efficiency of InGaN-based light-emitting diodes**, Yik-Khoon Ee, Xiao-Hang Li, Lehigh Univ. (USA); Jeff Biser, Lehigh Univ. (USA) and Lehigh Univ. (USA); Wanjun Cao, Helen M. Chan, Richard P. Vinci, Nelson Tansu, Lehigh Univ. (USA)[7617-16]

Wednesday 27 January

SESSION 4

Room: 304 (Esplanade). Wed. 8:00 to 10:20 am

IQE and Droop

Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Chengyi Liu**, National Central Univ. (Taiwan)

8:00 am: **Understanding efficiency limitations of InGaN quantum wells** (*Invited Paper*), Mary H. Crawford, Daniel D. Koleske, Stephen R. Lee, Andrew M. Armstrong, Karl R. Westlake, Nancy A. Missert, Mary A. Miller, Karen C. Cross, Sandia National Labs. (USA)[7617-17]

8:30 am: **Auger recombination in nitride light emitters: a theoretical perspective** (*Invited Paper*), Kris T. Delaney, Univ. of California, Santa Barbara (USA)[7617-18]

9:00 am: **Explanation of the efficiency droop in InGaN multiple quantum well light-emitting diodes by the reduced radiative recombination probability**, Jong-In Shim, Hyunsung Kim, Hanyang Univ. (Korea, Republic of); Han-Youl Ryu, Inha Univ. (Korea, Republic of)[7617-19]

9:20 am: **Effect of piezo-electric polarization on quantum efficiency of thin-GaN LED**, Chia-Lun Chang, Chengyi Liu, National Central Univ. (Taiwan)[7617-20]

9:40 am: **Carrier lifetime of GaInN LEDs: streak camera measurements**, Ulrich T. Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) and Univ. Regensburg (Germany); Markus Maier, Michael Kunzer, Thorsten Passow, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany)[7617-21]
 10:00 am: **A study on the reverse-bias and ESD instabilities of InGaN-based green LEDs**, Matteo Meneghini, Nicola Trivellin, Enrico Ranzato, Matteo Dal Lago, Univ. degli Studi di Padova (Italy); Berthold Hahn, Ulrich Zehnder, OSRAM Opto Semiconductors GmbH (Germany); Gaudenzio Meneghesso, Enrico Zanoni, Univ. degli Studi di Padova (Italy)[7617-23]
 Coffee Break 10:20 to 10:50 am

SESSION 5

Room: 304 (Esplanade).....Wed. 10:50 am to 12:10 pm

LED Design and Fabrication II

Session Chair: Hans Nikol, Philips Lighting B.V. (Netherlands)

10:50 am: **Growth of opto-electronic devices on 6-inch sapphire substrates in a mass production MOCVD Planetary Reactor**, Michael Heuken, Assadullah Alam, AIXTRON AG (Germany); Christof Sommerhalter, Brian Dlugosch, AIXTRON Inc. (USA); Bernd Schineller, AIXTRON AG (Germany)[7617-24]
 11:10 am: **Etching mechanism on n-GaN epitaxial layer by KOH solution**, You Hsien Chang, Chengyi Liu, National Central Univ. (Taiwan)[7617-25]
 11:30 am: **Surface roughness of gallium nitride with volcano-like protrusions formed by KrF excimer laser etching**, Shui-Jinn Wang, Wei-Chi Lee, National Cheng Kung Univ. (Taiwan); Kai-Ming Uang, Tron-Ming Chen, WuFeng Institute of Technology (Taiwan); Der-Ming Kuo, Pei-Ren Wang, Po-Hong Wang, National Cheng Kung Univ. (Taiwan)[7617-26]
 11:50 am: **Enhanced performance of vertical GaN-based LEDs with highly reflective ohmic contact and nano-roughened indium-zinc oxide surface using a nanospheres process**, Der-Ming Kuo, Shui-Jinn Wang, National Cheng Kung Univ. (Taiwan); Kai-Ming Uang, Tron-Ming Chen, WuFeng Institute of Technology (Taiwan); Wei-Chi Lee, Pei-Ren Wang, National Cheng Kung Univ. (Taiwan)[7617-27]
 Lunch/Exhibition Break 12:10 to 1:10 pm

SESSION 6

Room: 304 (Esplanade).....Wed. 1:10 to 3:40 pm

Photonic Crystals and Surface Plasmons

Session Chairs: Ross P. Stanley, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland);

Chih-Chung Yang, National Taiwan Univ. (Taiwan)

1:10 pm: **High-efficiency III-nitride photonic crystal LEDs (Invited Paper)**, Aurelien David, Philips Lumileds Lighting US LLC (USA)[7617-28]
 1:40 pm: **Plasmonic crystal applications in light-emitting diodes (Invited Paper)**, Anatoly V. Zayats, Queen's Univ. Belfast (United Kingdom)[7617-29]
 2:10 pm: **Light-emitting diode with surface plasmon coupling (Invited Paper)**, Kun-Ching Shen, Yen-Cheng Lu, Cheng-Yen Chen, Chih-Feng Lu, Cheng-Hung Lin, Che-Hao Liao, Tsung-Yi Tang, Chih-Chung Yang, National Taiwan Univ. (Taiwan)[7617-30]
 2:40 pm: **Determination of light extraction parameters in photonic crystals LEDs**, Claude Weisbuch, Elison Matioli, Liz rangel, Blaise Fleury, Evelyn L. Hu, James S. Speck, Univ. of California, Santa Barbara (USA)[7617-31]
 3:00 pm: **Nanophotonic emission rate control in LEDs: role of dipole orientation**, A. Femius Koenderink, Willem Vos, Ivan Nikolaev, FOM Institute for Atomic and Molecular Physics (Netherlands)[7617-32]
 3:20 pm: **Surface plasmon dispersion engineering utilizing double-metallic Ag/Au layers for InGaN quantum wells light-emitting diodes**, Hongping Zhao, Guangyu Liu, Nelson Tansu, Lehigh Univ. (USA)[7617-33]
 Coffee Break 3:40 to 4:00 pm

SESSION 7

Room: 304 (Esplanade).....Wed. 4:00 to 5:50 pm

LED Applications and SSL II

Session Chair: Kei May Lau, Hong Kong Univ. of Science and Technology (Hong Kong, China)

4:00 pm: **Retrofit and modules (Invited Paper)**, Hans Nikol, Philips Lighting B.V. (Netherlands)[7617-34]
 4:30 pm: **Influence of the injection current on the degradation of white high-brightness light-emitting diodes**, Sebastien Bouchard, Hugo Lemieux, Marie-Pier Côté, Simon Thibault, Univ. Laval (Canada)[7617-35]
 4:50 pm: **'No blue' LED solution for photolithography room illumination**, Haiyan Ou, Technical Univ. of Denmark (Denmark)[7617-36]
 5:10 pm: **Thermal management for solid state lamp for recessed-light applications**, John Vetrovec, Aqwest (USA)[7617-37]
 5:30 pm: **Novel sensor for color control in solid state lighting applications**, Alex Gourevitch, Thomas Thurston, Rajiv Singh, Bartosz Banachowicz, Vladimir Korobov, Cliff Drowley, Cypress Semiconductor Corp. (USA)[7617-38]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level).....Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Effect of current crowding on the ideality factor in MQW InGaN/GaN LEDs grown on isolated substrates, Volodymyr K. Maluytenko, Sergiy S. Bolgov, Andriy V. Zinovchuk, V. Lashkaryov Institute of Semiconductor Physics (Ukraine)[7617-22]
White-light-emitting (Ba, Ca)2SiO4:Ce³⁺, Eu²⁺, Mn²⁺ phosphors for white-light-emitting diode, Kwang Won Park, Jae Bum Lee, Pukyong National Univ. (Korea, Republic of); Tae Hoon Kim, Kyungpook National Univ. (Korea, Republic of); Jong Su Kim, Pukyong National Univ. (Korea, Republic of); Patrick Kung, Seongsin M. Kim, The Univ. of Alabama (USA)[7617-56]
Novel blue-emissive Sr₃Ga₂O₅Cl₂:Eu²⁺ phosphor for blue-light-emitting diode pumped by ultraviolet light, Jae Bum Lee, Pukyong National Univ. (Korea, Republic of); Jung Jun Lee, Yonsei Univ. (Korea, Republic of); Kwang Won Park, Pong Kyun Shon, Sang Nam Lee, Pukyong National Univ. (Korea, Republic of); Jin Chul Choi, Yonsei Univ. (Korea, Republic of); Jong Su Kim, Pukyong National Univ. (Korea, Republic of)[7617-57]
On the mechanisms of electroluminescence efficiency droop in (In,Ga)N quantum well diodes, Kei Kaneda, Hiroyuki Jimi, Kenzo Fujiwara, Kyushu Institute of Technology (Japan)[7617-58]
Photoluminescence and electroluminescence properties of CdS nanoparticles synthesized with macrowave irradiation, Mehdi Molaei, Tarbiat Modares Univ. (Iran, Islamic Republic of); Nima Taghavinia, Sharif Univ. of Technology (Iran, Islamic Republic of); Esmaiel Saievar Iranizad, Tarbiat Modares Univ. (Iran, Islamic Republic of); Maziar Marandi, Sharif Univ. of Technology (Iran, Islamic Republic of)[7617-59]
Polarization-dependent GaN grating reflector for short wavelength, Joonhee Lee, Sungmo Ahn, Hojun Chang, Seoul National Univ. (Korea, Republic of); Jaehoon Kim, Advanced Institutes of Convergence Technology (Korea, Republic of); Heonsu Jeon, Seoul National Univ. (Korea, Republic of) and Advanced Institutes of Convergence Technology (Korea, Republic of)[7617-60]
Syntonized white up-converted emission by Tm³⁺-Yb³⁺-Er³⁺-Ho³⁺ doped ZrO₂ nanocrystals, David Sólis, Tzarara López Luke, Octavio Meza, Sean Anderson, Elder De La Rosa, Ctr. de Investigaciones en Óptica, A.C. (Mexico)[7617-61]
Efficiency enhancement in white phosphor-on-cup light-emitting diodes using short wave-pass filters, Sang-Hwan Cho, Korea Advanced Institute of Science and Technology (Korea, Republic of); Jeong Rok Oh, Kookmin Univ. (Korea, Republic of); Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of); Young Rag Do, Kookmin Univ. (Korea, Republic of)[7617-62]
Dirty LED: effect of dirt on light output, Ivan Moreno, Diego Esparza, Univ. Autónoma de Zacatecas (Mexico)[7617-63]

OPTO

Sensitivity and fabrication issues for LED secondary optics, Chung-Jen Ou, Hsiuping Institute of Technology (Taiwan)[7617-64]

LED beam shaping with use of diffuser with micro-lens array, Xuan-Hao Lee, Wei-Ting Chien, Yi-Chien Lo, Ching-Cherng Sun, National Central Univ. (Taiwan)[7617-65]

Mechanism for Al Ohmic contact formation of laser-irradiated N-face n-GaN, Yanghee Song, Ho Won Jang, Jung Ho Son, Jong-Lam Lee, Pohang Univ. of Science and Technology (Korea, Republic of)[7617-66]

Grating coupled enhancement of light emission from IR light-emitting diode devices, Naresh C. Das, Wayne Change, Army Research Lab. (USA)[7617-67]

Improving the performance of white LED by using dielectric film technique, Le Wang, Pei-Fu Gu, Zhejiang Univ. (China); Shang-zhong Jin, China Jiliang Univ. (China)[7617-68]

Phosphor concentration and geometry for high-power white-light-emitting diode, Kyung-Mi Moon, Se-Hwan An, Jung-Hye Chae, Hyung-Kun Kim, Yong-Jo Park, Samsung LED (Korea, Republic of)[7617-69]

High-power 2.2mm light-emitting diode from strained quaternary GaInAsSb multiple-quantum well active region, Jinhui Tan, Jonathon T. Olesberg, Lee Murray, John P. Prineas, The Univ. of Iowa (USA)[7617-71]

Thursday 28 January

SESSION 8

Room: 304 (Esplanade).....Thurs. 8:00 to 10:10 am

OLED

Session Chair: Markus Klein,
OSRAM Opto Semiconductors GmbH (Germany)

8:00 am: **Novel concepts for OLED lighting** (*Invited Paper*), Björn Lüssem, Thomas Rosenow, Sebastian Reineke, Karl Leo, Technische Univ. Dresden (Germany)[7617-39]

8:30 am: **Light-outcoupling enhancement strategies in organic light-emitting diodes** (*Invited Paper*), Wolfgang Bruetting, Jörg Frischeisen, Stefan Nowy, Univ. Augsburg (Germany)[7617-40]

9:00 am: **On the lighting design aspect of OLED lighting** (*Invited Paper*), Peter Ngai, Acuity Brands Lighting (USA)[7617-41]

9:30 am: **Measuring the internal electroluminescence quantum efficiency of OLED emitter materials**, Michael Flämmich, Norbert Danz, Dirk Michaelis, Christoph A. Wächter, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Malte C. Gather, Klaus Meerholz, Univ. zu Köln (Germany)[7617-42]

9:50 am: **Outcoupling efficiency in small-molecule OLEDs: from theory to experiment**, Mauro Furno, Rico Meerheim, Michael Thomschke, Simone Hofmann, Björn Lüssem, Karl Leo, Technische Univ. Dresden (Germany)[7617-43]

Coffee Break10:10 to 10:40 am

SESSION 9

Room: 304 (Esplanade).....Thurs. 10:40 to 11:50 am

Semipolar and Nonpolar Growth

Session Chair: Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan)

10:40 am: **Nonpolar and semipolar GaN LEDs on sapphire substrates** (*Invited Paper*), Jung Han, Yale Univ. (USA); Qian Sun, Yale University (USA)[7617-44]

11:10 am: **Anisotropic properties of nonpolar M-plane GaN**, Shih-Wei Feng, Chih-Kai Yang, National Univ. of Kaohsiung (Taiwan); Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan); Qian Sun, Jung Han, Yale Univ. (USA)[7617-45]

11:30 am: **M-plane InGaN light-emitting diodes grown by PAMBE**, Shu-Ting Chou, Ting-Wei Liang, S. Y. Chiang, Ming-Fong Hsieh, Yung-Sung Q. Chen, Paritosh V. Wadekar, Priya V. Chinta, Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan)[7617-46]

Lunch/Exhibition Break11:50 am to 1:10 pm

SESSION 10

Room: 304 (Esplanade).....Thurs. 1:10 to 3:30 pm

Novel Substrates and Materials

Session Chairs: Satoshi Kamiyama, Meijo Univ. (Japan);
Ray-Hua Horng, National Chung Hsing Univ. (Taiwan)

1:10 pm: **High efficiency green LEDs using II-VI color converters**, Thomas J. Miller, Michael A. Haase, Xiaoguang Sun, Bing Hao, Junying Zhang, Terry L. Smith, Todd Ballen, Junqing Xie, Amy S. Barnes, Fedja Kecman, Joseph Yang, James Thielen, Catherine A. Leatherdale, 3M Co. (USA); Ralph Wirth, Andreas Biebersdorf, Karl Engl, Stefan Groetsch, OSRAM Opto Semiconductors GmbH (Germany)[7617-72]

1:30 pm: **LEDs on Si Substrates** (*Invited Paper*), Kei May Lau, Hong Kong Univ. of Science and Technology (Hong Kong, China)[7617-47]

2:00 pm: **High-power GaN-based blue LEDs grown on Si substrate by MOCVD**, Li Wang, Fengyi Jiang, Xiaolan Wang, Chunlan Mo, Xiaoli You, Changda Zheng, Weihua Liu, Yinhua Zhou, Chuanbing Xiong, Lattice Power (Jiangxi) Corp. (China)[7617-48]

2:20 pm: **Nanoarchitecture light emitting diode microarrays** (*Invited Paper*), Gyu-Chul Yi, Seoul National Univ. (Korea, Republic of)[7617-47]

2:50 pm: **Silicon nanocrystals-based light-emitting diodes integrated utilizing all inorganic metal oxide as the charge transport layers**, An-Jen Cheng, Richard W. Liptak, Uwe R. Kortshagen, Stephen A. Campbell, Univ. of Minnesota (USA)[7617-50]

3:10 pm: **Stability of binary-doped ZnO thin film in high-humidity environment**, Hsiu-Ming Hsieh, Chengyi Liu, National Central Univ. (Taiwan)[7617-51]

Coffee Break3:30 to 4:00 pm

SESSION 11

Room: 304 (Esplanade).....Thurs. 4:00 to 5:50 pm

UV-LEDs

Session Chair: Gerd Bacher, Univ. Duisburg-Essen (Germany)

4:00 pm: **Recent progress of 220-280nm-band AlGaIn based deep-UV LEDs** (*Invited Paper*), Hideki Hirayama, RIKEN (Japan)[7617-52]

4:30 pm: **Improved performance of near-ultraviolet InGaN/AlGaIn LEDs with various insertion structures** (*Invited Paper*), Dong-Sing Wu, Wen-Yu Lin, Ying-Chiuang Tsai, Shih-Cheng Huang, Ray-Hua Horng, National Chung Hsing Univ. (Taiwan); Chien-Min Liu, National Chiao Tung Univ. (Taiwan)[7617-53]

5:00 pm: **Low-resistive Ni/Ag ohmic contacts to p-AlGaIn for UV LEDs**, Thorsten Passow, Richard Gutt, Michael Kunzer, Wilfried Pletschen, Ralf Schmidt, Joachim Wiegert, Shangjing Liu, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany)[7617-54]

5:20 pm: **Development of high-power nitride LEDs and its application** (*Invited Paper*), Cheolsoo Sone, Samsung Electro-Mechanics (Korea, Republic of)[7617-55]

Emerging Liquid Crystal Technologies V

Conference Chair: **Liang-Chy Chien**, Kent State Univ.

Program Committee: **Dirk J. Broer**, Philips Research Nederland B.V. (Netherlands); **Vladimir G. Chigrinov**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Harry J. Coles**, Univ. of Cambridge (United Kingdom); **Gregory P. Crawford**, Univ. of Notre Dame; **Andy Y. Fuh**, National Cheng Kung Univ. (Taiwan); **Otto Wolfgang Haase**, Technische Univ. Darmstadt (Germany); **Jun-ichi Hanna**, Tokyo Institute of Technology (Japan); **Heinz-Siegfried Kitzerow**, Univ. Paderborn (Germany); **Shunsuke Kobayashi**, Tokyo Univ. of Science (Japan); **Seung Hee Lee**, Chonbuk National Univ. (Korea, Republic of); **Akihiro Mochizuki**, Nano Loa, Inc.; **Ci-Ling Pan**, National Chiao Tung Univ. (Taiwan); **Ryo Sakurai**, Bridgestone Corp. (Japan); **Richard Sutherland**, SAIC; **Shin-Tson Wu**, Univ. of Central Florida; **Hiroshi Yokoyama**, Kent State Univ.

Monday 25 January

SESSION 1

Room: 202 (Mezzanine) Mon. 1:30 to 3:00 pm

Emissive, Headmount and Projection Displays

Session Chair: **Byoung-ho Lee**, Seoul National Univ. (Korea, Republic of)

- 1:30 pm: **Quantum dot light emitting devices with heavy metal-free materials** (*Invited Paper*), Seth A. Coe-Sullivan, Peter T. Kazlas, Jonathan S. Steckel, John E. Ritter, QD Vision Inc. (USA) [7618-01]
- 2:00 pm: **Design of a free-form single-element see-through head-worn display**, Ozan Cakmakci, Kevin Thompson, Optical Research Associates (USA); Jannick Rolland, Univ. of Rochester (USA) [7618-02]
- 2:20 pm: **Next-generation head-mounted display**, James P. McGuire, Jr., Optical Research Associates (USA) [7618-03]
- 2:40 pm: **High-power high-bandwidth laser diode driver for next-generation laser projectors**, Andreas Streck, Wilhelm Stork, Univ. Karlsruhe (Germany); Armin Wagner, ELOVIS GmbH (Germany) [7618-04]
- Coffee Break 3:00 to 3:30 pm

SESSION 2

Room: 202 (Mezzanine) Mon. 3:30 to 5:40 pm

3D Displays

Session Chair: **Tae-Hoon Yoon**, Pusan National Univ. (Korea, Republic of)

- 3:30 pm: **Overview of 3D/2D switchable liquid crystal display technologies** (*Invited Paper*), Byoung-ho Lee, Seoul National Univ. (Korea, Republic of); Jae-Hyeung Park, Chungbuk National Univ. (Korea, Republic of) [7618-05]
- 4:00 pm: **Static 3D image space**, Badia Koudsi, Jim J. Sluss, Jr., Univ. of Oklahoma (USA) [7618-06]
- 4:20 pm: **Super multiview display and electronic holography as future 3D display**, Yasuhiro Takaki, Tokyo Univ. of Agriculture and Technology (Japan) [7618-08]
- 4:40 pm: **Resolution analysis of Fourier-hologram generated by integral imaging and its enhancement**, Chen Ni, Jae-Hyeung Park, Kim Nam, Byong-Ho Yoon, Chungbuk National Univ. (Korea, Republic of) [7618-09]
- 5:00 pm: **A new method for laser speckle suppression**, Michael M. Tilleman, Elbit Systems of America (USA) [7618-10]
- 5:20 pm: **An artifact metrics which utilizes laser speckle patterns for plastic ID card surface**, Manabu Yamakoshi, National Printing Bureau of Japan (Japan); Xiaoying Rong, California Polytechnic State Univ., San Luis Obispo (USA); Tsutomu Matsumoto, Yokohama National Univ. (Japan) [7618-11]

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: **E. Fred Schubert**, Rensselaer Polytechnic Institute; **Liang-Chy Chien**, Kent State Univ.

- 8:30 am: **Introduction and Opening Remarks**
- 8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)
- 9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

Coffee Break 10:00 to 10:30 am

SESSION 3

Room: 202 (Mezzanine) Tues. 10:30 am to 12:10 pm

Nonlinear Optics and Lasing

Session Chair: **Masanori Ozaki**, Osaka Univ. (Japan)

- 10:30 am: **Resonantly-pumped optical Kerr nonlinearity in liquid crystalline materials** (*Keynote Presentation*), Yuen-Ron Shen, Univ. of California, Berkeley (USA) [7618-12]
- 11:10 am: **Photoreactive third-harmonic generation in liquid crystalline azopolymer thin films** (*Invited Paper*), Chia Chen Hsu, Jian Hung Lin, Hung Chih Kan, National Chung Cheng Univ. (Taiwan); Liang-Chy Chien, Kent State Univ. (USA) [7618-13]
- 11:40 am: **Liquid crystal waveguides: new devices enabled by >1000 waves of optical phase control** (*Invited Paper*), Scott R. Davis, Scott D. Rommel, George Farca, Alan W. Martin, Benjamin Luey, Seth Johnson, Michael H. Anderson, Vescent Photonics Inc. (USA) [7618-47]
- Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 4

Room: 202 (Mezzanine) Tues. 1:30 to 3:00 pm

Nanoparticles Self-Assembly, Dispersion and Manipulation

Session Chair: **Yuen-Ron Shen**, Univ. of California, Berkeley

- 1:30 pm: **Quantum dot self assembly in liquid crystal media** (*Invited Paper*), Linda S. Hirst, University of California, Merced (USA) [7618-15]
- 2:00 pm: **Nanoparticle-dispersed liquid crystal prepared by a simple sputter deposition** (*Invited Paper*), Masanori Ozaki, Hidetsugu Yoshida, Kenji Kawamoto, Akihiko Fujii, T. Tsuda, Susumu Kuwabata, Osaka Univ. (Japan) [7618-16]
- 2:30 pm: **Control of colloidal interactions in liquid crystals by tailoring their shapes and using light-sensitive molecular monolayers** (*Invited Paper*), Ivan I. Smalyukh, Univ. of Colorado at Boulder (USA); Clayton P. Lapointe, Thomas G. Mason, Rahul Trivedi, Angel Martinez, Julian S. Evans, Paul ACKERMAN, University of Colorado at Boulder (USA) [7618-17]
- Coffee Break 3:00 to 3:20 pm

OPTO

SESSION 5

Room: 202 (Mezzanine) Tues. 3:20 to 4:50 pm

Spatial Light Modulators

Session Chair: Sin-Doo Lee, Seoul National Univ. (Korea, Republic of)

3:20 pm: **High performance spectroscopic ellipsometer using linearized liquid crystal phase modulators** (*Invited Paper*), Hiroshi Yokoyama, Liquid Crystal Institute, Kent State University (USA); Yuka Tabe, Waseda University (Japan)[7618-18]

3:50 pm: **30-ns liquid-crystal optical shutters** (*Invited Paper*), Michael G. Geis, Richard J. Molnar, George W. Turner, Theodore M. Lyszczarz, MIT Lincoln Lab. (USA); Richard M. Osgood, U.S. Army Soldier Systems Ctr. (USA) and Natick Lab. Army Research, Development, and Engineering Ctr. (USA); Brian R. Kimball, U.S. Army Soldier Systems Ctr. (USA)[7618-19]

4:20 pm: **Electroactive super-elongation of carbon nanotube aggregates in liquid crystal medium and its application for displays** (*Invited Paper*), Seung Hee Lee, Chonbuk National Univ. (Korea, Republic of)[7618-23]

SESSION 6

Room: 202 (Mezzanine) Tues. 4:50 to 6:10 pm

Bio-Active, Bio-Inspired Materials and Applications

Session Chair: Linda S. Hirst, Univ. of California, Merced

4:50 pm: **Cell biology and active liquid crystals** (*Invited Paper*), Daniel J. Needleman, Jan Brugues, Harvard University (USA)[7618-20]

5:20 pm: **Spatio-temporal growth of membrane patterns and lipid raft domains on a nanotopographic solid support** (*Invited Paper*), Sin-Doo Lee, Sang-Wook Lee, Seoul National Univ. (Korea, Republic of); Tae-Young Yoon, Korea Advanced Institute of Science and Technology (Korea, Republic of)[7618-21]

5:50 pm: **Printable sensor based on cholesteric liquid crystal for temperature and amine detection**, Katherine B. Pacheco, Technische Univ. Eindhoven (Netherlands); Dirk J. Broer, Philips Research Nederland B.V. (Netherlands); Cees W. M. Bastiaansen, Technische Univ. Eindhoven (Netherlands)[7618-22]

TECHNICAL EVENT

Room: Hilton Hotel, Golden Gate 1 Tues. 7:30 to 9:00 pm

Holography

Chair: Hans I. Bjelkhagen,
Centre for Modern Optics, OptIC (United Kingdom)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNNDT), computer-generated holography (CGH), electro- and digital holography, holographic microscopy, and holographic data storage (HDS). This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

Wednesday 27 January

SESSION 7

Room: 202 (Mezzanine) Wed. 8:00 to 10:30 am

New Materials and Substrates

Session Chairs: Junji Watanabe, Tokyo Institute of Technology (Japan); **Liang-Chy Chien**, Kent State Univ.

8:00 am: **Novel cinnamic-acid-derived hydrogen-bonded mesogens with relatively wide blue phases** (*Invited Paper*), Wan-Li He, Huai Yang, Univ. of Science and Technology Beijing (China)[7618-24]

8:30 am: **Liquid crystal and photoluminescent properties of gold(I)-alkanethiolates complexes and their transformation into gold nanomaterials** (*Invited Paper*), Jong-Chan Lee, Seoul National Univ. (Korea, Republic of)[7618-25]

9:00 am: **Plastic substrate technologies for flexible displays** (*Invited Paper*), Toru Hanada, Teijin Ltd. (Japan)[7618-26]

9:30 am: **Regular undulation morphology observed in fracture and film surfaces of chiral S_c* polymer** (*Invited Paper*), Junji Watanabe, Chunying Zhang, Susumu Edo, Ryouhei Ishige, Masatoshi Tokita, Tokyo Institute of Technology (Japan)[7618-27]

10:00 am: **A continous flow synthesis of micrometer sized actuators from liquid crystalline elastomers** (*Invited Paper*), Christian Ohm, Johannes Gutenberg Univ. Mainz (Germany); Christophe Serra, Lab. d'Ingénierie des Polymères pour les Hautes Technologies, CNRS (France); Rudolf Zentel, Johannes Gutenberg Univ. Mainz (Germany)[7618-28]

Coffee Break 10:30 to 11:00 am

SESSION 8

Room: 202 (Mezzanine) Wed. 11:00 am to 12:20 pm

Polymer-Stabilized LCDs

Session Chair: Hiroshi Yokoyama, Kent State Univ.

11:00 am: **Fast electro-optical Kerr effect of nano-structured liquid crystals** (*Invited Paper*), Hirotsugu Kikuchi, Kyushu Univ. (Japan); Yasuhiro Haseba, Chisso Petrochemical Co. Ltd. (Japan); Suk-Won Choi, Kyung Hee University (Korea, Republic of); Shin-ichi Yamamoto, Chisso Petrochemical Co. Ltd. (Japan); Takashi Iwata, NOF Corporations (Japan); Hiroki Higuchi, Kyushu Univ. (Japan)[7618-29]

11:30 am: **Polymer-networked liquid crystal cell for omni-directional viewing angle switching** (*Invited Paper*), Tae-Hoon Yoon, Jong-In Baek, Ki-Han Kim, Jae-Chang Kim, Pusan National Univ. (Korea, Republic of)[7618-30]

12:00 pm: **Liquid crystal directed-polymer nanostructure for vertically aligned nematic devices**, Volodymyr Borshch, Liang-Chy Chien, Kent State Univ. (USA)[7618-31]

Lunch/Exhibition Break 12:20 to 1:20 pm

SESSION 9

Room: 202 (Mezzanine) Wed. 1:20 to 3:10 pm

Dye-Doped Devices

Session Chair: Ivan I. Smalyukh, Univ. of Colorado at Boulder

1:20 pm: **Guest-host liquid crystal devices** (*Invited Paper*), Bahman Taheri, AlphaMicron, Inc. (USA)[7618-32]

1:50 pm: **Bistable device using anchoring transition of nematic liquid crystals on perfluoropolymer surface** (*Invited Paper*), Surajit Dhara, Univ. of Hyderabad (India); Jin Ki Kim, Fumito Araoka, Soon Moon Jeong, Reiri Kogo, Ken Ishikawa, Hideo Takezoe, Tokyo Institute of Technology (Japan)[7618-33]

2:20 pm: **Band-tunable color cone lasing emission based on a dye-doped cholesteric liquid crystal film** (*Invited Paper*), Chia-Rong Lee, S. Lin, National Cheng Kung Univ. (Taiwan); H. Yeh, National Kaohsiung First Univ. of Science and Technology (Taiwan); T. Ji, J. Liu, P. Yang, National Cheng Kung Univ. (Taiwan); Ting-Shan Mo, Kun Shan Univ. of Technology (Taiwan); Shuan-Yu Huang, Chung Shan Medical Univ. (Taiwan); Chie-Tong Kuo, National Sun Yat-Sen Univ. (Taiwan); Kuang Yao Lo, National Chiayi Univ. (Taiwan); Andy Y. Fuh, National Cheng Kung Univ. (Taiwan)[7618-14]

2:50 pm: **Reflective display based on biphotonic effect-induced phase transition in dye-doped cholesteric liquid crystals**, Andy Y.-G. Fuh, San-Yi Huang, Yi-Shin Chen, Hung-Chang Jau, Ming-Shian Li, Jui-Hsiang Liu, National Cheng Kung Univ. (Taiwan)[7618-34]

Coffee Break 3:10 to 3:40 pm

SESSION 10

Room: 202 (Mezzanine) Wed. 3:40 to 6:00 pm

Holography and Holographically-Formed PDLCs

Session Chair: Andy Y. Fuh, National Cheng Kung Univ. (Taiwan)

3:40 pm: **Electrically switchable diffractive devices based on LC and polymer composites** (*Invited Paper*), Joachim Stumpe, Oksana V. Sakhno, Fraunhofer-Institut für Angewandte Polymerforschung (Germany) [7618-35]

4:10 pm: **The dynamics of human sperm droplets on a liquid crystal and polymer composite film**, Farn Lu, Ton Yen General Hospital (Taiwan); Yi-Hsin Lin, National Chiao Tung Univ. (Taiwan); Wan-Chen Tsai, Ton Yen General Hospital (Taiwan); Jiong-Juan Li, Ting-Yu Chu, National Chiao Tung Univ. (Taiwan); Hsu-Kuan Hsu, Wang-Yang Li, Chi-Mei Optoelectronics Corp. (Taiwan) [7618-36]

4:30 pm: **Evaluations of liquid crystal panel as a random phase modulator for optical encryption systems based on the double random phase encoding**, Yasuhiro Harada, Shingo Fukuyama, Kitami Institute of Technology (Japan) [7618-37]

4:50 pm: **Electrical tuning of two-dimensional honeycomb photonic lattices using holographic polymer dispersed liquid crystals**, Ryuichiroh Ohira, Mayu Miki, Yasuo Tomita, The Univ. of Electro-Communications (Japan) [7618-38]

5:10 pm: **Ultrafast switching liquid crystals for next-generation transmissive and reflective displays** (*Invited Paper*), Harry J. Coles, Univ. of Cambridge (United Kingdom) [7618-39]

5:40 pm: **High quality assembly of liquid crystal on silicon (LCoS) devices for phase only holography**, Zichen Zhang, Anna M. Jeziorska-Chapman, Neil Collings, Mike Pivnenko, John Moore, Bill A. Crossland, D. P. Chu, Univ. of Cambridge (United Kingdom) [7618-46]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Smart windows with functions of reflective display and indoor temperature control, I-Hui Lee, Yu-Ching Chao, Chih-Cheng Hsu, Liang-Chao Chang, Taipei Municipal Lishan High School (Taiwan); Tien-Lung Chiu, Yuan Ze University (Taiwan); Jiunn-Yih Lee, National Taiwan Univ. of Science and Technology (Taiwan); Fu-Jen Kao, National Yang-Ming Univ. (Taiwan); Chih-Kung Lee, Jiun-Haw Lee, National Taiwan Univ. (Taiwan) [7618-40]

Novel type of tunable infrared liquid crystalline filters, Tahir D. Ibragimov, Institute of Physics (Azerbaijan); Gazanfar M. Bayramov, Baku State Univ. (Azerbaijan) [7618-41]

Textured Zn₂SiO₄:Mn²⁺ phosphor film on quartz glass, Jae Bum Lee, Je Hong Park, Kwang Won Park, Pukyong National Univ. (Korea, Republic of); Kwang Il Seo, Young Kw K. Kwon, MUJIN (Korea, Republic of); Jong Su Kim, Pong Kyun Shon, Sang Nam Lee, Pukyong National Univ. (Korea, Republic of) [7618-43]

A metal-dielectric thin film with broadband absorption, Sang-Hwan Cho, Ju-Hyung Kang, Min-Kyo Seo, Jin-Kyu Yang, Sung-Yong Kang, Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7618-44]

Multi-domain liquid crystal alignment based on periodical polyimide micro-bars fabricated by inkjet printing, Jeoung-Yeon Hwang, Liang-Chy Chien, Kent State Univ. (USA) [7618-45]



Practical Holography XXIV: Materials and Applications

Conference Chairs: **Hans I. Bjelkhagen**, Glyndwr Univ. (United Kingdom) and Technium OpTIC (United Kingdom); **Raymond K. Kostuk**, The Univ. of Arizona

Program Committee: **V. Michael Bove, Jr.**, MIT Media Lab.; **Gerald L. Heidt**, Wasatch Photonics, Inc.; **Toshio Honda**, Chiba Univ. (Japan); **Fujio Iwata**, Toppan Printing Co., Ltd. (Japan); **Tung H. Jeong**, Lake Forest College; **Gaylord E. Moss**, MossOptics; **Albert O. Okorogu**, The Aerospace Corp.; **Nadya O. Reingand**, CeLight, Inc.; **Martin J. Richardson**, De Montfort Univ. (United Kingdom); **Christopher W. Slinger**, QinetiQ Ltd. (United Kingdom); **Fred D. Unterseher**, Columbia Career Ctr.; **Ichirou Yamaguchi**, The Institute of Physical and Chemical Research (Japan); **Toyohiko Yatagai**, Utsunomiya Univ. (Japan)

Sunday 24 January

SESSION 1

Room: 202/204 (Mezzanine). Sun. 8:20 to 10:00 am

Holographic Video and LCD

8:20 am: **Frameless hologram display module employing resolution redistribution optical system**, Yasuhiro Takaki, Yumi Tanemoto, Tokyo Univ. of Agriculture and Technology (Japan)[7619-01]

8:40 am: **Interactive holographic stereograms with accommodation cues**, Quinn Smithwick, James Barabas, Daniel Smalley, V. Michael Bove, Jr., MIT Media Lab. (USA)[7619-02]

9:00 am: **Holographic single-image velocimetry**, Lisa Dixon, David G. Grier, New York Univ. (USA)[7619-03]

9:20 am: **Flow visualization and flow cytometry with holographic video microscopy**, Fook-Chiong Cheong, David G. Grier, New York Univ. (USA)[7619-04]

9:40 am: **Real-time color holography system for live scene using 4K2K video system**, Kenji Yamamoto, Tomoyuki Mishina, Ryutaro Oi, Takanori Senoh, Taiichiro Kurita, National Institute of Information and Communications Technology (Japan)[7619-05]

Coffee Break10:00 to 10:30 am

SESSION 2

Room: 202/204 (Mezzanine). Sun. 10:30 to 11:50 am

Digital and Computer Generated Holography

10:30 am: **Single-shot digital holography applying spatial heterodyne method**, Yoshihide Iwayama, Kohei Maejima, Kunihiro Sato, Univ. of Hyogo (Japan)[7619-06]

10:50 am: **Tolerance analysis in single-shot phase-shifting digital holography based on the spatial carrier interferometry**, Yasuhiro Harada, Aizuddin Wan, Yuichi Sasaki, Kitami Institute of Technology (Japan)[7619-07]

11:10 am: **Computer-generated holograms considering background reflection on various object shapes with reflectance distributions**, Kazuhiro Yamaguchi, Yuji Sakamoto, Hokkaido Univ. (Japan)[7619-08]

11:30 am: **Calculation of computer-generated hologram for 3D display using light-ray sampling plane**, Koki Wakunami, Masahiro Yamaguchi, Tokyo Institute of Technology (Japan)[7619-09]

Lunch/Exhibition Break11:50 am to 1:10 pm

SESSION 3

Room: 202/204 (Mezzanine). Sun. 1:10 to 3:10 pm

Applications and Displays

1:10 pm: **Lens-less holographic microscope with high-resolving power**, Kunihiro Sato, Osamu Murata, Univ. of Hyogo (Japan)[7619-10]

1:30 pm: **Application of holographic interferometry to misalignment measurements in packaging applications**, Vladimir V. Nikulin, Zhao Liu, Binghamton Univ. (USA)[7619-11]

1:50 pm: **Using photoconductivity for coherence domain imaging**, Xiangxue Zhang, Univ. of Missouri, Columbia (USA) and Beijing Forestry Univ. (China); Ping Yu, Univ. of Missouri, Columbia (USA)[7619-12]

2:10 pm: **Application of holographic optical elements in active interferometers for nondestructive testing**, János Kornis, Richárd Sféf, Budapest Univ. of Technology and Economics (Hungary)[7619-13]

2:30 pm: **Optically compensating for degraded reconstructed images in phase-conjugate holographic data storage**, Tetsuhiko Muroi, Nobuhiro Kinoshita, Norihiko Ishii, Koji Kamijo, Naoki Shimidzu, NHK Science & Technology Research Labs. (Japan)[7619-14]

2:50 pm: **Zonal wavefront sensing with improved dynamic range and resolution using a liquid crystal spatial light modulator**, Bosanta R. Boruah, Indian Institute of Technology Guwahati (India)[7619-16]

Coffee Break3:10 to 3:40 pm

SESSION 4

Room: 202/204 (Mezzanine). Sun. 3:40 to 6:00 pm

Materials and Experimental Techniques

3:40 pm: **Blends of azobenzene-containing polymers and molecular glasses as stable rewritable holographic storage materials**, Roland Walker, Hubert Audorff, Lothar Kador, Hans-Werner Schmidt, Univ. Bayreuth (Germany)[7619-42]

4:00 pm: **Reaction-diffusion model applied to high-resolution Bayfol-HX1 photopolymer**, Friedrich K. Bruder, Francois O. Deuber, Thomas Fäcke, Rainer Hagen, Dennis Hönel, Bayer MaterialScience AG (Germany); David Jurbergs, Bayer MaterialScience LLC (USA); Thomas Rölle, Marc S. Weiser, Bayer MaterialScience AG (Germany)[7619-17]

4:20 pm: **Fabrication of HOEs with enhanced characteristics**, Christo G. Stojanoff, Holotec GmbH (Germany)[7619-18]

4:40 pm: **Holographic recording without a separate reference wave**, Meric Ozcan, Muharrem Bayraktar, Sabanci Univ. (Turkey)[7619-19]

5:00 pm: **Refreshable holographic 3D display using photorefractive polymer: progresses and prospectives**, Pierre-Alexandre Blanche, Ram Voorakaranam, Cory Christenson, College of Optical Sciences, The Univ. of Arizona (USA); Arkady Bablumian, TIPD LLC (USA); Jayan Thomas, College of Optical Sciences, The Univ. of Arizona (USA); Michiharu Yamamoto, Nitto Denko Technical Corp. (USA); Robert A. Norwood, Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA)[7619-41]

5:20 pm: **New thermoplastic-based photosensitive materials for holographic applications**, Mark Cheverton, Sumeet Jain, Moitreyee Sinha, Mike Takemori, Andrew Burns, John Maxam, GE Global Research (USA); Shreyas Chakravarti, Michael Davis, Christopher Hein, Bart Kiekens, Mike Laurin, Lennard Markestein, Matt Niemeyer, Bimal Patel, Shinichiro Tanizaki, Mahari Tjahjadi, Jian Zhou, SABIC Innovative Plastics (USA); George Kuriakose, Shantaram Naik, Pradeep Nadkarni, Kiran Puthamane, Vinod Vasudevan, GE John F. Welch Technology Ctr. (India)[7619-43]

5:40 pm: **A fast analytical algorithm for generating CGH of 3D scene**, YuanZhi Liu, Jianwen Dong, Yiyang Pu, Bingchu Chen, Hexiang He, Zilan Deng, Hezhou Wang, Sun Yat-sen Univ. (China)[7619-21]

Tuesday 26 January

OPTO Plenary Session

Room: 102 (Exhibit Level) Tues. 8:30 to 10:00 am

Session Chairs: E. Fred Schubert, Rensselaer Polytechnic Institute; Liang-Chy Chien, Kent State Univ.

8:30 am: **Introduction and Opening Remarks**

8:40 am: **GaN-based nonpolar/semipolar LEDs, laser diodes and bulk crystal growth**, Shuji Nakamura, Univ. of California, Santa Barbara (USA)

9:20 am: **Solid-state lighting: science, technology and economic perspectives**, Jeffrey Y. Tsao, Sandia National Labs. (USA)

TECHNICAL EVENT

Room: Hilton Hotel, Golden Gate 1. Tues. 7:30 to 9:00 pm

Holography

Chair: Hans I. Bjelkhagen, Centre for Modern Optics, OpTIC (United Kingdom)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNDT), computer-generated holography (CGH), electro- and digital holography, holographic microscopy, and holographic data storage (HDS). This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

- Experimental study on the influence of wavefront aberration for holographic data storage**, Naruki Yoshida, Tokyo Univ. of Science (Japan) [7619-31]
- Simulation study on the influence of wavefront aberration for holographic memory**, Yasuhiro Ohuchi, Tokyo Univ. of Science (Japan) [7619-32]
- Pre-calculated object light-based fast calculation method for computer-generated hologram**, Hironobu Sakata, Yuji Sakamoto, Hokkaido Univ. (Japan) [7619-33]
- Fresnel hologram generation by using HD resolution depth video camera**, Ryutaro Oi, Kenji Yamamoto, Takanori Senoh, Tomoyuki Mishina, Taiichiro Kurita, National Institute of Information and Communications Technology (Japan) [7619-34]
- An electro holography using reflective LCD for enlarging visual field and viewing zone with the Fourier transform optical system in CGH**, Atsushi Katou, Yuji Sakamoto, Hokkaido Univ. (Japan) [7619-36]
- Efficient CGH generation of three-dimensional objects using line-redundancy and novel-look-up table method**, Seung-Cheol Kim, Woo-Young Choe, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of) [7619-37]
- Efficient generation of 3D hologram for American Sign Language using look-up table**, Seung-Cheol Kim, Joo-Sup Park, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of) [7619-38]
- High-definition full-parallax CGHs created by using the polygon-based method and the shifted angular spectrum method**, Kyoji Matsushima, Sumio Nakahara, Kansai Univ. (Japan) [7619-39]
- Integration of holograms into designer objects: preliminary results**, Jürgen P. Eichler, Sebastian Chruszicki, Claudia Schneeweiss, Gerhard K. Ackermann, Technische Fachhochschule Berlin (Germany) [7619-40]

Wednesday 27 January

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

- Mobile phone color holography**, Stanislovas J. Zacharovas, Andrej Nikolskij, Evgenij A. Kuchin, Geola Digital uab (Lithuania) [7619-22]
- Floating image display with high-resolution computer-generated hologram**, Takeshi Yamaguchi, Tomohiko Fujii, Hiroshi Yoshikawa, Nihon Univ. (Japan) [7619-23]
- Superresolution digital holographic microscopy using multipoint light sources illumination**, Anh-Hoang Phan, Nam Kim, Jae-Hyeung Park, Chungbuk National Univ. (Korea, Republic of); Seok-Hee Jeon, Univ. of Incheon (Korea, Republic of) [7619-24]
- The electromagnetic wave diffraction on a dielectric multilayer coated Fourier grating in conical mounting**, Makoto Ohki, Koki Sato, Shonan Institute of Technology (Japan); Shogo Kozaki, Gunma Univ. (Japan) [7619-26]
- Image enhancement in phase-shifting digital holographic microscopy using spiral-phase filter**, Mei-Lan Piao, Nam Kim, Jae-Hyeung Park, Chungbuk National Univ. (Korea, Republic of); Sang-Geun Gil, Univ. of Suwon (Korea, Republic of) [7619-27]
- Evolution of diffraction efficiency of holograms with monosaccharides**, Nildia Y. Mejias-Brizuela, Arturo Olivares Pérez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Abel Grande Grande, Instituto Tecnológico Superior de Atlixco (Mexico); Israel Fuentes Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7619-28]
- Study of pH effect and aging of coating emulsions for hologram recording**, Rosangela C. Fontanilla-Urdaneta, Arturo Olivares-Pérez, Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7619-29]
- High-speed white-LED-light optical transmission for computer-generated hologram**, Koki Sato, Shonan Institute of Technology (Japan) [7619-30]



Broadband Access Communication Technologies IV

Conference Chairs: **Benjamin Dingel**, Nasfine Photonics, Inc.; **Raj Jain**, Washington Univ. in St. Louis; **Katsutoshi Tsukamoto**, Osaka Univ. (Japan)

Program Committee: **Arjan Durresti**, Indiana Univ.-Purdue Univ. Indianapolis; **David W. Faulkner**, British Telecom Research Labs. (United Kingdom); **Mahbub Hassan**, Univ. of New South Wales (Australia); **Mohsen Kavehrad**, The Pennsylvania State Univ.; **Rangaraj Madabhushi**, Madabhushi Consultants, LLC; **Nicholas Madamopoulos**, The City College of New York; **Dalma Novak**, Pharad, LLC; **Jean-Charles Point**, JCP-Consult (France); **Ken-ichi Sato**, Nagoya Univ. (Japan); **Peter Van Daele**, Univ. Gent (Belgium); **Jeroen S. Wellen**, Alcatel-Lucent (Netherlands)

Wednesday 27 January

SESSION 1

Room: Room 232 (Mezzanine) Wed. 9:00 to 9:35 am

Economics of Broadband Access

Session Chair: **Benjamin Dingel**, Nasfine Photonics, Inc.

9:00 am: **Pricing broadband access** (*Invited Paper*), Mung Chiang, Princeton Univ. (USA) [7620-01]

SESSION 2

Room: Room 232 (Mezzanine) Wed. 9:35 to 11:55 am

Toward 4G Wireless Access

Session Chairs: **Raj Jain**, Washington Univ. in St. Louis; **Benjamin Dingel**, Nasfine Photonics, Inc.

9:35 am: **A case for cross-layer traffic management in 4G networks** (*Invited Paper*), Shyam Parekh, Alcatel-Lucent Bell Labs. (USA) [7620-16]

10:10 am: **Introduction and comparison of next-generation mobile wireless technologies**, Syed R. Zaidi, Shahab Hussain, Mohamed A. Ali, The City College of New York (USA); Ajaz Sana, Samir Saddawi, Bronx Community College (USA); Aparicio Carranza, New York City College of Technology (USA) [7620-03]

Coffee Break 10:30 to 11:00 am

11:00 am: **Smooth migration technologies towards next-generation access systems** (*Invited Paper*), Naoto Yoshimoto, NTT Access Network Service Systems Labs. (Japan) [7620-04]

11:35 am: **Integration of PON and 4G mobile WiMAX networks to provide broadband integrated services to end users**, Shahab Hussain, Syed R. Zaidi, Mohamed A. Ali, The City College of New York (USA); Ajaz Sana, Bronx Community College (USA) [7620-05]

Lunch/Exhibition Break 11:55 am to 1:30 pm

SESSION 3

Room: Room 232 (Mezzanine) Wed. 1:30 to 3:25 pm

High Speed Access: Systems and Devices

Session Chairs: **Benjamin Dingel**, Nasfine Photonics, Inc.; **Katsutoshi Tsukamoto**, Osaka Univ. (Japan)

1:30 pm: **Fiber-radio solutions for in-building high speed wireless networks** (*Invited Paper*), Michael Sauer, Corning Inc. (USA) [7620-06]

2:05 pm: **Analysis of the spectrum characteristics of a super linear optical modulator**, Andru J. Prescod, Corning Inc. (USA); Benjamin Dingel, Nasfine Photonics, Inc. (USA); Nicholas Madamopoulos, The City College of New York (USA) [7620-07]

2:25 pm: **Optical heterodyne technique for generating and distributing microwave signals**, Alejandro García Juárez, Univ. de Sonora (Mexico); Ignacio E. Zaldivar Huerta, Gustavo Aguayo Rodríguez, Instituto Nacional de Astrofísica Óptica y Electrónica (Mexico); Jorge Rodríguez-Asomoza, Univ. de las Américas Puebla (Mexico); Rocío R. Gómez Colín, Alicia Vera Marquina, Milka del Carmen Acosta Enriquez, Armando Rojas Hernández, Univ. de Sonora (Mexico) [7620-08]

2:45 pm: **Cancellation of the IMD3 and IMD5 using opto-electrical predistortion optical transmitter for radio-over-fiber systems**, Tae-Kyeong Lee, Yon-Tae Moon, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [7620-09]

3:05 pm: **Modeling and performance analysis of an all-optical photonic microwave filter in the frequency range of 0.01-15 GHz**, Gustavo Aguayo Rodríguez, Ignacio E. Zaldivar-Huerta, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Jorge Rodríguez Asomoza, Univ. de las Américas Puebla (Mexico); Alejandro García Juárez, Univ. de Sonora (Mexico); Paul Alonso Rubio, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7620-10]

Coffee Break 3:25 to 3:55 pm

SESSION 4

Room: Room 232 (Mezzanine) Wed. 3:55 to 5:30 pm

Advances in PON and Optical Wireless

Session Chairs: **Katsutoshi Tsukamoto**, Osaka Univ. (Japan); **Raj Jain**, Washington Univ. in St. Louis

3:55 pm: **Application and technical issues of WDM-PON** (*Invited Paper*), Katsumi Iwatsuki, NTT Access Network Service Systems Labs. (Japan) [7620-11]

4:30 pm: **A novel PON-based mobile distributed cluster of antennas approach to provide impartial and broadband services to end users**, Ajaz Sana, Samir Saddawi, Bronx Community College/CUNY (USA); Shahab Hussain, Syed R. Zaidi, The City College of New York (USA) [7620-12]

4:50 pm: **Wideband optical propagation measurement system for characterization of indoor optical wireless channels**, Mohsen Kavehrad, Jarir Fadlullah, The Pennsylvania State Univ. (USA) [7620-13]

5:10 pm: **Efficiency of MIMO configuration and adaptive optics corrections in free space optical fading channels**, Zeinab Hajjarian Kashani, Mohsen Kavehrad, The Pennsylvania State Univ. (USA) [7620-14]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions on page 319.

Statistical analysis on the optical fading in free space optical channel for RoFSO link design, Kyung-Hwan Kim, Takeshi Higashino, Katsutoshi Tsukamoto, Shozo Komaki, Osaka Univ. (Japan); Kamugisha Kazaura, Mitsuji Matsumoto, Waseda Univ. (Japan) [7620-15]

Optical Metro Networks and Short-Haul Systems II

Conference Chairs: **Werner Weiershausen**, Deutsche Telekom AG (Germany); **Benjamin Dingel**, Nasfne Photonics, Inc.; **Achyut Kumar Dutta**, Banphil Photonics, Inc.; **Atul K. Srivastava**, OneTerabit

Program Committee: **Ronald Freund**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Franco Küppers**, College of Optical Sciences, The Univ. of Arizona; **Ralph Leppla**, Deutsche Telekom AG (Germany); **Ernst-Dieter Schmidt**, Siemens AG (Germany); **Sascha Vorbeck**, Deutsche Telekom AG (Germany); **Winston I. Way**, OpVista, Inc.

Wednesday 27 January

SESSION 1

Room: 200 (Mezzanine) Wed. 1:30 to 3:30 pm

Fiber Optics Links and Devices

Joint Session with conference 7607: Optoelectronic Interconnects and Component Integration X

Session Chair: **Yakov G. Soskind**, David H. Pollock Consultants, Inc.

1:30 pm: **Evolution of optical access network technologies** (*Invited Paper*), Thomas Pfeiffer, Alcatel-Lucent Deutschland AG (Germany) [7607-41]

2:00 pm: **Optical fiber interconnects: physical design for reliability** (*Invited Paper*), Ephraim Suhir, Univ. of California, Santa Cruz (USA) and Univ. of Maryland, College Park (USA) and ERS Co. (USA); Allen M. Earman, Arasor (USA) [7607-42]

2:30 pm: **Active and tunable waveguide devices based on silicon and silica for use in optical communication systems** (*Invited Paper*), Ernst Brinkmeyer, Technische Univ. Hamburg-Harburg (Germany) [7621-01]

3:00 pm: **Optical transceivers for short and medium reach optical networks** (*Invited Paper*), Bernd Huebner, Finisar Corp (USA) [7621-02]

Coffee Break 3:30 to 4:00 pm

SESSION 2

Room: 200 (Mezzanine) Wed. 4:00 to 6:00 pm

Metro Network Architecture

Session Chair: **Atul K. Srivastava**, OneTerabit

4:00 pm: **Changing the network structure: leaving the past behind** (*Invited Paper*), Ralf Herber, T-Systems Enterprise Services GmbH (Germany) [7621-03]

4:30 pm: **Optical metro networks 2.0** (*Invited Paper*), Joerg-Peter Elbers, ADVA AG Optical Networking (Germany) [7621-04]

5:00 pm: **Recent development and future prospects of optical metro networks and their technologies** (*Invited Paper*), Tetsuro Inui, Akio Sahara, Tetsuo Takahashi, NTT Network Innovation Labs. (Japan) [7621-05]

5:30 pm: **All optical grooming for 100G ethernet** (*Invited Paper*), Juerg Leuthold, Wolfgang Freude, Univ. Karlsruhe (Germany) [7621-07]

POSTERS—Wednesday

Room: 103/104 (Exhibit Level) Wed. 6:00 to 7:30 pm

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Investigation of dense dispersion management optical links with non-perfect dispersion maps, Vladimir A. Burdin, Vladimir A. Andreev, Mikhail V. Dashkov, Kirill A. Volkov, Povolzhskaya State Academy of Telecommunications and Informatics (Russian Federation) [7621-25]

Optical link upgrade by DDMS technique with compensating fiber in optical cable closure, Vladimir A. Burdin, Anton V. Bourdine, Mikhail V. Dashkov, Kirill A. Volkov, Povolzhskaya State Academy of Telecommunications and Informatics (Russian Federation) [7621-26]

Thursday 28 January

SESSION 3

Room: 200 (Mezzanine) Thurs. 8:00 to 10:10 am

Components and Sub-Systems for Optical Networks

Session Chair: **Werner Weiershausen**, Deutsche Telekom AG (Germany)

8:00 am: **In-service characterization of optical links and signals with respect to PMD** (*Invited Paper*), Harald Rosenfeldt, Agilent Technologies Deutschland GmbH (Germany) [7621-06]

8:30 am: **Phase preserving amplitude noise suppression using an attenuation imbalanced NOLM**, Earl R. Parsons, College of Optical Sciences, The Univ. of Arizona (USA); Christian Stephan, Klaus Sponsel, Tobias Roethlingshoefer, Max Planck Institute for the Science of Light (Germany); Franko Küppers, College of Optical Sciences, The Univ. of Arizona (USA); Georgy Onishchukov, Max Planck Institute for the Science of Light (Germany); Bernhard Schmauss, University of Erlangen-Nuremberg (Germany); Gerd Leuchs, Max Planck Institute for the Science of Light (Germany) [7621-08]

8:50 am: **Photonic balancing and its application in optical receivers and regenerators for fiber optic systems** (*Invited Paper*), Franko Küppers, Earl R. Parsons, Hacène Chaouch, College of Optical Sciences, The Univ. of Arizona (USA); Werner Weiershausen, Marco Mattila, Ari Tervonen, Tuomo von Lerber, Luxdyne Ltd. (Finland) [7621-09]

9:20 am: **Challenges and opportunities for optical amplifiers in metro optical networks** (*Invited Paper*), Gregory J. Cowle, JDSU (USA) [7621-10]

9:50 am: **All-optical 2x2 switch by exploiting optical nonlinearities in a single semiconductor optical amplifier**, Claudio Porzi, Scuola Superiore Sant'Anna (Italy); Lingmei Ma, Tsinghua Univ. (China); Mirco Scaffardi, CNIT (Italy); Minyu Yao, Tsinghua Univ. (China); Luca Poti, Antonella Bogoni, CNIT (Italy) [7621-11]

Coffee Break 10:10 to 10:40 am

SESSION 4

Room: 200 (Mezzanine) Thurs. 10:40 am to 12:00 pm

Access and Metro Network Convergence

Session Chair: **Atul K. Srivastava**, OneTerabit

10:40 am: **NG-PON: Enabling technologies for metro-access convergence** (*Invited Paper*), Frank J. Effenberger, Huawei Technologies Co., Ltd. (USA) [7621-12]

11:10 am: **Challenges of future converged access and metro networks** (*Invited Paper*), Dirk Breuer, Ralf Hülsermann, Christoph Lange, Erik Weis, Deutsche Telekom Labs. (Germany) [7621-13]

11:40 am: **Effects of network node consolidation in optical access and aggregation networks on costs and power consumption**, Christoph Lange, Ralf Hülsermann, Dirk Kosiankowski, Frank Geilhardt, Andreas Gladisch, Deutsche Telekom AG (Germany) [7621-14]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 5

Room: 200 (Mezzanine)Thurs. 1:30 to 3:00 pm

**High Capacity Transmission and
New Modulation Formats I**

*Session Chair: Werner Weiershausen,
Deutsche Telekom AG (Germany)*

1:30 pm: **40G/100G DWDM transmission in metro optical networks** (*Invited Paper*), Avid Lemus, Ross Saunders, Opnext, Inc. (USA)[7621-15]

2:00 pm: **Serial 100 Gbit/s PM-RZ-DQPSK transmission in the presence of perturbations from lower data rate neighboring channels**, Hacène Chaouch, Franko Küppers, College of Optical Sciences, The Univ. of Arizona (USA); Sascha Vorbeck, Malte Schneiders, Deutsche Telekom (Germany)[7621-16]

2:20 pm: **Non-binary LDPC-coded modulation for high-speed optical metro networks with back propagation**, MURAT ARABACI, Ivan B. Djordjevic, The University of Arizona (USA); Ross Saunders, Roberto M. Marcoccia, Opnext, Inc. (USA)[7621-17]

2:40 pm: **Quaternary modulation formats for 100-Gbps optical links**, Thomas F. Detwiler, Steven M. Searcy, Georgia Institute of Technology (USA); Robert Lingle, Jr., OFS Fitel, LLC (USA); E. Bert Basch, Verizon Labs., Inc. (USA); Stephen E. Ralph, Georgia Institute of Technology (USA)[7621-18]

Coffee Break :3:00 to 3:30 pm

SESSION 6

Room: 200 (Mezzanine)Thurs. 3:30 to 5:40 pm

**High Capacity Transmission and
New Modulation Formats II**

Session Chair: Achyut Kumar Dutta, Banpil Photonics, Inc.

3:30 pm: **Ultimate information capacity of fiber optic networks** (*Invited Paper*), Ivan B. Djordjevic, The Univ. of Arizona (USA)[7621-19]

4:00 pm: **DQPSK for metro networks**, Andrew J. Stark, Yu-Ting Hsueh, Cheng Liu, Georgia Institute of Technology (USA); Alan McCurdy, Robert Lingle, Jr., OFS Fitel, LLC (USA); Sorin Tibuleac, ADVA Optical Networking (USA); Gee-Kung Chang, Stephen E. Ralph, Georgia Institute of Technology (USA) [7621-20]

4:20 pm: **Capacity achieving modulation format for high-speed optical networks**, Hussam G. Batshon, Ivan B. Djordjevic, The Univ. of Arizona (USA)[7621-21]

4:40 pm: **1- μ m waveband and C-band, 10-Gbps error-free operation of ultra-broadband photonic transport system with holey fiber**, Naokatsu Yamamoto, Kouichi Akahane, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Yu Omigawa, Aoyama Gakuin Univ. (Japan); Hideyuki Sotobayashi, Aoyama Gakuin Univ. (Japan) and National Institute of Information and Communications Technology (Japan)[7621-22]

5:00 pm: **Experimental demonstration of simultaneous compensation of polarization mode dispersion and fiber nonlinearities by LDPC-coded turbo equalization**, Lyubomir L. Minkov, Ivan B. Djordjevic, The Univ. of Arizona (USA)[7621-23]

5:20 pm: **NLMS-based PMD equalization with improved adaption speed**, Daniel Goelz, Peter Meissner, Technische Univ. Darmstadt (Germany) .[7621-24]

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

A


- Aalders, Maurice C.** 7555 ProgComm
Aamar, Ousama M. [7548C-168]S1
Aans, Jan Bonne [7548C-181]S5
Aaron, Holly L. 7569 SPS1 SessChr
Aaron, Jesse S. [7570-01]S1
Aaron, Jesse [7576-26]S7
Abboud, Marie [7576-33]S8
Abdollahi Pour, Siamak [7608-60]S13,
[7608-94]S16
Abdou-Ahmed, Marwan [7579-22]S6
Abe, Hiroshi [7594-21]S6
Abermann, Stephan [7603-26]S6
Abeyasinghe, Don C. [7604-45]S10
Abid, Mohamed [7603-46]S10
Abiko, Yoshimitsu [7552-06]S1
Able, Andreas [7597-50]S11
Abolghasemi, Ladan E. [7609-38]S9
Abou-Zied, Osama K. [7576-40]S10
Abraham, Anish V. [7570-03]S1
Abraham, Annie [7576-02]S1, [7576-
56]SPS1, [7576-57]SPS1
Abraham, Thomas [7555-33]S7
Abram, Tim [7593-45]SPS2
Abramov, Avraham [7558-01]S1
Abramski, Krzysztof [7578-90]SPS2
Abran, Maxime [7573-45]SPS1
Abreu, Igor D. [7549-15]S2
Abshire, James B. [7578-01]S1,
[7582-19]S5
Abushagur, Mustafa A. G. [7604-44]
S9
Abu-Yousif, Adnan [7551-17]S4,
[7551-18]S4
Acevedo, Luis [7597-29]S7
Aceves, Alejandro [7580-77]SPS2
Achanta, Ravi [7592-18]S4
Achilefu, Samuel 7565 ProgComm,
[7569-64]S9, 7576 Chr, 7576 S1
SessChr, [7576-08]S2, [7576-11]
S3, [7576-12]S3, [7576-34]S9,
[7576-36]S9, [7576-72]SPS1
Achtenhagen, Martin 7616
ProgComm, 7616 S8 SessChr,
[7616-32]S8
Ackemann, Thorsten [7597-26]S6
Ackermann, Gerhard K. [7619-40]
SPS3
Ackermann, Katrin [7593-01]S1
Acosta, Eva [7550-87]SPS1
Acosta Enriquez, Milka del Carmen
[7620-08]S3
Adachi, Jun [7612-24]S6
Adachi, Sadao [7579-50]SPS2
Adam, Jean-Luc 7598 ProgComm
Adamiec, Pawel [7616-53]S12
Adams, David [7616-46]S11
Adams, Jessica [7597-04]S1
Adams, Michael J. [7597-59]S13
Adelaiye, Alexander B. [7552-28]SPS1
Adelsteinsson, Orn [7565-06]S2
Adibi, Ali TrackChr, [7569-79]SPS1,
7609 Chr, 7609 S1 SessChr, 7609
S10 SessChr, [7609-19]S5, [7609-
30]S7, [7609-31]S7, [7609-42]S10,
[7609-48]S11
Adie, Steven G. [7554-65]S10, [7554-
69]S11
Adleman, James R. [7593-11]S2
Adler, Desmond C. [7548D-114]S3,
[7554-02]S1, [7554-49]S8, [7558-
20]S4
Adler, Werner [7555-42]S9
Adschiri, Tadafumi [7575-38]SPS1
Aé, Lorenz [7603-47]S10
Aeberhard, Urs 7597 S13 SessChr,
[7597-01]S1
Aegerter, Christof M. [7554-108]SPS1
Aers, Geof C. [7616-49]S11, [7608-88]
S19
Afonso, Carmen N. [7584-04]S1, 7586
ProgComm, 7586 S4 SessChr,
[7586-08]S2
Afshar, Kourosh [7548B-32]S1
Agard, David A. [7570-05]S1
Agarwal, Anita [7550-33]S6
Agarwal, Asha [7561-19]S3
Agarwal, Vivechana [7603-56]S12
Agaskar, Pradyot A. [7569-96]S3
Agazzi, Laura [7604-07]S2
Agger, Søren [7580-45]S11
Agranat, Aharon J. [7604-33]S7
Agrawal, Anant [7556-18]S5, 7567
ProgComm, 7567 S4 SessChr
Agrawal, Brij [7587-15]S3
Agrawal, Deepak [7554-09]S2
Agrawal, Govind P. [7598-42]S10
Agriba, Pavel [7577-25]S6
Aguayo Rodríguez, Gustavo [7620-
08]S3, [7620-10]S3
Aguet, François [7571-25]S7, [7571-
35]S10
Aguilar, Guillermo [7548A-04]S,
[7562-38]S8
Aguilo, Magdalena [7578-14]S3
Aguirre, Aaron D. [7554-08]S2
Aguirre, Andres [7564-127]SPS1,
[7564-130]SPS1
Ahamad, Nur U. [7559-21]S
Ahari Kaleibar, Aminreza [7593-12]S2
Aharoni, Daniel B. [7608-85]S18
Ahearne, Mark [7566-09]S2
Ahlers, Christian [7550-27]S5
Ahlert, Sandra [7583-23]S5
Ahluwalia, Balpreet S. [7604-31]
S7, [7613-29]S8, [7613-31]SPS3,
[7613-26]S7
Ahmad, Adeel [7554-65]S10, [7558-
15]S4, [7569-22]S3
Ahmadi, Elahe [7609-13]S3
Ahn, Byeong-Hyeon [7609-17]S4,
[7610-16]S4
Ahn, Hyo-Yang [7599-29]S8, [7599-
37]S10, [7599-61]SPS3
Ahn, Jin-chul [7548C-97]S5, [7552-10]
S2
Ahn, Myoung Ki [7558-27]SPS1,
[7568-25]SPS1
Ahn, Sungmo [7591-13]S3, [7617-60]
SPS3
Ahn, Sunmin [7553-17]S5
Ahn, Wha-Keun [7582-52]SPS2
Ahn, Yeh-Chan [7548C-175]S2,
[7554-72]S11, [7555-58]SPS1,
[7593-05]S1
Ahn, Youngkeun [7568-72]S1
Ai, Irene [7583-20]S5
Aichele, Thomas [7609-09]S3
Aidam, Rolf [7616-60]S14
Aiello, M. [7575-15]S6
Aigouy, Lionel [7608-29]S7
Aikens, David M. SC700 Inst, SC863
Inst
Ait-Belkacem, Dora [7569-56]S8
Aitchison, J. S. [7584-22]S8, [7584-22]
S12, [7591-17]S5, [7593-06]S1
Ait-Kaci, Hocine [7608-64]S14
Akahane, Kouichi [7610-24]S6, [7621-
22]S6
Akahane, Yutaka [7589-18]S5
Akalin, Tahsin [7608-31]S7
Akasaki, Isamu [7602-58]S13, [7602-
76]S11, [7602-76]SPS3, [7617-01]
S1
Akchurin, Georgy G. [7563-27]S5
Akers, Walter [7569-64]S9, [7576-11]
S3, [7576-12]S3, [7576-34]S9,
[7576-72]SPS1
Akhlagh Moayed, Alireza [7550-65]
SPS1, [7554-15]S3
Akhmediev, Nail [7580-80]SPS2
Akhtar, Mohammed [7548B-36]S1
Akhter, Mohammed P. [7548F-140]S1
Akikusa, Naota [7616-61]S14
Akins, Brian A. [7575-33]S10
Akl, Tony J. [7572-20]SPS1
Akondi, Vyasa [7588-05]S1, [7588-09]
S2
Akopian, Nikolay [7608-27]S6
Aksnes, Astrid [7548A-12]S
Al Saleh, Mohammed [7614-09]S3
Alam, Assadullah [7617-24]S5
Alam, Murad 7565 S2 SessChr, [7565-
04]S2
Alam, Shaif-ul [7580-06]S1, [7580-35]
S9, [7582-17]S4
Alasaarela, Tapani [7598-11]S3,
[7598-12]S3, [7606-50]SPS3
Alayo, Marco I. [7590-13]S2, [7598-
69]SPS3
Albero, Felipe G. [7549-14]S2
Albert, Genevieve [7568-34]S6
Albert, Jacques [7559-21]S, [7577-16]
S4
Albert, Stephanie [7604-04]S1
Aldea, Eugen [7598-14]S4
Alén, B. [7610-09]S3
Alencar, Márcio A. R. C. [7582-47]S10,
[7612-18]S5, [7610-21]S5
Alexandrou, Antigoni [7560-20]S3,
7575 ProgComm, [7575-02]S2,
[7575-45]S9
Alfano, R. [7561-09]S1, [7561-40]
SPS1, [7561-42]SPS1, 7548F
ProgComm, 7561 Chr, 7561 S2
SessChr, [7561-06]S1, [7561-41]
SPS1, [7582-56]SPS2, [7613-04]
S1, [7613-17]S5, [7613-28]S8
Alfieri, Domenico [7548A-06]S,
[7548A-07]S, [7569-40]S6
Al-Halhouli, Alaaldeem T. [7593-40]
SPS2
Alharbi, Fahhad [7597-32]S7
Al-Hendy, Ayman [7560-18]S4
Ali, Mohamed A. [7620-03]S2, [7620-
05]S2
Ali Zulqurnain, Ali [7575-16]S6
Alic, Nikola [7582-09]S3
Alimova, A. [7561-40]SPS1
Ali-Ridha, Andre [7550-65]SPS1
Alivisatos, A. Paul [7575-01]S1
Alizadeh-Bagheri, Amir [7589-47]
SPS2
Alkayed, Nabil [7548E-125]S1
Alkeskjold, Thomas T. [7580-37]S9,
[7580-45]S11, [7580-48]S11
Al-Lawatia, Najla [7576-40]S10
Allegra Mascaro, Anna Letizia [7548G-
164]SPS1
Allegretti, Luca A. [7598-45]S11
Allen, David W. [7567-15]S4
Allen, Kenneth W. [7605-25]S9
Allen, Thomas J. [7564-11]S2
Allenstein, Frank [7591-33]S8
Almeida, Diogo [7575-04]S2
Almeida, Janete D. [7561-39]SPS1
Almutairi, Adah [7576-12]S3, [7576-
34]S9
Al-Omari, Ahmad N. [7615-24]S6
Alonso Rubio, Paul [7620-10]S3
Alonso-Álvarez, D. [7610-09]S3
Alouini, Mehdi [7612-28]S7
Al-Qadi, Bassam [7577-31]S7
Al-Saadi, Aws [7579-45]S11, [7606-
41]S11
Alsing, Paul [7608-42]S9
Alt, Clemens [7550-45]S9
Altmann, Konrad [7578-88]SPS2
Alton, Daniel J. [7579-39]S10
Altoukhov, Alexei [7616-18]S4
Altschuler, Margin D. [7551-13]S3
Altschuler, Gregory B. 7549
ProgComm, [7563-30]SPS1
Alvarez-Tamayo, R. I. [7580-98]SPS2
Alves, Marcelo C. [7549-23]S
Alvez, Rani d. S. [7560-07]SPS1
Amaechi, Bennett T. 7548F
ProgComm
Amako, Jun 7585 CoChr, 7585 S4
SessChr
Amano, Hiroshi 7597 ProgComm,
7602 ProgComm, [7602-58]S13,
[7602-76]S11, [7602-76]SPS3,
[7617-01]S1
Amaral, Ademir [7575-24]S8
Amat-Roldan, Ivan [7569-99]SPS1
Ambekar Ramachandra Rao, Raghu
[7569-80]SPS1
Amelink, Arjen [7548C-83]S2, [7548C-
184]S4
Amelyan, Gayane V. [7551-39]SPS1
Amiji, Mansoor [7576-36]S9
Amin, Faheem [7575-16]S6
Amirian, James [7564-09]S2
Amrami, Kimberly K. [7548B-44]S3
Amsden, Jason A. [7553-05]S2,
[7553-15]S4
Amyot, Franck [7561-36]S5
Amzajerdian, Farzin [7608-80]S17
An, Ho Myoung [7602-66]S15
An, Lin [7550-71]SPS1, [7554-19]S3,
[7554-40]S6
An, Se-Hwan [7617-69]SPS3
An, Yupeng [7583-42]SPS2, [7603-63]
SPS3
Ana, Patricia A. [7549-14]S2
Anand, Sanjay [7551-04]S2
Anappara, Aji A. [7600-63]S15
Anastasio, Mark A. 7564 ProgComm,
7564 S3 SessChr, 7564 S11
SessChr, [7564-24]S4, [7564-115]
SPS1, [7564-119]SPS1
Andegeko, Yair [7569-125]S9
Anderegg, Jesse P. [7580-15]S4,
[7580-15]S6, [7580-15]S1
Anders, Juanita 7552 Chr, 7552 S2
SessChr, [7552-11]S2
Andersen, C. E. [7559-37]S
Andersen, Geoff P. [7595-05]S1
Andersen, Peter E. 7554 ProgComm,
[7554-52]S8, [7582-02]S4, [7582-
02]S6, [7582-02]S1, [7616-52]S12
Andersen, Thomas V. [7580-57]S13
Anderson, Chris D. [7563-32]SPS1
Anderson, George [7553-07]S2
Anderson, Michael H. [7618-47]S3
Anderson, Mitchell D. [7590-02]S1
Anderson, Monte D. [7612-10]S2
Anderson, R. Rox SympChair,
[7548A-02]S
Anderson, Sean P. [7606-25]S7,
[7606-39]S10
Anderson, Sean [7617-61]SPS3
Anderson, Troy P. [7589-44]S8,
[7589-44]S12, [7590-03]S1
Anderson, Jan Y. [7602-78]SPS3,
[7602-78]S11
Andersson, Stefan K. 7561
ProgComm
Andilla, Jordi [7568-90]S3, [7570-32]
S7
Andken, Kerry Lee [7567-18]S4
Ando, Takahiro [7562-33]S7
Ando, Tsuneya [7608-53]S11
Andrade, Carolina D. [7576-47]S11
Andrade, Juliana [7575-07]S3
Andrade, L. A. [7569-59]S8, [7569-
111]SPS1
Andrade, Luis Eduardo C. [7568-14]
SPS1
Andraud, Chantal 7599 ProgComm,
7599 S9 SessChr, [7599-12]S3,
[7599-41]S11
Andre, Franck M. [7548G-156]S3

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member


- Andre, Regis [7600-08]S2
Andreev, Vladimir A. [7621-25]SPS3
Andrejco, Matthew J. [7580-51]S12
Andrew, Jennifer [7576-18]S5
Andrews, Aaron M. [7616-22]S5,
[7616-62]S14
Andrews, David L. [7569-66]S9,
[7571-10]S2, 7613 CoChr, 7613 S2
SessChr, 7613 S7 SessChr, [7613-
08]S3, [7613-24]S7
Andrews, Jonathan R. [7595-07]S2,
[7595-08]S2
Andrews, Larry C. SC188 Inst, 7588
ProgComm, [7588-08]S2, [7588-
19]S4
Andrews, Mark P. [7574-25]S4
Andrews, Michael K. [7563-07]S5
Andrisano, Vincenza 7568
ProgComm, [7574-12]S2
Andruschenko, Sergi [7572-08]S2
Andrusyak, Oleksiy G. [7578-45]S11,
[7580-63]S15, [7580-65]S15
Aneesh, Alex [7554-30]S5
Angeles Chavez, Carlos [7576-25]S6
Anis, Hanan [7569-93]SPS1
Anischenko, Vadim S. 7563
ProgComm
Anisimov, Petr M. [7611-14]S3, [7611-
32]S7
Anka, Ali [7548E-130]S3
Ankundinov, Aleksandr [7597-16]S4
Ansari, Rafat R. 7550 ProgComm,
7550 S3 SessChr, [7550-07]S2,
[7550-11]SPS1, [7550-63]SPS1,
7572 ProgComm
Ansbaek, Thor [7615-09]S3
Anstee, Quentin [7561-07]S1
Anthony, Brian W. [7593-08]S2
Anthony, John E. [7599-25]S6
Antipov, Andrei [7608-73]S16
Antonczak, Arkadiusz [7578-90]SPS2
Antos, Linda [7556-21]S5
Anvari, Bahman [7562-15]S4, [7576-
58]SPS1
Anwar, Shahzad [7552-27]SPS1
Ao, Xianyu [7579-07]S2
Aoki, Hiromichi [7557-17]S4
Aouani, Heykel [7571-09]S2, [7577-
19]S5
Aoyama, Makoto [7589-18]S5
Appavoo, Kannatassen [7586-05]S1
Applegate, Brian E. [7554-32]S5,
[7554-70]S11, [7561-23]S4, [7564-
35]S5
Aptel, Florent [7550-48]S10, [7589-02]
S1
Aquirre, Aaron D. [7570-19]S4
Aquirre, Andres [7564-78]S11
ARABACI, MURAT [7621-17]S5
Arai, Hideaki [7597-51]S11, [7597-61]
S13
Arai, Toshiaki [7598-32]S8
Arai, Tsunenori [7548D-108]S1,
[7551-40]SPS1, [7562-32]S7
Arakawa, Yasuhiko 7597 Chr, [7597-
43]S10, [7602-38]S8, [7603-35]S8,
[7608-44]S10, [7610-12]S3, 7616
ProgComm
Araki, Tsutomu [7569-21]S3, [7569-70]
SPS1
Aranzabe, Ana [7584-33]S11
Araoka, Fumito [7618-33]S9
Araya, Roberto [7548G-154]S2
Arbab, M. Hassan H. [7601-05]S1
Arbeit, Jeffrey M. [7564-05]S1
Arce, Gonzalo R. [7596-12]S3
Arce-Diego, José L. [7548A-08]S,
[7548F-145]S2, [7562-10]S3
Ardeshiri, Ardalan [7566-12]S3,
[7548A-19]S
- Ardeshirpour, Yasaman** [7564-127]
SPS1
Arguirov, Tzanimir [7586-17]S4
Arian, Cyrus [7580-60]S14
Arie, Ady [7553-10]S3
Arif, Khalid M. [7574-32]SPS1
Arima, Yasunori [7589-26]S7
Arimoto, Yoshinori [7587-06]S2,
[7587-07]S2
Arisaka, Katsushi [7608-85]S18
Arisawa, Emilia A. L. [7560-04]S4
Arit, Sebastian [7583-21]S5
Armani, Andrea M. [7604-11]S2
Armellini, Cristina [7598-23]S6
Armstrong, Andrew M. [7617-17]S4
Armstrong, Darrell J. 7582
ProgComm, 7582 S7 SessChr,
[7582-28]S6
Armstrong, David [7569-40]S6, [7569-
103]S6
Armstrong, William B. [7548C-169]S5,
[7548C-177]S2
Arndt-Staufenbiel, Norbert [7607-14]
S4
Arnett, Curtesa L. [7576-47]S11,
[7576-59]SPS1
Arney, Susanne 7594 ProgComm
Arnold, Cord L. [7589-02]S1
Arnold, Craig B. [7570-29]S6, 7584
ProgComm, 7589 ProgComm
Arnold, Felix [7587-03]S1
Arnold, Stephen [7553-04]S1, [7579-
29]S7
Arnold, Thomas [7570-20]S4
Arora, Siddharth [7563-08]S1
Arridge, Simon R. [7573-15]S4
Arrieta-Quintero, Esdras [7550-86]
SPS1
Arrigoni, Marco [7569-40]S6
Arrington, Christian L. [7590-08]S2,
[7590-14]S3
Arroyo Rojas Dasilva, Yadira [7602-15]
S3, [7602-19]S4
Arsenault, Michel [7564-46]S7
Arsene, Octavian [7574-14]S2
Arshavsky, Vadim Y. [7548G-158]S3
Artal, Pablo [7550-40]S8, [7550-41]
S8, [7550-87]SPS1, [7569-112]
SPS1, [7569-113]SPS1, [7595-14]
S3
Artigas, David [7569-99]SPS1, [7570-
32]S7
Arum, Carl-Jørgen [7548B-43]S3,
[7548B-58]S6
Aruna, P. [7577-29]S6, [7582-48]S10
Aruta, Carmela [7603-30]S7
Arzberger, Markus [7583-28]S6
Arzumanov, Grant [7573-33]S8
As, Donat J. [7608-15]S4
Asada, Masaki [7597-57]S12
Asanani, Nayan [7548D-112]S2
Asanuma, Daisuke [7576-09]S3,
[7576-60]SPS1
Aschke, Lutz 7579 CoChr, 7579 S10
SessChr, [7579-20]S5, [7583-55]
SPS2
Asghari, Mehdi [7607-03]S1
Ash, William M. [7568-58]S1
Ashekenazi, Shai [7564-96]SPS1
Ashida, Hiroshi [7551-30]S7, [7562-
33]S7, [7564-47]S7
Ashmead, Allan [7578-66]S16
Askari, Murtaza 7609 S11 SessChr,
[7609-42]S10
Aslan, Mustafa M. [7559-36]S
Asryan, Levon V. [7610-25]S6, [7610-
27]S6
Assion, Andreas [7578-63]S15
Astratov, Vasily N. [7605-25]S9
Atanaskova, N. [7551-04]S2
Atature, Mete [7611-25]S6
- Atia, Walid [7554-50]S8
Atiquzzaman, Mohammed [7587-23]
S4, [7587-32]S5
Atlas, Michael [7573-07]S2, [7576-33]
S8
Attias, Andre-Jean [7599-35]S9
Atwell, Thomas D. [7548B-44]S3
Au, Hinmeng [7607-08]S2
Au, Kendrew [7567-05]S2
Au, Leslie [7564-66]S9
Au, Michael [7583-17]S4
Au, Sylvia [7561-18]S3
Aubé, Maryse [7579-44]S11
Audet, Ross M. [7607-33]S8
Aurdorf, Hubert [7619-42]S4
Auen, Karsten [7582-06]S2
Auf der Maur, Matthias [7597-09]S2,
[7597-12]S3
Augst, Steven J. [7578-40]S10
Austwick, Martin R. [7548C-180]S4,
[7573-04]S1, [7573-11]S3, [7573-
14]S3, [7573-26]S7, [7573-48]SPS1
Avadisian, Miriam [7576-48]S11
Avakyants, Leo [7568-77]SPS1,
[7574-18]S3, [7574-28]S4
Avanesyan, Sergey M. [7585-06]S2
Avanes-Espinosa, Rodrigo [7570-32]S7
Avizonis, Petras V. [7578-16]S4
Avramescu, Adrian [7616-16]S4
Avramov, Latchezar A. [7563-33]
SPS1
Avrutin, Vitaliy [7602-79]S4
Awazu, Kunio [7562-13]S4, [7562-26]
S6, [7562-47]SPS1
Awschalom, David D. [7611-03]S1
Axt, Volrath M. 7600 S11 SessChr,
[7600-26]S6
Ay, Feridun [7605-20]S7
Ayache, Nicholas 7557 ProgComm
Ayala-Diaz, Cesar [7598-68]SPS3
Ayaz, Ulas [7579-28]S7
Ayers, Frederick [7567-05]S2
Ayesheshim, Ayesheshim K. [7600-65]
S15
Aylo, Rola [7604-37]S8
Aymon, Daniela [7548B-57]S6
Ayotte, Simon [7579-44]S11
Ayres Pereira, Fernando R. [7556-
35]SPS1
Azar, Fred S. 7557 Chr, 7557 S2
SessChr, 7557 S3 SessChr, 7557
S4 SessChr
Azevedo, Clayton [7575-07]S3
Azevedo, Denise [7575-24]S8
Azizian, Mahdi [7568-13]S5
Azorin Peris, Vicente [7556-24]S6
Azucena, Oscar A. [7595-16]S3
Azuma, Takeshi [7562-26]S6
Azyazov, Valeriy N. [7581-04]S1,
[7581-07]S1
- B**
- Baac, Hyoung Won [7564-89]SPS1,
[7564-96]SPS1, [7564-97]SPS1
Baarstad, Ivar [7561-30]S4
Baas, Augustin [7600-08]S2
Baba, Toshihiko 7597 ProgComm,
[7612-24]S6
Babinec, Thomas [7609-07]S2
Bablumian, Arkady [7619-41]S4
Babu, N. Ramesh [7590-31]S
Babushkin, Andrei V. [7580-22]S6
Bacchin, Gianluca [7583-24]S5
Bacher, Gerd 7617 ProgComm, 7617
S11 SessChr
Bachler, Brandon R. [7569-23]S3
Bachmann, Adrian [7558-18]S4
Bachmann, Alexander [7548B-63]S7
- Bachmann, Friedrich G.** 7583
ProgComm, 7583 S3 SessChr,
7585 ProgComm, 7585 S2
SessChr
Bachmann, Luciano [7549-14]S2
Bachor, Hans [7548E-126]S2, [7613-
21]S6
Backman, Marie [7586-07]S2, [7586-
23]SPS2
Backman, Vadim [7556-19]S5, [7559-
13]S, [7561-28]S4, [7563-05]S1,
[7567-13]S3, [7568-62]S1, 7573
Chr, 7573 S5 SessChr, 7573 S8
SessChr, [7573-02]S1, [7573-10]
S3, [7573-21]S5, [7573-34]S8
Badali, Daniel [7576-48]S11
Bade, Klaus [7586-14]S3
Badea, Cristian [7557-04]S1
Bader, Arjen [7569-24]S4
Badieirostami, Majid [7571-33]S10
Badikov, D. V. [7578-76]SPS2
Badikov, Valerii V. [7578-75]SPS2,
[7578-76]SPS2
Badizadegan, Kamran [7568-65]S6,
[7568-66]S4
Bado, Philippe 7584 ProgComm
Bae, Yoonsung [7574-07]S1, [7575-
40]SPS1
Bae, Youngwoo [7548A-18]S
Baehr-Jones, Tom W. [7604-27]S6
Baek, Jong Hyeob [7602-70]S11,
[7602-70]SPS3
Baek, Jong-In [7618-30]S8
Baeten, John [7564-20]S3
Baets, Roel [7554-46]S7
Baeumler, Wolfgang [7548C-176]S2
Baggett, Brenda K. [7570-34]S7
Baghsiahi, Hadi [7607-18]S5
Baghininchi, Pierre-Olivier [7566-
01]S1, [7566-03]S1
Bagnato, Vanderlei S. [7550-76]SPS1,
[7551-33]SPS1, [7555-32]S6,
[7557-33]SPS1
Bahir, Gad [7602-45]S10
Bahmani, Baharak [7576-58]SPS1
Bahner, Malte L. [7555-17]S4
Bai, Chendong [7583-01]S1, [7583-04]
S1, [7583-46]SPS2
Bai, Jian [7591-21]S5
Bai, Lihua [7551-28]S7
Bai, Yanbo [7608-11]S3, [7608-96]S3,
[7609-14]S4
Baida, Hatim [7600-02]S1
Bailey, Wendell O. S. [7578-50]S12
Baird, Brian W. [7580-25]S7
Bajaj, Jagmohan 7608 ProgComm,
7608 S15 SessChr
Bajoni, Daniele [7608-26]S6
Bakanas, Ramunas [7578-30]S7
Bakaraju, Ravi Chandra [7550-88]
SPS1
Bakarov, Ashkat K. [7610-15]S4
Baker, Howard J. [7578-20]S5, [7580-
06]S1
Baker, James R. [7553-02]S1
Baker, Kevin L. [7595-01]S1, [7595-02]
S1
Baker, Michael S. [7592-30]S6
Baker, Sherry [7568-81]SPS1
Bakowski, Mietek [7602-78]SPS3,
[7602-78]S11
Bakr, Mohamed H. [7598-19]S5,
[7604-43]S10
Balaa, Karla [7570-36]S7, [7577-27]S6
Balabuc, Cosmin [7549-22]S
Balalaeva, Irina [7568-21]S5, [7568-
46]S2, [7575-34]S10
Balch, Kevin [7582-09]S3
Balda, Rolindes [7598-03]S1, [7614-
09]S3
Baldacchini, Tommaso 7584
ProgComm

Balderas, Sandra E. [7582-45]S10
Baldini, Francesco [7559-08]S,
 [7574-11]S2
Baldovino-Pantaleón, Oscar [7562-37]S8
 Baldwin, Geoff [7593-02]S1
 Bale, Brandon G. [7580-31]S8, [7580-70]SPS2, [7582-40]S9
 Ball, David A. [7568-55]S5
Ballato, John M. 7591 ProgComm, [7598-40]S10
Ballen, Todd [7617-72]S10
 Ballesta, Jérôme [7595-19]S4
 Ballif, Christophe [7603-09]S3
 Balster, Sven [7548C-100]S5
 Balu, Mihaela [7569-130]SPS1
Bamber, Jeffrey [7564-57]S8
 Bamiedakis, Nikolaos [7607-23]S6
 Bammer, Ferdinand [7598-65]SPS3
 Banachowicz, Bartosz [7617-38]S7
Bandara, Sumith V. [7608-56]S12
 Bandera, Yuriy [7591-37]SPS2, [7599-62]SPS3
 Bandyopadhyay, N. [7608-96]S3
Banerjee, Partha P. [7604-37]S8
 Banerjee, Sreetama [7606-02]S1
 Bangert, Ursel [7606-55]SPS3, [7606-56]SPS3
 Banin, Eyal [7589-11]S4
 Banister, Ron [7593-29]S6
 Banks, Matthew R. [7573-48]SPS1
 Bansaku, Isao [7564-105]SPS1
 Bansropun, Shailendra [7616-35]S8
 Banton, Garrett [7599-25]S6
 Bao, Ande [7568-63]S4
 Bao, Gang [7575-12]S5
 Bao, Ling [7583-01]S1, [7583-04]S1, [7583-46]SPS2
 Bao, Yiping [7576-20]S5
 Baptista, Mauricio d. S. [7567-07]S2
 Barabas, James [7619-02]S1
 Baraldi, Giorgio [7584-04]S1
 Baranov, Alexei N. 7608 ProgComm, 7608 S6 SessChr, [7616-37]S9
 Baratto, Camilla [7603-40]S9
 Baraulya, Vladimir I. [7578-86]SPS2
 Barber, David [7573-14]S3
Barber, William C. [7557-07]S2
 Barbieri, Stefano [7608-31]S7
 Barbosa, Breno [7575-07]S3
 Barbosa, Luiz C. [7610-08]S2
Barbosa Pinheiro, Antonio L. [7549-15]S2, [7549-18]S, [7552-15]S3, [7552-24]SPS1, [7552-25]SPS1
 Barcikowski, Stephan [7573-20]S5, [7576-27]S7, 7584 ProgComm
 Barclay, Paul E. [7611-07]S2, [7611-09]S2
 Barette, Rudy [7596-13]S3
Bargo, Paulo R. [7548A-09]S, [7548A-22]S, [7548A-24]S
Barman, Ishan [7562-03]S1
 Barnes, Amy S. [7617-72]S10
 Barnett, Nick [7568-60]S6
 Barnett, Stephen M. [7613-20]S6
 Barnham, Keith W. [7597-04]S1
 Barolet, Daniel [7552-02]S1
 Baron, Corey [7600-21]S5
 Baroughi, Mahdi F. [7597-05]S1
 Barquinha, P. [7603-33]S8, [7603-37]S9
Barriga, Simon [7550-52]S11
 Barrios, Pedro J. [7616-49]S11
 Barry, Scott [7550-56]S11
 Barsella, Alberto [7599-12]S3
 Barszczewski, Marcin [7570-31]S6
 Bartels, Martin [7591-26]S6
 Bartels, Randy A. [7568-54]S6
 Bartels, Thomas [7560-10]S3
 Bartelt, Hartmut [7580-46]S11
Barth, Michael [7609-09]S3
 Barthelemy, Agnes [7603-57]S5
 Barthélémy, Eléonore [7604-04]S1
Bartlett, Lisa A. [7558-10]S3
 Bartlome, Richard [7608-07]S2
 Bartnik, Andrzej S. [7584-29]S10, [7586-16]S4
Barton, Jennifer K. 7555 ProgComm, [7555-15]S3, [7558-09]S2, [7558-25]S6, [7558-25]S2, [7572-03]S1, PW10SE S SessChr
 Bartoschewski, Daniel [7583-56]SPS2
 Bartsch, Ivonne [7554-27]S4
 Bartylla, Christoph [7581-08]S2
Barzda, Virginijus [7569-95]S7
 Bascaramurty, Saro [7548D-115]S3
 Basch, E. Bert [7621-18]S5
Basha, Mohamed A. [7594-36]SPS2
 Bashkansky, Mark [7612-13]S3
 Bashkatov, Alexey N. [7563-28]SPS1
 Basiev, Tasoltan T. [7578-75]SPS2, [7578-76]SPS2
 Basiri, Ali [7548A-11]S
 Baski, Alison A. 7602 ProgComm, [7602-33]S7, [7602-59]S13, [7602-73]S11, [7602-73]SPS3, [7602-77]S11, [7602-77]SPS3
 Bassett, Kevin [7608-34]S8
 Bassi, Carl J. [7550-66]SPS1
 Bastiaansen, Cees W. M. [7618-22]S6
 Basu, Santanu 7578 ProgComm, 7578 S4 SessChr, [7578-13]S3, [7578-46]S11, [7579-26]S6, [7580-67]SPS2
 Batalla, Pilar [7575-09]S4
 Batisse, Claire [7569-29]S4
 Batshon, Hussam G. [7621-21]S6
 Batt, Carl A. 7553 ProgComm
 Batteas, James D. [7593-34]S7
 Battistella, Lorenzo [7591-10]S3
 Bauco, Anthony S. [7582-04]S2
 Bauer, Brigitte [7551-29]S7
 Bauer, Daniel [7555-17]S4
Bauer, Daniel R. [7564-122]SPS1
 Bauer-Marschalling, Johannes [7564-23]S4
 Baumann, Bernhard [7550-27]S5, [7550-54]S11, [7554-57]S9, [7554-62]S9
 Baumann, Stefan O. [7554-57]S9
 Baumberg, Jeremy J. [7591-16]S4, [7609-05]S2
 Baumert, Thomas [7586-18]S4, [7600-32]S7
 Bautista, Jerry R. 7607 ProgComm
Baveja, Prashant P. [7598-42]S10
 Bavencove, Anne Laure [7603-61]SPS3
 Bawendi, Mounqi G. 7575 ProgComm
 Bayat, Khadijeh [7597-05]S1
 Bayat, Mina [7609-13]S3
Bayer, Andreas [7583-55]SPS2
Baykal, Yahya K. 7588 ProgComm, [7588-17]S4, [7588-18]S4, [7588-23]S4
 Bayraktar, Muharrem [7619-19]S4
 Bayramov, Gazanfar M. [7618-41]SPS3
 Bazant-Hegemark, Florian [7554-107]SPS1
Beach, Michael E. SC982 Inst
 Beals, Joseph [7607-23]S6
 Beamis, John F. [7548C-80]S2
 Beard, Matthew C. [7600-36]S8
 Beard, Paul C. 7564 ProgComm, 7564 S5 SessChr, [7564-02]S11, [7564-11]S2, [7564-13]S3, [7564-29]S5, [7564-45]S7, [7564-107]SPS1, [7564-112]SPS1
 Beaudoin, Grégoire [7608-86]S18, [7616-41]S9
 Beaumont, Andrew [7566-19]S4

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Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Beaupaire, Emmanuel [7550-48] S10, [7570-29]S6
Beausoleil, Raymond G. [7611-07] S2, [7611-09]S2, 7612 ProgComm, [7616-29]S7, [7616-29]S12
Beavan, Sarah E. [7611-16]S4
Becerra-Macias, Jacqueline [7568-78] S
Beche, Bruno [7604-06]S1
Bechou, Laurent [7583-40]SPS2
Bechstedt, Friedhelm [7603-08]S2
Beck, Fiona [7586-04]S1
Beck, Markus [7606-06]S3
Beck, Michael [7548B-47]S4
Becker, Holger 7593 Chr, 7593 S5 SessChr, 7593 S1 SessChr, [7593-09]S2
Becker, Jill [7598-37]S9
Becker, Lauren [7558-20]S4
Becker, Martin [7559-11]S, [7580-46] S11
Becker, Michael F. 7596 ProgComm, 7596 S2 SessChr, [7596-09]S3
Becker, Wolfgang 7569 ProgComm, [7569-25]S4
Beckers, Ingeborg E. [7570-39]S7
Beckert, Erik [7556-06]S2, [7585-04] S1, [7593-09]S2, [7595-17]S3
Becker-Willinger, Carsten [7590-17] S3, [7591-15]S4
Beckford, Garfield [7576-06]S2
Beckley, Amber M. [7570-37]S7
Bedford, Robert G. [7597-86]SPS3
Beecher, David [7550-17]S3
Been, Stefan [7548B-42]S3, [7556-30] S8, [7562-30]S7
Beere, Harvey E. [7608-31]S7
Beerntsen, Brenda [7564-50]S7
Beg, M. F. [7554-93]SPS1
Beggs, Daryl M. [7604-17]S4
Behring, Richard [7554-23]S4
Behrndt, Martin [7569-56]S8
Beier, Axel [7548A-03]S, [7569-100] SPS1
Beier, Hope T. [7575-17]S6
Beierholm, A. R. [7559-37]S
Beigang, René 7600 S6 SessChr, [7600-22]S5
Beke, Szabolcs [7584-40]SPS2
Bélanger, Samuel [7573-45]SPS1
Belenky, Gregory [7616-66]S2
Belfield, Kevin D. [7576-46]S11, [7576-47]S11, [7576-59]SPS1, [7599-29]S8, [7599-37]S10, [7599-61]SPS3
Belisle, Jonathan M. [7568-68]S3
Belkin, Michael 7550 ProgComm, 7550 S8 SessChr, [7550-10]S2, [7550-28]S6, [7550-83]SPS1, 7562 ProgComm, 7562 S9 SessChr, [7562-39]S9, BO111 Chr
Bell, Howard [7565-10]S3
Belliard, L. [7609-66]SPS3
Bellini, Nicola [7589-10]S3, [7589-29] S7
Bellmann, Konrad [7593-32]S6
Bello Doua, Ramatou [7580-04]S1
Bello-Jiménez, Miguel A. [7580-98] SPS2, [7582-24]S6
Bellotti, Enrico [7602-46]S10, [7603-02]S1, [7606-38]S10, [7608-21]S5
Belloul, Malika [7604-06]S1
Belmonte, Aniceto M. [7588-01]S1
Belmoubarik, Mohamed [7603-07]S2
Belo, Ricardo [7560-13]SPS1
Beloglavsky, Sergey [7578-53]S13
Belokopitov, Mark [7562-39]S9
Belhangady, Chinmay [7612-32]S9
Beltrán, A. M. [7610-09]S3
Belyanin, Alexey A. 7616 Chr, [7616-27]S6
Ben, T. [7610-09]S3
Ben Yaish, Shai [7550-10]S2, [7550-83]SPS1
Benabid, Fetah A. 7609 S9 SessChr, [7609-33]S8, [7612-01]S1
Benalcazar, Wladimir [7558-15]S4, [7569-22]S3
Benavides, Gabriel F. [7581-01]S1
Ben-David, Moshe [7559-35]S
Bender, Tamás [7552-21]S4
Bendett, Mark P. [7548G-190]S
Benech, Pierre [7604-36]S8
Benford, Melodie E. [7577-04]S2
Benichou, Emmanuel [7569-57]S8, [7599-13]S3
Benndorf, Klaus [7569-35]S5
Bennett, Corey V. [7587-21]S3
Benson, Oliver [7579-40]S10, [7609-09]S3
Benson, Trevor M. [7604-30]S7
Bentley, Julie SC935 Inst
Bentoumi, Wissam [7599-12]S3
Bentz, Dirk [7590-17]S3
Ben-Yakar, Adela [7548C-98]S5, [7569-62]S9, [7577-36]S8, 7589 ProgComm, 7589 S3 SessChr, [7589-49]SPS2
Beobide, Garikoitz [7559-07]S
Berakdar, Jamal [7603-23]S5
Berendt, Martin O. [7580-23]S6
Berer, Thomas [7564-21]S4
Beresna, Martynas [7600-41]S10
Berezin, Mikhail [7569-64]S9, 7576 ProgComm, 7576 S5 SessChr, 7576 S7 SessChr, 7576 S9 SessChr, [7576-12]S3, [7576-34] S9, [7576-72]SPS1
Berg, Kristian [7548C-180]S4
Berger, Andrew J. 7560 ProgComm, [7560-16]S5
Berger, Perrine [7612-28]S7
Berggren, Karl K. [7591-10]S3
Bergman, Keren [7598-10]S3
Bergmann, Gerald [7613-25]S7
Bergner, N. [7560-26]S1
Berini, Pierre 7604 ProgComm, 7604 S9 SessChr
Berishev, Igor E. [7583-09]S2
Berk, Yuri [7583-11]S3, [7583-50] SPS2
Berkowitz, Eyal [7608-65]S14
Berland, Keith M. 7569 ProgComm
Berlien, Hans-Peter [7548A-31]SPS1
Berliner, Birgitt [7555-17]S4
Berliner, Michael [7555-17]S4
Berlinguer-Palmini, Rolando [7548G-162]S5
Berman, Gennady P. [7588-03]S1, [7588-10]S2, [7608-32]S7
Berman, Paul R. [7611-20]S5
Bernacki, Bruce E. [7608-13]S3
Berneschi, Simone [7559-08]S, [7598-23]S6, [7604-34]S7
Bernet, Stefan [7570-12]S3
Bernhardt, Edward H. [7605-20]S7
Bernier, Martin [7598-17]S4
Bernini, Romeo [7606-08]S3
Bernstein, Jonathan J. [7577-26]S6
Berry, Catherine [7575-28]S9
Bert, Nikolay A. [7608-61]S13
Bertagnolli, Emmerich [7603-26]S6
Bertazzi, Francesco [7602-46]S10, [7603-02]S1
Bertram, Frank [7602-05]S1, [7602-24] S6, [7602-31]S7, [7602-64]S15
Bertroux, Jean-Claude [7580-76] SPS2, [7616-34]S8
Bertru, Nicolas [7608-45]S10
Bertschi, Mattia [7593-22]S4
Besecker, Jason [7550-37]S7
Besner, Sebastien [7584-02]S1
Bespalov, Victor G. [7601-06]S1
Bestwater, Felix [7575-44]S8
Besthge, Ole [7603-26]S6
Betrouni, Nacim [7548B-40]S2
Betschon, Felix [7607-19]S5, [7607-21]S5
Betten, Peter [7598-35]S9
Bettiati, Mauro A. [7580-76]SPS2
Bettio, Andrew A. [7606-18]S6, [7606-20]S6, [7593-16]SPS2
Betz, Christian S. [7548C-82]S2, [7548C-174]S1, [7548C-178]S2
Betz, Markus 7600 CoChr, 7600 S9 SessChr, 7600 S15 SessChr
Betz, Martha [7566-02]S1
Beuchet, Gérard [7580-76]SPS2, [7616-34]S8
Beuerman, Erich [7599-30]S8, [7599-31]S8, [7599-43]S11
Beunis, Filip [7613-10]S3
Bever, Marco [7550-03]S1, [7550-05] S1
Beveratos, Alexios [7608-86]S18
Beyeler, Rene [7607-19]S5, [7607-20] S5
Bezares, Francisco J. [7611-02]S1
Bhaktha, Shivakiran N. B. [7604-34]S7
Bhandari, Rishi [7548C-94]S4, [7548C-96]S5
Bhatia, Sanjiv [7548E-136]S4, [7556-20]S5
Bhatia, Vikram [7582-04]S2
Bhattacharya, Enakshi 7592 ProgComm, [7592-15]S3, [7592-31] S6, [7594-34]S9
Bhattacharya, Pallab K. 7610 ProgComm
Bhattacharya, Shanti [7594-34]S9
Bhattacharyya, Anirban [7608-21]S5
Bhattacharyya, Kiran [7564-38]S6
Bhowmick, Mithun [7608-22]S5
Bhuiyan, Delower [7599-38]S10
Bi, Lei [7604-05]S1
Bi, Xiaohong [7548F-183]S
Biasioli, Giorgio [7600-63]S15
Bibes, Manuel [7603-57]S5
Bich, Andreas [7594-13]S4
Biebersdorf, Andreas [7617-72]S10
Biedermann, Benjamin R. [7554-41] S7, [7554-51]S8, [7554-56]S8
Biedron, Slavomir [7548C-99]S5
Biel, Merrill A. [7548C-93]S4, [7551-21]S5
Bierden, Paul A. [7595-09]S2
Biesenbach, Jens [7583-14]S3, [7583-23]S5, [7583-27]S6, [7583-28]S6
Bifano, Thomas G. 7595 Chr, 7595 S1 SessChr, [7595-11]S2, [7595-21]S4, [7595-203]S, [7595-203]S, [7595-203]S, [7595-203]S
Bigelow, Nicholas P. 7613 ProgComm
Bigio, Irving J. [7548C-168]S1, [7567-18]S4, 7573 ProgComm, 7573 S7 SessChr, [7573-26]S7
Bigotta, Stefano [7614-02]S1, [7614-06]S2, [7614-08]S3
Biju, Vasudevan P. [7575-46]S9
Bilencia, Alberto [7571-35]S10, [7571-37]S10
Bilge, U#287;ur [7573-31]S7
Billard, Franck [7569-11]S2, [7569-97] SPS1
Billeh, Yazan N. [7564-103]SPS1
Bimberg, D. [7597-27]S6
Bimberg, Dieter [7597-53]S12, [7602-38]S8, [7610-15]S4, [7610-23]S6, [7615-22]S6, [7616-54]S13
Binder, Rolf H. [7600-47]S11, [7612-27]S7, 7614 ProgComm, [7614-12] S4
Bing, I. [7548C-83]S2
Bintig, Willem [7589-09]S3
Bintz, Louis J. [7583-47]SPS2
Biolot, Jean-Pierre [7575-02]S2, [7575-45]S9
Birch, Gabriel C. [7558-24]S6, [7558-24]S2, [7590-09]S2
Birnbaum, Kevin M. [7587-09]S2, [7587-22]S3, [7587-25]S4
Birngruber, Reginald [7550-05]S1
Birtill, David C. [7564-57]S8
Bisailon, Charles-Etienne [7548D-113] S2, [7548D-115]S3, [7567-17]S4
Biser, Jeff [7617-16]S3
Bishop, Alan R. [7588-03]S1, [7588-10]S2
Bishop, Richard C. [7580-15]S4, [7580-15]S6, [7580-15]S1
Biskup, Christoph U. 7569 SPS1 SessChr, [7569-35]S5
Biss, David P. [7550-45]S9
Biswas, Abhijit 7587 S2 SessChr, [7587-02]S1, [7587-10]S2, [7587-11]S2, [7587-16]S3
Biswas, Roshni [7574-15]S3
Bitar, Renata A. [7560-02]S1, [7560-04]S4
Bizbeva, Kostadinka K. [7550-12]S3, [7550-65]SPS1, [7554-15]S3
Bjarklev, Anders O. [7580-48]S11
Bjorkhagen, Hans I. 7619 Chr
Blaaberg, Soeren [7612-35]S9
Blackledge, William [7555-46]S10
Blackmon, Richard L. [7548B-53]S5, [7548B-54]S5
Blair, David G. [7579-42]S10
Blair, Steve 7577 S8 SessChr, [7577-19]S5, [7604-35]S8
Blaise, Sylvain [7604-39]S8
Blanchard, Adam [7548A-19]S
Blanchard, Francois [7600-65]S15
Blanchard-Dionne, Andre-Pierre [7577-18]S4
Blanche, Pierre-Alexandre [7599-04] S1, [7619-41]S4
Blanchette, Craig [7571-14]S4
Blanco-Canosa, Juan [7575-26]S9
Bland, Megan E. [7548F-14]S1
Bland-Hawthorn, Joss [7580-84] SPS2, [7582-09]S3
Blandin, Pierre [7569-33]S5
Blank, L. [7581-17]S4
Blatt, Mike R. [7568-38]S1
Blatter, Cedric [7550-15]S3, [7558-18] S4
Blau, Pinhas 7582 ProgComm, 7582 S10 SessChr
Blau, Werner J. 7599 ProgComm
Bledt, Carlos M. [7559-35]S
Bléger, David [7599-35]S9
Bletscher, Warren L. [7570-38]S7
Bliokh, Konstantin Y. [7613-16]S5
Bliss, David F. [7602-14]S3
Bloch, Jacqueline I. [7608-26]S6
Blokhin, Sergey A. [7597-53]S12, [7610-23]S6
Blokhin, Sergey S. [7615-22]S6
Blomster, Ola [7578-61]S15
Blood, Peter [7616-04]S1
Bloos, Martin [7559-34]S
Blouin, Alain [7564-81]S12
Bluiett, Althea G. [7578-89]SPS2
Blume, Gunnar [7582-59]SPS2, [7583-30]S7
Blumenthal, Daniel J. [7606-31]S8
Boas, David A. [7548E-124]S1, 7557 ProgComm, PanelMember, [7563-19]S4, [7569-91]SPS1

Boccara, Claude [7554-80]S12, 7555 S3 SessChr, [7555-13]S3, 7564 ProgComm, 7564 S12 SessChr, [7564-88]SPS1

Bocchio, Noelia [7571-35]S10

Bocher, Laura [7603-57]S5

Bochove, Erik J. [7580-77]SPS2

Bocian, David F. [7576-11]S3

Bock, Anne [7607-29]S7

Bock, Martin [7579-25]S6, [7613-07]S2

Bock, Przemek J. [7606-13]S5

Bock, Volker [7592-20]S4

Bocsi, Jozsef [7568-17]S5

Boeneman, Kelly [7575-26]S9

Boer, Arnaud [7598-35]S9

Bogaerts, Wim [7554-46]S7, [7604-17]S4

Bogalecki, Alfons W. [7605-10]S3, [7606-37]S10, [7606-54]SPS3

Bogatyrenko, Viacheslav V. [7606-28]SPS3

Bogdanov, Simeon [7608-60]S13, [7608-94]S16

Bogoni, Antonella [7621-11]S3

Böhme, Steffen [7580-49]S11

Bohrer, Markus [7579-13]S4

Boiko, Yuri B. [7585-30]SPS2

Bois, Emmanuel [7572-12]S3

Boisen, Anja [7615-09]S3

Boissier, Guilhem [7616-31]S7, [7616-31]S12

Boivin, David E. [7580-82]SPS2, [7598-14]S4

Bolgov, Sergiy S. [7617-22]SPS3

Bollaert, Sylvain [7608-41]S9

Bolten, Jens [7605-01]S1

Bolwien, Carsten [7560-06]S2

Bon, Pierre [7570-14]S3

Bonacina, Luigi [7594-19]S6

Bonaiuti, Matteo [7550-67]SPS1

Bonanno, Lisa M. [7553-20]S5

Bonati, Guido F. [7583-08]S2

Bonello, Bernard [7609-66]SPS3

Bonesi, Marco [7566-17]S4

Bonin, Tim [7550-03]S1, [7554-111]SPS1

Bonn, Mischa [7569-13]S2, 7600 ProgComm, 7600 S4 SessChr, [7600-62]S15

Bonnema, Garret T. [7558-25]S6, [7558-25]S2, [7572-03]S1

Bonod, Nicolas [7571-09]S2, [7577-32]S7

Bonomelli, Fabio [7606-19]S6

Bonora, Stefano [7595-15]S3

Bonse, Joern [7584-40]SPS2

Bonvalet, Adeline [7560-20]S3

Book, Lewis D. [7580-11]S3

Booth, Martin J. [7569-38]S6, [7569-48]S7, [7570-28]S6, [7595-13]S3

Boppert, Stephen A. 7554 ProgComm, 7554 S11 SessChr, [7554-31]S5, [7554-65]S10, [7554-69]S11, 7555 ProgComm, 7555 S5 SessChr, [7555-21]S5, [7556-12]S3, [7556-14]S4, [7558-15]S4, 7566 ProgComm, [7569-22]S3, [7569-77]SPS1, 7573 ProgComm, 7573 S9 SessChr, [7573-37]S9, [7576-35]S9

Bordel, Damien [7610-12]S3

Bordun, Oleg [7548B-65]SPS1

Borejdo, Julian [7571-05]S1

Borek, Gregg T. 7591 ProgComm

Borges, Fátima Maria C. [7549-17]S

Borghs, Gustaaf [7597-35]S8, [7597-38]S8

Boriskina, Svetlana V. [7553-05]S2, [7553-15]S4, [7553-22]S6, [7577-34]S7

Borison, Boris [7602-62]S14

Borisova, Ekaterina G. [7563-33]SPS1

Borisova, Svetlana [7602-32]S7

Borja, David [7550-21]S4, [7550-42]S9, [7550-86]SPS1

Boroson, Don M. 7587 ProgComm

Borowski, Lin R. [7615-06]S2

Borruel, Luis [7597-54]S12

Börsch, Michael [7551-15]S4, [7569-29]S4, 7571 ProgComm, [7571-24]S7

Borshch, Volodymyr [7618-31]S8

Bortnik, Bartosz J. [7579-32]S8

Boruah, Bosanta R. [7570-23]S5, [7619-16]S3

Bosch, Ruud J. H. L. [7548B-34]S1, [7548B-60]S6

Bose, Ranojoy [7605-15]S6

Bosman, Erwin [7607-15]S4

Boss, Gerry R. [7555-46]S10

Bossert, David J. [7578-16]S4

Bost, Wolfgang [7564-36]S5

Boswell, Cosima N. [7603-29]S7

Botcherby, Edward J. [7569-38]S6, [7570-28]S6

Botez, Dan 7616 ProgComm, 7616 S11 SessChr, [7616-23]S5

Böttcher, Bettina [7569-29]S4

Botcher-Luiz, Fatima [7569-59]S8, [7569-111]SPS1

Boucart, Julien [7583-25]S5

Boucharaba, Ahmed [7568-77]SPS1

Bouchard, Jean-Pierre [7553-11]S3, [7567-09]S2

Bouchard, Sebastien [7617-35]S7

Bouchier, Aude [7579-43]S11, [7580-106]SPS2

Bouchonville, Nicolas [7575-11]S5

Bouchoule, Sophie [7608-26]S6

Boudoux, Caroline [7558-13]S3

Boudreau, Denis [7571-28]S7, [7577-22]S5, [7577-48]SPS1

Bougerol, Catherine [7602-36]S8

Boulais, Etienne [7584-14]S6, [7584-14]S10, [7589-08]S3

Boullet, Johan [7580-04]S1

Bouma, Brett E. [7548C-77]S2, [7548C-78]S2, [7548C-79]S2, [7548C-80]S2, [7548D-107]S1, [7548D-111]S2, [7548D-112]S2, [7548D-117]S3, [7548D-121]S4, [7554-01]S1, [7554-04]S1, [7554-10]S2, [7554-64]S10, [7557-11]S3, [7558-02]S1, [7558-03]S1, [7558-04]S1, [7558-10]S3, [7558-16]S4, [7558-17]S4, [7560-14]S5, [7571-26]S7

Bounhalli, Mourad [7586-17]S4

Bour, David 7616 ProgComm

Bourderionnet, Jérôme [7612-28]S7

Bourdine, Anton V. [7621-26]SPS3

Bourgeois, Frederic [7589-49]SPS2

Bourguet, Feliza [7571-14]S4

Bou-Sanayeh, Marwan [7597-54]S12

Bousi, Evgenia [7554-67]S10

Bousseksou, Adel [7616-41]S9

Boutet, Jerome [7548B-48]S4, [7557-12]S3

Boutwell, Ryan C. [7603-44]S10

Bouwmeester, Dirk [7609-06]S2

Bouzehouane, Karim [7603-57]S5

Bouzigues, C. [7575-45]S9

Bovatssek, James M. [7585-19]S4

Bove, V. Michael 7619 ProgComm, [7619-02]S1

Bower, Bradley A. [7548G-158]S3

Bower, Chris L. [7591-16]S4

Bowers, John E. [7606-31]S8, [7616-29]S7, [7616-29]S12

Bowman, David [7594-08]S3

Bowman, Richard [7548E-126]S2

Bowman, Steven R. [7614-04]S2

Bown, Stephen G. [7548C-180]S4, [7551-20]S5, [7555-06]S2, [7573-04]S1, [7573-11]S3, [7573-14]S3, [7573-26]S7, [7573-48]SPS1

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Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Boyd, Ian W. [7584-11]S4
Boyd, Robert W. [7611-31]S7, [7612-
S6 SessChr, [7612-16]S4, [7613-
20]S6
Boyd, Shelley [7550-65]SPS1, [7554-
15]S3
Boyden, Edward S. 7548G
ProgComm
Boye, Robert R. [7604-22]S5, [7604-
24]S5
Boyer, Paul M. [7584-02]S1
Boyko, O. [7609-66]SPS3
Bozio, Renato [7582-46]S10, [7582-
54]SPS2
Bozkurt, Murat [7610-09]S3
Bracamonte, Angel-Guillermo [7577-
48]SPS1, [7571-28]S7
Bracker, Allan S. [7600-33]S8, [7611-
20]S5
Brackmann, Christian [7569-05]S1
Bradburne, Christopher [7575-26]S9
Bradley, Allison [7548G-190]S
Bradley, Jonathan D. B. [7605-20]S7,
[7604-07]S2
Bradshaw, David S. [7571-10]S2
Bradu, Adrian [7549-03]S1, [7549-22]
S, [7554-63]S10, [7554-88]SPS1
Brady, David Jones [7577-14]S4
Brady, John [7568-52]S3
Braga, Antonio [7603-40]S9
Bragheri, Francesca [7589-10]S3
Braithman, Yehuda [7580-77]SPS2,
[7583-34]S8
Braive, Remy [7608-86]S18
Brakel, Ralph v. [7549-13]S2
Brakenhoff, G. J. 7570 ProgComm,
7570 S1 SessChr
Brambilla, Marco [7557-06]S2
Branch, Darren W. [7576-51]S12,
[7605-11]S4
Brand, Thomas [7583-14]S3
Brandeis, Rachel [7562-40]S9
Brar, Khushvinder [7580-03]S1
Brasil, Aluizio G. [7575-07]S3, [7575-
10]S4, [7575-24]S8
Brasselet, Sophie [7569-53]S7, [7569-
56]S8, [7569-96]S3, [7569-105]S4,
[7577-32]S7
Bratschitsch, Rudolf [7600-01]S
Brattain, Michael A. [7616-33]S8
Braun, Andreas [7549-16]S, [7549-21]
S
Braun, Harald [7597-50]S11
Braun, Paul V. [7584-05]S2, [7591-29]
S7
Braxmaier, Claus [7594-25]S7
Brecher, Christian [7583-53]SPS2
Brecht, Hans-Peter [7564-24]S4,
[7564-67]S10, [7564-74]S11,
[7564-129]SPS1
Brede, Olivier [7549-16]S, [7549-21]S
Breen, Joe [7548G-190]S
Breese, Mark B. H. [7606-18]S6,
[7606-20]S6
Breidenassel, Andreas [7602-75]S11,
[7602-75]SPS3, [7616-16]S4
Brenci, Massimo [7559-08]S, [7604-
34]S7
Brener, Igal 7574 ProgComm, [7605-
11]S4
Brennan, James F. [7548D-104]S1
Brenner, David J. [7568-93]SPS1
Brenner, Matthew [7548C-175]S2,
[7554-07]S2, [7555-46]S10, [7555-
47]S10, [7593-05]S1
Brenot, Romain [7585-29]SPS2
Bressel, Ralf [7569-16]S2
Bretenaker, Fabien [7612-07]S2,
[7612-28]S7
Bretonniere, Yann [7599-12]S3, [7599-
41]S11
Brett, Michael J. [7609-39]S9
Breuer, Dirk [7621-13]S4
Breunig, Hans G. [7564-92]SPS1,
[7589-05]S2, [7548A-05]S, [7568-
48]S1, [7569-43]S6
Breunig, Ingo [7579-27]S7, [7582-60]
S5
Brevet, Pierre-François [7569-57]S8,
[7599-13]S3
Brewer, Molly A. [7558-09]S2, [7562-
04]S1, [7564-127]SPS1, [7569-47]
S7
Brick, Peter [7597-54]S12
Brida, Daniele [7595-15]S3
Bright, Frank V. [7553-29]S
Bright, Stephanie [7573-24]S6
Brilkina, Anna A. [7575-34]S10
Brilland, Laurent [7598-22]S5, [7609-
36]S8
Brinker, C. Jeffrey 7610 ProgComm
Brinkmann, Ralf 7550 ProgComm,
7550 S6 SessChr, [7550-03]S1,
[7550-05]S1
Brinkmeyer, Ernst [7621-01]S1, [7621-
01]S10
Briot, Olivier [7602-06]S2
Brissinger, Damien [7608-37]S8
Bristow, Alan D. 7600 S13 SessChr,
[7600-49]S12
Brocas, Arnaud [7569-94]SPS1
Brochu, Guillaume [7579-44]S11
Brockmann, Ruediger [7578-12]S3,
[7583-10]S2
Broderick, Neil G. R. [7580-35]S9
Brodsky, Dale [7550-66]SPS1
Broeng, Jes 7580 ProgComm, 7580
S5 SessChr, [7580-38]S9
Broer, Dirk J. 7618 ProgComm, [7618-
22]S6
Brongersma, Mark L. [7608-91]S9
Bronner, Wolfgang [7608-08]S2,
[7616-60]S14
Brooks, Dana H. [7570-04]S1
Broome, James T. [7555-45]S9
Broquin, Jean-Emmanuel 7604 Chr,
7604 S2 SessChr
Brose, Martin [7562-41]S9
Brosnihan, Timothy J. [7594-06]S3
Brossollet, Charles [7554-80]S12,
[7555-13]S3
Brouard, Danny [7571-28]S7
Brouckaert, Joost [7606-26]S7
Broué, Adrien [7592-02]S1, [7592-09]
S2
Brousseau, Emmanuel [7590-11]S2
Brow, Richard K. [7589-42]S8, [7589-
42]S12
Brown, Aaron [7583-32]S8, [7583-47]
SPS2
Brown, Ari-David [7594-24]S7
Brown, Dean [7594-08]S3, [7594-09]
S3
Brown, Donald J. [7589-03]S1
Brown, Ei [7578-89]SPS2
Brown, Elliott R. [7555-39]S8
Brown, Gail J. 7608 CoChr, [7608-71]
S13, [7609-12]S3
Brown, J. Quincy [7567-14]S3, [7573-
23]S6
Brown, Jefferson [7550-31]S6
Brown, Jeremiah BO111 ProgComm
Brown, Julie J. [7617-03]S1
Brown, Matthew G. [7608-89]S19
Brown, Robert G. W. [7616-17]S4
Brown, Thomas G. 7570 Chr, 7570 S6
SessChr, [7570-37]S7
Brown, William J. [7573-24]S6
Browne, Mark [7571-06]S2
Brox, Olaf [7583-22]S5, [7583-43]
SPS2, [7616-36]S8
Bruce, Richard H. [7572-05]S1
Bruchmann, Claudia [7595-17]S3
Brückner, Sven [7580-46]S11
Bruder, Friedrich K. [7619-17]S4
Brüderl, Georg [7602-75]S11, [7602-
75]SPS3
Bruestle, Jeremy [7550-37]S7
Bruetting, Wolfgang [7617-40]S8
Brugge, William [7554-10]S2
Brugnera Junior, Aldo [7552-15]S3
Brumer, Maya [7608-65]S14
Bruner, Eric L. [7590-16]S3
Brunette, Isabelle [7569-94]SPS1
Brunker, Joanna [7564-02]S11, [7573-
11]S3
Brunkov, Pavel N. [7610-20]S5
Brunner, Fabian [7599-11]S3
Bruno, Jonathan R. [7607-45]SPS3
Bruns, Michael [7585-23]S5
Bruns, Oliver T. [7575-47]S9
Brusatin, Giovanna [7582-46]S10,
[7582-54]SPS2
Brusberg, Lars [7607-14]S4
Bruscino, Nicola [7548A-07]S
Brustlein, Sophie [7569-11]S2, [7569-
96]S3
Bryant, Garnett W. [7609-50]S11,
[7610-05]S1, [7610-32]S8
Bubeck, Christoph 7599 ProgComm
Bucci, Davide [7597-30]S7
Büchau, Florian [7599-34]S9
Bucher, Guido F. [7584-26]S10
Buchmann, Ellen [7552-12]S3
Buchner, Richard [7601-16]S4
Bucht, Curry P. [7550-50]S10
Buchy, Philippe [7575-44]S8
Bückers, Christina [7597-19]S4,
[7597-25]S6
Bückle, Rainer [7554-90]SPS1, [7568-
48]S1, [7589-05]S2, [7555-16]S4
Buckmiller, Lisa [7548C-182]S5
Budiarto, Bugi R. [7565-08]S3
Budihala, Raghavendra Prasad [7588-
05]S1
Budker, Dmitry 7611 ProgComm
Buelta-Carrillo, Luis [7548F-145]S2
Bueno, Juan M. [7550-87]SPS1,
[7569-112]SPS1, [7569-113]SPS1,
[7595-14]S3
Bueno, Luciano A. [7568-06]S2,
[7582-51]SPS2, [7598-48]S1
Buermen, Miran [7556-17]S4
Bufetov, Igor A. [7580-39]S9
Bugge, Frank [7583-22]S5, [7583-43]
SPS2, [7616-36]S8
Bui, Dang Thanh [7598-25]S6
Bukowska, Danuta [7550-16]S3,
[7554-37]S6, [7554-74]S11
Bulla, Benjamin [7590-10]S2
Bulla, Douglas [7609-37]S9
Bulyshv, Alexander [7608-80]S17
Buma, Takashi [7564-103]SPS1,
[7601-02]S1
Bun, Philippe [7576-33]S8
Burachas, Stanislav [7578-53]S13
Burch, Ronald W. 7587 ProgComm
Burdin, Vladimir A. [7621-25]SPS3,
[7621-26]SPS3
Bureau, Bruno [7559-30]S, [7598-01]
S1
Burgansky-Eliash, Zvia [7555-23]S5
Burger, Sven [7604-14]S3, [7606-35]
S9, [7609-62]SPS3
Burgholzer, Peter [7564-21]S4, [7564-
23]S4
Burgner, Jessica [7562-25]S6
Burie, Jean-René [7616-34]S8
Burigo Almeida, Diogo [7568-59]S3,
[7575-37]S11, [7610-08]S2
Burkey, Theodore J. [7600-17]S4
Burkhardt, Anke [7554-95]SPS1
Burkhardt, Thomas [7585-04]S1
Burmeister, Emily F. [7606-31]S8
Bürmen, Miran [7556-40]SPS1
Burnett, Arthur L. [7548B-46]S4,
[7548G-192]S
Burns, James A. 7548C ProgComm
Burns, Stephen A. [7550-34]S7
Burov, Ekaterina [7580-32]SPS2
Burris, Harris Rayvon [7587-01]S1
Burruel, Luis [7616-50]S12
Buryakina, Tatyana [7569-31]S5
Buscarello, Daniel [7592-25]S5
Busch, George E. [7608-80]S17
Busch, Theresa M. 7551 S4 SessChr,
[7551-06]S2, [7551-07]S2
Buschmann, Volker [7568-61]S4,
[7568-87]S6, [7569-82]S5, [7569-
106]SPS1, [7571-13]S4, [7571-39]
SPS1
Buse, Karsten [7582-60]S5
Bush, Nigel L. [7564-57]S8
Bussan, John [7593-37]S7
Butlin, Nathaniel [7572-12]S3, [7575-
14]S5
Butté, Raphaël [7616-18]S4
Buttenschoen, Kim K. [7550-81]SPS1,
[7569-114]SPS1
Büttner, Edlef [7569-16]S2
Button, Christopher [7583-21]S5
Buu, Natalie C. H. [7549-09]S1
Byard, Courtney L. [7559-36]S
Bydlon, Torre M. [7573-23]S6
Byer, Robert L. [7609-45]S10
Byrd, Darrin [7564-42]S3
Byrd, John M. [7581-23]SPS2
Byrd, Teresa [7555-03]S1
Byrnes, Ron [7593-21]S4
Byun, Kyung Min [7577-08]S3, [7577-
44]SPS1

C

- Cable, Alex [7550-56]S11, [7555-51]
S10, [7566-02]S1
Cabrini, Stefano 7591 ProgComm
Caccia, Michele [7565-25]SPS1
Cacciari, Ilaria [7598-23]S6, [7604-34]
S7
Cadeddu, Jeffrey A. [7596-03]S1
Cadet, Gardy [7596-11]S3
Caesar, Katharina [7568-12]S6
Cahill, Laurence W. 7606 ProgComm
Cai, Can [7604-11]S2
Cai, Hong [7605-24]S9
Cai, Jason [7583-54]SPS2
Cai, Shoudong [7554-112]SPS1
Cai, Xin [7564-128]SPS1
Cai, Yangjian 7588 ProgComm, [7588-
15]S3, [7588-18]S4, [7588-22]S4,
[7588-23]S4, [7588-24]S4
Cai, Yuanxue [7612-14]S3
Cai, Zhihua [7608-72]S14, [7616-47]
S1
Cakmakci, Ozan [7618-02]S1
Calander, Nils [7571-21]S6, [7574-31]
SPS1
Caldas, Paulo [7580-23]S6
Caldera, Lizeth [7555-25]S5
Caliman, Andrei [7615-19]S5
Caliva, Brian [7583-20]S5
Callender, Claire L. [7598-24]S6
Calligaro, Michel [7616-35]S8, [7616-
50]S12, [7616-51]S12
Callens, Gordon [7602-27]S6, [7603-
04]S1
Callstrom, Matthew R. [7548B-44]S3
Calvez, Laurent [7598-01]S1
Calvez, Stephane [7578-33]S8
Camacho-Lopez, Santiago [7562-38]
S8
Câmara, Terezinha J. R. [7568-06]S2
Cambri, Edmond [7608-86]S18
Cameron, Brent D. [7572-02]S1,
[7577-09]S3

Index of Authors, Chairs, and Committee Members

- Camet, Sebastien [7550-80]SPS1, [7595-24]S4
 Camp, Charles H. [7569-79]SPS1
 Campagnola, Paul [7562-04]S1, [7566-10]S3, 7569 S8 SessChr, [7569-47]S7
 Campbell, Gordon [7567-17]S4
 Campbell, Joe [7598-33]S8
 Campbell, Stephen A. [7617-50]S10
 Campbell, Stuart [7578-61]S15
Campo, Eva M. 7593 ProgComm
 Campos Acosta, Joaquin [7582-50]SPS2, [7597-49]S11
 Camy, Patrice [7589-19]S5
 Cancio, Leopoldo C. [7596-04]S1
Canfield, Brian K. [7571-36]S10
 Cangussú, Maria Cristina T. [7549-15]S2, [7552-15]S3
 Canioni, Lionel [7578-45]S11
 Cankaya, Huseyin [7598-46]S11
 Cannarozzo, Giovanni [7548A-06]S, [7548A-07]S
 Cannata, Jonathan M. [7555-01]S1, [7564-75]S11
 Cannon, Bret D. [7608-13]S3
 Canonica, Michael D. [7594-26]S7
 Canovas, Carmen [7550-41]S8
Canpolat, Murat [7573-31]S7
 Canti, Gianfranco L. 7565 ProgComm
Canva, Michael T. 7577 S3 SessChr, 7577 S4 SessChr, [7577-11]S3, [7577-33]S7
 Cao, Bingqiang [7586-10]S3
 Cao, Chuanshun [7583-20]S5
 Cao, Honge [7553-11]S3
 Cao, Hui [7597-41]S9
 Cao, Jie [7576-52]SPS1
 Cao, Linyou [7608-91]S9
 Cao, Minsong [7564-54]S8, [7564-59]S9
 Cao, Ning [7564-54]S8, [7564-116]SPS1
 Cao, Wanjun [7617-16]S3
 Cao, Xu [7554-66]S10
 Capala, Jacek [7561-50]SPS1
Capasso, Federico [7600-30]S7, 7603 S10 SessChr, [7603-49]S11, 7616 ProgComm, [7616-20]S5, [7616-27]S6
 Capmany, Jose [7612-35]S9
Capoglu, Ilker R. [7573-02]S1, [7573-10]S3
 Carbalaj-Dominguez, Adrián [7588-21]S4
 Carbone, Luigi [7575-05]S3
 Cardeno, Mark [7558-29]SPS1
Cardimona, David A. 7608 ProgComm, 7608 S12 SessChr, 7608 S13 SessChr, [7608-42]S9
 Cardoso, Alexandre [7569-58]S8
 Cardoso, Maria Angelica G. [7568-14]SPS1, [7560-13]SPS1
 Carey, Christopher R. [7600-12]S3
Carey, James E. 7589 ProgComm, 7589 S5 SessChr
 Carini, Marco [7548B-33]S1
 Carlier, Pierre [7548A-04]S
 Carlin, Jean-François [7602-67]S15, [7616-18]S4
 Carlini, Lina [7575-27]S9
Carlson, Alicia L. [7576-07]S2
Carlson, Chad G. [7580-36]S9
 Carlson, Christine A. [7571-07]S2
 Carmele, Alexander [7597-63]S14
 Carmody, Michael [7608-70]S15
 Carmon, Tal E. [7579-37]S9
 Carnell, Dawn [7548C-180]S4
 Carnielli, Virgilio [7556-32]S8
 Caron, Jean-Sol [7592-03]S1
 Carpenter, Amelia K. [7582-44]S10
 Carpenter, Jerome [7554-71]S11
 Carr, Emily J. [7592-36]SPS2
 Carranza, Aparicio [7620-03]S2
 Carretta, Elizabeth [7573-24]S6
Carroll, David L. 7581 ProgComm, [7581-01]S1, [7581-19]S4, [7581-20]S4
Carroll, James D. 7552 ProgComm, 7552 S4 SessChr
 Carson, Jeffrey J. [7562-09]S2, [7564-113]SPS1, [7564-115]SPS1, [7564-119]SPS1, [7568-34]S6, [7577-35]S8, [7557-37]SPS1
 Carson, Paul L. [7564-37]S6, [7564-75]S11
 Carson, Richard F. [7615-03]S1
 Carter, Adrian L. G. [7580-09]S2
 Carter, Samuel G. [7600-33]S8
 Carter, Shirron L. [7551-06]S2
 Carter, Tony R. [7604-22]S5
Cartwright, Alexander N. [7553-29]S, 7574 Chr, 7574 S2 SessChr, 7574 S3 SessChr, [7599-45]S12
 Carvajal, Joan J. [7578-14]S3
 Carvalho, Carolina S. [7568-14]SPS1
 Carvalho, Daniel O. [7590-13]S2, [7598-69]SPS3
 Carvalho, Fernandes F. [7569-58]S8, [7569-110]SPS1
 Carvalho, Kilmara [7575-10]S4, [7575-24]S8
 Carvalho, Luis Felipe d. C. e. S. [7561-39]SPS1
 Casanova, Didier [7575-45]S9
 Casear, Katharina [7568-38]S1
 Casey, Thomas A. [7576-39]S10
 Caspersen, Lee [7579-07]S2
 Cassan, Eric [7598-13]S3, [7606-22]S7, [7606-26]S7
Cassarly, William J. SC011 Inst
 Castellanos, Celia [7548D-117]S3, [7554-01]S1
 Castelo, Antonio [7586-08]S2
 Castiglia, Antonino [7602-67]S15, [7616-18]S4
Castracane, James [7593-15]S3
 Castro-Ramos, Jorge [7572-22]SPS1
 Cataluna, Maria-Ana [7616-12]S3
Catanzaro, Brian E. [7552-18]S4, [7555-28]S6
 Catchpole, Kylie [7586-04]S1
 Cathabard, Olivier [7616-37]S9
Catrysse, Peter B. [7604-23]S5
 Cattini, Stefano [7572-09]S2
 Cavalcanti, Mariana [7575-24]S8
 Cavani, Olivier [7580-82]SPS2
Cayce, Jonathan [7548G-159]S4, [7548G-160]S4
 Cayron, Charles [7616-35]S8
 Cech, Miroslav [7578-74]SPS2
 Cechet, Francesca [7582-15]S4
 Celli, Jonathan P. [7551-17]S4, [7551-18]S4
Cengel, Keith [7551-08]S2, [7551-13]S3, [7551-43]SPS1
 Cense, Barry [7550-23]S4, [7550-26]S5, [7550-37]S7
 Cerchiario, Giselle [7551-34]SPS1
 Cerullo, Giulio [7589-10]S3, [7589-29]S7, [7595-15]S3
Cerussi, Albert [7567-02]S1
 Cerutti, Laurent [7616-31]S7, [7616-31]S12
 Cerutti, Robin [7598-16]S4
 Cervera, Cyril [7608-63]S13, [7608-64]S14
 Cervera, Manuel [7603-05]S2
 Cesar, Carlos L. [7568-56]S2, [7568-57]S2, [7568-59]S3
 Cesare, Paolo [7548G-164]SPS1
 Cha, Doo Yeol [7605-28]SPS3
 Cha, Mi Hye [7568-79]S1
 Cha, Myoungsik [7582-52]SPS2
 Chadha, Anju [7592-15]S3
 Chae, Dong Ju [7602-66]S15, [7602-70]S11, [7602-70]SPS3
 Chae, Jung-Hye [7617-69]SPS3
 Chaghi, Radhouane [7608-64]S14
 Chai, Dongyul [7589-03]S1
 Chai, Ning [7564-90]SPS1
 Chaiken, Joseph [7560-23]S4, [7560-24]S6
 Chak, Amitabh [7554-09]S2
 Chakrabarti, Subhananda [7603-20]S4, [7603-59]SPS3, [7606-02]S1
 Chakraverty, R. [7561-40]SPS1
 Chalabi, Hamid Reza [7609-13]S3
Chalau, Vadzim [7573-26]S7
 Chamberland, David [7564-75]S11
 Chamma, Karima [7580-103]SPS2
 Chamorovskii, Yuri [7580-42]S10
 Chan, Chia-Hua [7602-04]S1, [7609-54]SPS3
 Chan, Chih-Chieh [7552-08]S2
 Chan, Helen M. [7617-16]S3
 Chan, James W. [7555-44]S9
 Chan, Kin Foong [7548B-52]S5
 Chan, Kwok-Hon [7555-04]S1
 Chan, Ming-Che [7569-51]S7
 Chan, Vincent W. 7587 ProgComm
 Chance, Britton 7557 ProgComm, 7561 ProgComm
 Chandler, Lin [7569-28]S4, [7569-81]SPS1
 Chandrasekara, S. [7548B-62]S7
 Chandrasekaran, Arvind [7555-49]S10
 Chandrayan, Neelima [7601-04]S1
 Chaney, Eric J. [7554-31]S5, [7554-69]S11, [7569-22]S3, [7573-37]S9, [7576-35]S9
 Chang, Chang [7551-10]S3, [7551-11]S3
 Chang, Cheng-Chieh [7617-15]S3
 Chang, Chia-Lun [7617-20]S4
 Chang, Chia-Seng [7600-42]S10
 Chang, Chih-Han [7577-03]S1, [7608-38]S8, [7608-39]S10
 Chang, Ching-Wei [7555-02]S1
 Chang, Ching-Wei [7570-06]S1
 Chang, Chung-Chih [7600-24]S5
Chang, Chun-Lin [7562-27]S6, [7574-09]S1
 Chang, Gee-Kung [7621-20]S6
 Chang, Hojun [7617-60]SPS3
 Chang, Ji-Ho [7602-01]S1
 Chang, Jih-Yuan [7597-74]SPS3
 Chang, Liang-Chao [7618-40]SPS3
 Chang, Robert C. [7556-27]S7
 Chang, Shoude [7555-12]S3
 Chang, Shu-Hsuan [7597-75]SPS3
 Chang, Shu-Jeng [7597-75]SPS3
 Chang, So-Young [7548C-97]S5
 Chang, Sung Pil [7605-28]SPS3
Chang, Walter H. [7575-06]S3, [7575-22]S8, [7576-38]S9
 Chang, Wen-Ming [7602-08]S2, [7602-60]S14
 Chang, Yi-Lu [7602-09]S2
 chang, yin [7555-04]S1
 Chang, You Hsien [7617-25]S5
 Chang, Yuan-Chih [7600-42]S10
 Chang, Yu-Chung [7564-89]SPS1
 Change, Wayne [7617-67]SPS3
 Chang-Lyoul, Lee [7599-54]SPS3
 Chao, Chu-Li [7602-74]S11, [7602-74]SPS3
 Chao, Guo-Shan [7573-13]S3
 Chao, Jerry [7570-03]S1, [7575-19]S7
 Chao, Paul C.-P. [7564-126]SPS1
 Chao, Pen Hsiu [7569-71]SPS1
 Chao, Yu-Ching [7618-40]SPS3
Chaoouch, Hacène [7621-09]S3, [7621-16]S5
Chapman, Glenn [7557-37]SPS1, [7562-08]S2, [7562-09]S2, [7562-11]S3, [7568-34]S6, [7593-30]S6
 Charalambous, Ismini [7554-67]S10
 Charalel, Resmi [7592-32]S6
 Charbonnière, Loïc [7572-12]S3, [7575-14]S5
 Charles, Jeffrey R. [7587-30]S5
 Charnovich, Stepan [7598-53]SPS3
 Charon, Yves [7548E-131]S3, [7567-06]S2
 Charra, Fabrice 7599 S10 SessChr, [7599-32]S9, [7599-35]S9
 Charron, Luc G. [7589-14]S4
 Chartier, Thierry [7589-22]S5
 Chatterjee, Pallab [7593-41]SPS2
 Chatterjee, Rohit [7605-15]S6
 Chatterjee, Sangam [7597-18]S4, [7597-19]S4, [7597-20]S5, [7597-25]S6, [7597-65]S14, 7600 S5 SessChr, [7600-10]S3
 Chau, Alexandra H. [7548D-107]S1
 Chau, Kelvin K. [7592-36]SPS2
 Chaudenson, Julien [7585-29]SPS2
 Chaudhari, Chitrarekha B. [7598-58]SPS3, [7598-59]SPS3
 Chaudhary, Govind [7564-115]SPS1, [7564-119]SPS1
Chaudhary, Ujwal [7548E-138]S4
 Chaudhuri, Sujeet [7594-36]SPS2
 Chauvat, Marie-Pierre [7602-19]S4, [7602-37]S8
 Chavantes, Maria Cristina [7567-08]S2
 Chaves, Claudilene R. [7575-04]S2
 Chavez Boggio, Jose M. [7582-09]S3
 Chavez-Pirson, Arturo [7582-26]S6, [7582-29]S7
 Chazelle, Jean [7608-35]S8
 Che, Yong [7590-01]S1
 Cheben, Pavel [7594-28]S8, 7604 ProgComm, 7604 S7 SessChr, [7606-10]S4, [7606-13]S5
 Cheli, Alain [7604-39]S8
 Chelnokov, Alexei [7615-18]S5
 Chembo, Yanne K. [7582-08]S3
 Chen, Aaron C. [7552-05]S1, [7552-09]S2, [7565-03]S1
 Chen, Aiqing [7606-09]S4
 Chen, Andy [7559-04]S
Chen, Antao 7601 ProgComm, 7601 S1 SessChr, [7601-05]S1
 Chen, Bi-Chang [7569-08]S1
 Chen, Bin [7593-36]S7
 Chen, Bingchu [7619-21]S4
 Chen, Chaowei [7566-02]S1
 Chen, Charlton J. [7565-15]S6
 Chen, Cheng-Hung [7602-40]S9
 Chen, Cheng-Yen [7609-18]S4, [7617-30]S6
 Chen, Chia-Chun [7548A-25]S
 Chen, Chien-Kang [7602-40]S9
 Chen, Chi-Hau [7575-22]S8
 Chen, Chii-Chang [7602-04]S1, [7605-03]S1, [7609-41]S9, [7609-54]SPS3
 Chen, Chi-Meng [7564-63]S9
 Chen, Ching-Sung [7556-25]S6
 Chen, Chin-Ming [7597-76]S8
 Chen, Chi-Ping [7609-35]S8
 Chen, Chu [7615-02]S1
 Chen, Chung-Ming [7573-47]SPS1
 Chen, Chun-Yu [7561-25]S4
 Chen, Chyong-Hua [7606-46]SPS3
 Chen, Danni [7569-74]SPS1
 Chen, De [7568-27]S5
 Chen, Feng [7572-17]SPS1
 Chen, Guan-Ting [7602-04]S1
 Chen, Heather [7548C-86]S3
 Chen, Hsin-Ming [7554-11]S2, [7554-33]S5
 Chen, Hui [7605-24]S9

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Chen, Hung-Pin [7601-14]S3
Chen, I-Hsiu [7569-51]S7
Chen, Jeon-Hor [7557-34]SPS1
Chen, Ji Yao [7568-04]S1
Chen, Jian [7611-35]S7
Chen, Jian Wen [7565-08]S3
Chen, Jianxin [7548A-14]S
Chen, Jianxin [7616-62]S14
Chen, Jie [7603-47]S10
Chen, Jie [7613-26]S7
Chen, Jiji [7571-16]S5
Chen, Jin [7557-44]S1, [7557-45]S2
Chen, Jingyi [7564-66]S9, [7564-111]SPS1
Chen, Junewen [7578-83]SPS2
Chen, Kangkang [7580-06]S1, [7580-35]S9, [7582-17]S4
Chen, Kevin [7609-26]S6
Chen, Kuei-Ming [7602-74]S11, [7602-74]SPS3
Chen, Lawrence R. [7580-101]SPS2, [7580-102]SPS2
Chen, Li [7577-21]S5
Chen, Li [7609-12]S3
Chen, Liang-Yu [7573-50]SPS1
Chen, Lian-Kuan [7573-41]SPS1
Chen, Long [7605-08]S3
Chen, Mei-Ling [7597-74]SPS3
Chen, Nanguang [7556-03]S1, [7570-26]S5, [7577-30]S7
Chen, Nan-Kuang [7582-11]S3
Chen, Nathaniel W. [7548A-19]S
Chen, Peng-Ren [7602-54]S12, [7602-61]S14
Chen, Pin-Tarnq [7555-04]S1
Chen, Qing-Yun [7559-10]S
Chen, Qiu-Lan [7565-14]S4
Chen, Ray T. 7607 Chr, 7607 S6 SessChr, 7607 S3 SessChr, [7607-24]S6, [7607-26]S6, [7607-32]S8, [7607-38]S9, [7607-43]SPS3, [7607-48]SPS3, [7609-44]S10
Chen, Ruimin [7564-12]S2
Chen, Shean-Jen [7548A-25]S, [7550-64]SPS1
Chen, Sheng-Hui [7591-38]SPS2
Chen, Shih-Chi [7561-01]S1
Chen, Shih-Wei [7602-40]S9
Chen, Shih-Yuan [7601-14]S3
Chen, Shiuian-Yeh [7604-46]S10
Chen, Shu [7553-11]S3
Chen, Si [7551-29]S7
Chen, Sung-Liang [7564-08]S2, [7564-89]SPS1
Chen, Szu-Yu [7569-55]S8
Chen, Szu-Yuan [7600-43]S10
Chen, Thomas W. [7598-36]S9
Chen, Tongsheng [7565-19]SPS1
Chen, Tron-Ming [7617-26]S5, [7617-27]S5
Chen, Tzer-Perng 7602 ProgComm
Chen, Vincent W. [7609-24]S6
Chen, Vivian A. [7565-07]S3
Chen, Wei R. 7563 ProgComm
Chen, Wei [7563-21]SPS1
Chen, Wei R. 7565 Chr, 7565 S3 SessChr, [7565-05]S2, [7565-06]S2, [7565-07]S3, [7565-15]S4, [7565-23]SPS1
Chen, Weibin [7604-45]S10
Chen, Wei-Cheng [7598-43]S10
Chen, Wei-Liang [7569-54]S8, [7569-73]SPS1
Chen, Wen Li [7565-24]SPS1, [7568-26]SPS1, [7568-30]SPS1, [7568-31]SPS1
Chen, Wen-Shiang [7564-100]SPS1
Chen, Xi [7613-04]S1
Chen, Xiaoyan [7572-16]SPS1
Chen, Xing [7616-63]S14
Chen, Xinguang [7557-27]SPS1
Chen, Xinyang [7576-52]SPS1
Chen, Xiyi [7566-10]S3
Chen, Xuyuan [7613-26]S7
Chen, Yaohui [7612-35]S9
Chen, Yi-Fan [7578-34]S8
Chen, Yijiang [7587-09]S2
Chen, Yiju [7617-12]S3
Chen, Yi-Ju [7569-52]S7
Chen, Ying-Chih [7564-33]S5
Chen, Yi-Shin [7618-34]S9
Chen, Yongping [7558-11]S3, [7574-03]S1, [7576-50]S12, [7577-23]S5
Chen, Young-Kai [7605-08]S3
Chen, You-Yin [7564-126]SPS1
Chen, Yu [7555-51]S10
Chen, Yu [7563-19]S4, [7566-02]S1
Chen, Yuanu-Joan [7555-56]SPS1
Chen, Yueli [7550-43]S9, [7550-56]S11
Chen, Yun [7565-12]S4
Chen, Yung-Fu [7578-34]S8, [7613-01]S1
Chen, Yung-Jui 7605 ProgComm
Chen, Yung-Sheng [7602-08]S2, [7602-60]S14
Chen, Yung-Sung Q. [7617-46]S9
Chen, Yun-Sheng [7564-61]S9, [7564-114]SPS1, [7574-04]S1
Chen, Zheng [7565-13]S4
Chen, Zhigang [7600-33]S8
Chen, Zhiqiang [7568-26]SPS1
Chen, Zhonghua [7568-38]S1
Chen, Zhongping [7548C-167]S2, [7548C-177]S2, [7548E-123]S1, [7548E-137]S4, 7554 ProgComm, 7554 S8 SessChr, [7554-07]S2, [7554-53]S8, [7554-72]S11, [7554-102]SPS1, [7554-106]SPS1, [7555-58]SPS1, [7557-10]S3, [7569-83]SPS1, [7593-05]S1
Cheng, Adrian M. [7608-85]S18
Cheng, An-Jen [7617-50]S10
Cheng, Chung-Chih [7564-102]SPS1
Cheng, Fang-Hsuan [7551-35]SPS1
Cheng, Gang [7565-16]S4
Cheng, Ho Yiu K. [7580-100]SPS2, [7580-101]SPS2, [7580-102]SPS2
Cheng, James [7608-47]S10
Cheng, Ji-Xin [7564-86]S12, [7564-90]S1, 7569 S2 SessChr, [7569-04]S1
Cheng, Lingyun [7576-18]S5
Cheng, Liwei [7616-44]S10, [7616-63]S14
Cheng, Nai-Chia [7569-51]S7
Cheng, Ran [7548D-120]S4, [7557-08]S2
Cheng, Tusng-Chieh [7591-36]SPS2
Cheng, Ya [7584-45]SPS2, [7585-12]S3
Cheng, Yuan-Bing [7604-20]S4
Cheng, Yueh-Hung [7568-75]S2
Cheng, Yuh-Jen [7602-69]S11, [7602-69]SPS3
Cheng, Zhao [7578-62]S15, [7578-63]S15
Cheng, Zhen [7560-17]S5, [7575-31]S10
Cheong, Fook-Chiong [7619-04]S1
Cheriton, Ross [7608-88]S19
Cherkezyan, Lusik [7573-02]S1
Chernikov, Anton E. [7609-16]S4
Chernikov, Alexey [7597-19]S4, [7597-20]S5, [7597-25]S6, [7597-65]S14
Chernobrod, Boris M. [7588-03]S1, [7588-10]S2, [7608-32]S7
Chernomordik, Victor [7561-36]S5, [7561-50]SPS1
Chernysheva, Tatyana A. [7580-15]S4, [7580-15]S6, [7580-15]S1
Cheung, Angela 7548F ProgComm
Cheung, Chi M. [7565-15]S4
Cheung, Herbert C. [7571-27]S7
Cheung, Ka-Lun [7565-14]S4
Cheung, Ka-Yi Kim [7582-27]S6
Cheung, Maurice [7574-25]S4
Chhetri, Raghav K. [7554-71]S11
Chi, Sien [7582-11]S3
Chi, Ting-Ta [7554-06]S1, [7554-11]S2, [7554-33]S5
Chi, Tung-Wei [7602-74]S11, [7602-74]SPS3
Chia, Shih-Hsuan [7569-51]S7
Chia, Thomas [7569-90]SPS1, [7589-24]S6
Chiang, Cheng-Yan [7599-50]SPS3
Chiang, Chia-Chin [7591-36]SPS2
Chiang, Chung-Pin [7551-12]S, [7565-08]S3, [7554-33]S5
Chiang, Chun-Ping [7551-35]SPS1
Chiang, Chun-Ping [7554-11]S2
Chiang, Gary [7562-11]S3
Chiang, Huihua Kenny [7548B-35]S1
Chiang, Kin-Seng [7605-06]S2
Chiang, Mung [7620-01]S1
Chiang, S. Y. [7617-46]S9
Chiang, Shu-Jen [7548A-25]S
Chiao, Jung-Chih 7590 Chr
Chiao, Mu 7590 ProgComm
Chiappini, Andrea [7598-23]S6, [7604-34]S7
Chiari, Marcella [7553-17]S5
Chiasera, Alessandro [7604-34]S7
Chichibu, Shigeofusa F. 7602 S6 SessChr, [7602-07]S2
Chichkov, Boris N. [7584-20]S7, [7584-20]S11
Chiel, Hillel J. [7548G-161]S4
Chien, Chih-Wei [7585-17]S4
Chien, Liang-Chy TrackChr, SympChair, 7597 S SessChr, 7598 S SessChr, 7599 S SessChr, 7600 S SessChr, 7602 S SessChr, 7603 S SessChr, 7604 S SessChr, 7606 S SessChr, 7607 S SessChr, 7608 S SessChr, 7609 S SessChr, 7610 S SessChr, 7612 S SessChr, 7616 S SessChr, 7617 S SessChr, 7618 Chr, 7618 S SessChr, 7618 S7 SessChr, [7618-13]S3, [7618-31]S8, [7618-45]SPS3, 7619 S SessChr, OE123x Chr
Chien, Li-Hsin [7608-73]S16
Chien, Wei-Ting [7617-10]S3, [7617-65]SPS3
Chigrinov, Vladimir G. 7618 ProgComm
Childs, David T. D. [7616-05]S1, [7616-10]S2
Chilkoti, Ashutosh [7553-09]S3
Chin, Shu-Cheng [7600-42]S10
Chinnaraj, Mathivanan [7571-27]S7
Chin-Sinex, Helen [7564-54]S8, [7564-116]SPS1
Chinta, Priya V. [7617-46]S9
Chiu, Arthur E. T. [7556-02]S1, [7569-41]S6
Chiou, Pei-Yu E. [7562-02]S1
Chiplunkar, Shuba [7568-83]S2
Chipman, Russell A. [7573-28]S7, [7573-43]SPS1
Chiragh, Furqan L. [7616-13]S3
Chirico, Giuseppe [7565-25]SPS1, [7574-02]S1
Chirvi, Sajal [7568-70]S4
Chitnian, Shahab [7548B-37]S2
Chitnis, Parag V. [7564-129]SPS1
Chiu, Allen W. [7548B-35]S1
Chiu, Chia-Hsiang [7606-46]SPS3
Chiu, Hsien-Chin [7603-66]SPS3
Chiu, Pei-Chin [7601-14]S3
Chiu, Tien-Lung [7618-40]SPS3
Chiu, W. Y. [7605-03]S1, [7609-41]S9
Chiu, Yichun [7548B-35]S1
Chiu, Yi-Jen [7604-19]S4
Cho, Bong Rae [7556-26]S7, [7556-38]S
Cho, Dong-Woo [7593-05]S1
Cho, Eun Chul [7564-66]S9, [7564-111]SPS1
Cho, Jae Du [7554-55]S8
Cho, Mu Hee [7607-25]S6, [7607-30]S7, [7607-47]SPS3
Cho, Namhyun [7554-91]SPS1
Cho, S. M. [7602-41]S9
Cho, Sang-Hwan [7617-62]SPS3, [7618-44]SPS3
Cho, Se Jun [7605-28]SPS3
Cho, Seung Bum [7580-83]SPS2
Cho, Won Hae [7578-81]SPS2
Cho, Yong-Hoon [7600-05]S1
Cho, Yong-Jin [7548A-18]S
Choa, Fow-Sen [7597-21]S5, [7616-44]S10, [7616-63]S14
Chodavarapu, Vamsy P. [7553-29]S, 7574 S4 SessChr, [7574-25]S4
Choe, Regine [7557-01]S1
Choe, Woo-Young [7619-37]SPS3
Choi, Ben [7548B-63]S7
Choi, Bernard 7548A Chr, 7548A S SessChr, [7548E-123]S1, 7573 ProgComm, 7573 S1 SessChr, 7573 S2 SessChr, [7573-06]S2, [7573-08]S2
Choi, Chulhee [7548D-118]S4, [7562-16]S4, [7568-45]SPS1, [7568-53]SPS1
Choi, Duk-Yong [7609-37]S9
Choi, E. Y. [7599-33]S9, [7599-40]S10, [7601-17]S4
Choi, Eun S. [7568-40]SPS1
Choi, Eun Seo [7555-58]SPS1
Choi, Eung-Ho [7548A-18]S
Choi, Eunshil [7574-24]S4
Choi, H. C. [7572-24]SPS1
Choi, Hae Young [7556-39]SPS1
Choi, Heejin [7561-01]S1
Choi, Hyosook [7568-45]SPS1
Choi, Jae-bong [7607-25]S6
Choi, Jae-Won [7596-15]S4
Choi, Jae-Woo [7593-11]S2
Choi, Jin Chul [7617-57]SPS3
Choi, Jiyeon [7589-44]S8, [7589-44]S12, [7590-03]S1
Choi, Jong-ryul [7568-41]S3, [7596-07]S2
Choi, Jun Hyuk [7603-36]S8
Choi, Kwangsik [7605-13]S5
Choi, Myunghwan [7562-16]S4
Choi, Seong-Soo [7606-53]SPS3
Choi, Sukyung [7599-53]SPS3
Choi, Sun Young [7578-81]SPS2
Choi, Sung-Eun [7609-40]S9
Choi, Wonshik [7568-65]S6, [7568-66]S4
Choi, Woo J. [7568-40]SPS1, [7568-76]S1
Choi, Yoon-Ho [7602-41]S9
Choi, Young-Ki [7572-19]SPS1
Choi, Young-Wan [7572-10]S2, [7572-19]SPS1, [7579-68]SPS3, [7606-49]SPS3, [7608-51]S11, [7620-09]S3
Choki, Koji [7607-27]S7
Chong, Changho [7554-66]S10, [7554-98]SPS1
Chong, Khin-Sze A. [7554-87]SPS1
Chong, Shasha [7569-45]S6, [7569-84]SPS1
Chong, Shau-Poh [7570-26]S5
Choo-Smith, Lin-P'ing [7548C-179]S2, [7548D-115]S3, [7549-04]S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Crozat, Paul [7606-22]S7, [7606-26]S7
Crozier, Ken [7577-26]S6, [7591-12]S3, [7604-42]S9
Crump, Paul A. [7583-22]S5
Cruz, Aurélien [7600-02]S1
Cruz-Cabrera, Alvaro A. [7591-24]S6, [7609-46]S11
Cserhati, Csaba [7598-53]SPS3
Csete, Maria [7577-49]SPS1
Cubeddu, Rinaldo [7556-15]S4
Cuccia, David J. [7573-06]S2, [7573-17]S4
Cucu, Radu G. [7554-18]S3
Cui, Huizhong [7564-28]S4
Cui, Jian-Lei [7590-23]SPS2
Cui, Meng [7569-23]S3
Cui, Xiquan [7570-08]S2, [7570-10]S3
Cukierski, William [7557-32]SPS1
Cula, Gabriela O. [7548A-17]S
Culjat, Martin O. [7555-22]S5, [7555-39]S8
Cullighan, Melissa [7551-43]SPS1
Culpepper, Martin L. [7561-01]S1
Culver, Joseph P. 7563 ProgComm, [7576-11]S3
Cundiff, Steven T. [7600-33]S8, [7600-49]S12
Cundin, Luisiana X. [7562-21]S5
Cune, Marco [7549-13]S2
Cunha, Alexandre [7589-13]S4
Cunha de Castro, Guilherme [7578-72]SPS2
Cunningham, Brian T. 7553 S2 SessChr, [7553-01]S1
Cunningham, John E. 7607 ProgComm, 7607 S1 SessChr, [7607-01]S1, [7607-02]S1, [7607-11]S3
Cuper, Natascha [7555-30]S6
Curatu, George [7579-16]S4
Curis, Jean-Francois [7550-80]SPS1, [7595-24]S4
Cury, Jaime A. [7549-14]S2
Custer, Jonathan [7564-50]S7
Custillon, Guillaume [7604-39]S8
Cuttitta, Frank [7568-27]S5
Czarnomski, Mariusz [7587-08]S2
Czycholl, Gerd [7602-35]S8
-
- D**
- Da, Xing** 7565 ProgComm
da Costa, Ernande [7582-51]SPS2
Da Costa, Ralph S. [7558-12]S3
da Costa Lino, Maira D. M. [7552-25]SPS1
da Silva, Andrea [7582-51]SPS2
Daaboul, George [7553-17]S5, [7553-19]S5
Dabhi, Harish [7576-43]S10
Dachner, Matthias-Rene [7597-63]S14
Dadgar, Armin [7602-05]S1
Dadic, Dalibor [7585-11]S3
Daehn, Glenn [7590-29]S
Dagenais, Mario 7605 ProgComm, 7605 S3 SessChr, [7605-13]S5
Daghastanli, Nasser A. [7551-34]SPS1, [7567-07]S2
Dahal, Rajendra P. [7598-44]S10, [7602-62]S14
Dahan, Maxime 7575 ProgComm
Dahlberg, Jan-Olof [7569-05]S1
Dahlgren, Robert P. 7598 ProgComm
Dähne, Mario [7602-32]S7, [7610-11]S3, [7610-13]S3
Dai, Hongjie [7560-17]S5, [7574-05]S1, [7575-31]S10
Dai, Xingcan [7600-49]S12
Dai, Yu-Tang [7590-23]SPS2
- Dainty, Christopher J.** 7595 ProgComm
Dajani, Iyad A. [7580-53]S12, [7580-93]SPS2
Dakka, Milad [7559-21]S, [7577-16]S4
Dal Lago, Matteo [7617-23]S4
Dal Negro, Luca [7553-05]S2, [7553-13]S4, [7553-15]S4, [7577-34]S7
Dalacu, Dan [7608-88]S19
D'Alfonso, Laura [7574-02]S1
Dalla Mora, Alberto [7556-15]S4
Dallas, Tim E. [7592-11]S2, [7592-13]S3, [7592-19]S4, [7592-21]S4, [7592-25]S5, [7592-27]S5, [7593-18]S3, [7593-29]S6, [7594-17]S5, [7595-23]S4
Dalsjo, Per [7592-17]S3
Dalton, Larry R. [7579-32]S8
Daltrozzi, Ewald [7576-34]S9
Daly, Aidan J. [7615-25]S6
Daly, Daniel J. [7550-81]SPS1
Daly, John G. SC015 Inst
Dalzell, Danielle R. [7562-22]S5
Damania, Dhwanil [7568-62]S1, [7573-02]S1, [7573-21]S5
Dambon, Olaf [7590-10]S2
Damlencourt, J. F. [7606-26]S7
D'Amours, Frédéric [7548D-115]S3
Damzen, Michael J. [7578-19]S5
Dana, Kristin J. [7548A-17]S
Daneker, Vadim [7591-26]S6
Daneshbod, Mehran [7570-11]S3
Dang, Boshi [7612-14]S3
Dang, Gerard T. [7615-10]S3
Dangel, Roger [7607-18]S5, [7607-19]S5, [7607-20]S5
Danhof, Julia [7602-39]S8
Daniele, Michael Angelo A. [7599-62]SPS3, [7591-37]SPS2
Danielli, Amos [7553-10]S3
Danielyan, Hakob [7582-01]S4, [7582-01]S6, [7582-01]S1
Dannberg, Peter [7556-06]S2
Dantus, Marcos M. [7569-125]S9
Danylov, Andriy A. [7601-04]S1
Danz, Norbert [7617-42]S8
Dapkus, P. Daniel 7605 ProgComm
Darafsheh, Arash [7605-25]S9
Darbouret, Bruno [7572-12]S3
Daria, Vincent R. [7548E-126]S2, [7613-03]S1
Darling, Cynthia L. [7549-05]S1, [7549-24]S, [7549-25]S, [7549-27]S
Darvish, Shaban R. [7608-11]S3, [7608-96]S3, [7609-14]S4
Das, Bidyut B. [7561-06]S1
Das, Naresh C. [7617-67]SPS3
Das, Susanta K. [7586-20]SPS2
Dasari, Kiran [7586-20]SPS2
Dasari, Ramachandra R. [7562-03]S1, [7568-65]S6, [7568-66]S4
Dasen, Stephan [7593-22]S4
Dasgupta, Sonali [7580-35]S9
Dashkov, Mikhail V. [7621-25]SPS3, [7621-26]SPS3
Datiles, Manuel B. [7550-07]S2
Dauderstädt, Ulrike A. [7592-24]S5
Daudin, Bruno [7602-36]S8
Daunt, Chris L. L. M. [7598-60]SPS3
Dausinger, Friedrich [7585-01]S1
Dave, Digant [7568-70]S4, [7576-30]S8
David, Aurelien [7617-28]S6
David, Gachet [7569-11]S2
Davids, Paul [7609-46]S11
Davies, Alexander G. [7616-26]S6
Davies, Matthew A. 7591 ProgComm
Davila Romero, Luciana C. [7613-24]S7
- Davis, Chris A. [7562-49]SPS1
Davis, Daniel [7595-09]S2
Davis, John R. [7558-09]S2
Davis, Lloyd M. [7571-36]S10
Davis, Ryan W. [7570-01]S1
Davis, Scott C. [7551-25]S6
Davis, Scott R. [7618-47]S3
Davis, Steven J. [7551-14]S3, 7581 Chr, 7581 S1 SessChr, [7581-03]S1, [7581-06]S1, [7581-21]S4
Davis, Wyatt O. 7594 ProgComm, 7594 S4 SessChr, [7594-08]S3, [7594-09]S3
Dawson, Jay W. 7580 CoChr, 7580 S16 SessChr, 7580 S SessChr
Dawson, Martin D. 7578 ProgComm, [7578-33]S8
Dawson, Phillip [7575-26]S9
Dax, Tanya [7580-14]S3
Day, James [7569-13]S2
Dayton, Amanda [7555-37]S8, [7567-12]S3, [7573-03]S1
De, Arijit Kumar [7569-72]SPS1
de Almeida, Darcy [7552-16]S3
de Araujo, Renato E. [7582-42]S9
De Biasio, Martin [7570-20]S4
de Boer, Johannes F. [7551-18]S4, 7554 ProgComm, [7554-60]S9
de Boorder, Tjeerd [7548B-42]S3, [7556-30]S8, [7562-30]S7
de Carvalho, Carolina M. [7549-18]S
De Coss Gómez, Maritza [7568-78]S
de Dios Fernandez, Cristina [7597-23]S5
de Faria e Sousa, Sidney Julio [7550-78]SPS1
de Fornel, Frederique A. [7608-37]S8, [7609-21]S5
De Geest, Bruno G. [7575-36]S11
De Giorgi, Vincenzo [7548A-07]S, [7569-104]SPS1
de Graaff, Jurgen C. [7555-30]S6
De Greve, Kristiaan [7611-22]S5
De Groote, Jean-Jacques G. S. [7550-84]SPS1
De Guido, Stefano [7602-47]S10
De Koker, Stefaan [7575-36]S11
de la Cruz, Jomer [7548A-13]S
de la Fuente, Jesus M. 7575 ProgComm
De La Rosa, Elder [7576-25]S6, [7598-51]S12, [7617-61]SPS3
de la Rosette, Jean J. [7548B-63]S7
de la Zeda, Adam [7560-17]S5
de Lary, Brian [7583-25]S5
De Llanos, Raquel [7577-41]SPS1
De Luca, Anna C. [7555-43]S9, [7568-39]S
de Mauro, Claudio [7569-40]S6
de Mello, Andrew J. [7593-02]S1
de Melo Mendonça, Tânia [7603-19]S4
de Montmorillon, Louis-Anne [7598-14]S4
de Oliveira, Jose Paulo G. [7587-18]S3
De Poly, Bertrand [7554-80]S12, [7555-13]S3
de Ridder, René M. [7559-02]S, [7605-20]S7
de Roode, Rowland [7548G-157]S3, [7561-24]S4
de Rooij, Nico F. [7594-13]S4, [7594-19]S6, [7594-26]S7
De Rossi, Alfredo [7608-40]S9
De Sa Peixoto, Paulo [7569-57]S8, [7599-13]S3
De Sario, Marco [7598-45]S11
De Servi, Barbara [7550-59]SPS1
De Siena, Gaetano [7548A-06]S
- De Silvestri, Sandro [7595-15]S3
De Stefano, Luca [7606-12]S4
De Taobada, Luis H. 7552 ProgComm, [7552-18]S4, [7552-31]SPS1
De Tandt, Cathleen [7597-35]S8, [7597-38]S8
de Thomaz, André A. [7568-56]S2, [7568-59]S3, [7575-37]S11, [7610-08]S2, [7569-58]S8, [7569-59]S8, [7569-110]SPS1, [7569-111]SPS1
De Tommasi, Edoardo [7606-12]S4
de Visscher, Sebastiaan A. [7548C-184]S4
De Vittorio, Massimo [7602-47]S10
De Witte, Olivier [7554-80]S12, [7555-13]S3
Dean, David [7548E-130]S3
Dean, John [7564-43]S7
Dean, Paul [7616-26]S6
DeAngelo, Bianca [7573-33]S8
Debaes, Christof [7606-36]S10, [7608-33]S8
Débarre, Delphine [7570-29]S6
deBoer, Johannes F. [7551-17]S4
Debourdeau, Mathieu [7548B-48]S4, [7575-12]S3
DeBusschere, Derek [7564-75]S11
Decaris, Martin [7566-04]S1
DeCerco, Joseph [7555-25]S5
Dechev, Nikolai [7594-36]SPS2
Decker, Manuel [7586-14]S3
Deckert, Volker [7560-25]S4
Deckert-Gaudig, Tanja [7560-25]S4
Decoster, Didier J. 7608 S3 SessChr, [7608-35]S8
Decoster, Stefan [7603-19]S4
Deen, M. Jamal [7574-26]S4
Degeenaar, Patrick [7548G-162]S5
deGrandpré, Christian [7567-17]S4
Dehghani, Zahra [7600-59]S14
Dejardin, Theo [7575-28]S9
Dekhter, Rima [7574-22]S4, [7568-43]S6
Dekkiche, Leila [7609-53]SPS3
Dekoulis, George [7588-26]SPS2
Del Fatti, Natalia [7600-02]S1
del Mercato, Loretta L. [7575-35]S11
del Pino, Pablo [7575-09]S4, [7575-28]S9, [7575-35]S11
Delàge, André [7606-10]S4, [7606-13]S5
Delahaye, Emilie [7569-53]S7
Delahaye, Julie [7570-36]S7, [7571-38]S10, [7608-28]S6
Delaigue, Martin [7578-45]S11, [7589-19]S5
Delaney, Kris T. [7617-18]S4
Delaney, Marie [7572-11]S3
DeLaunay, Pierre-Yves [7608-60]S13
Delaue, Philippe [7564-88]SPS1
Delehanty, James B. [7575-26]S9
Delgado, S. [7550-20]S4
Delger, Philip [7598-35]S9
Deliolanis, Nikolaos C. [7557-03]S1, [7564-11]SPS1
Della Giustina, Gioia [7582-46]S10, [7582-54]SPS2
Delmas, Thomas [7576-49]S12
Delmdahl, Ralph F. [7581-11]S3
Deloison, Florent [7550-29]S6, [7589-02]S1
DeLouise, Lisa A. 7553 S6 SessChr, [7553-20]S5
DelRio, Stephen P. [7564-04]S1, [7564-71]S10, [7564-84]S12
DeMange, Paul P. [7581-12]S3
Demeter, Béla [7552-21]S4
Denier, Camelia [7549-22]S
Demirbas, Umit [7598-46]S11

Index of Authors, Chairs, and Committee Members

- Demirci, Utkan** [7551-17]S4
Demjan, Eniko T. [7549-03]S1, [7554-88]SPS1
Demmler, Marcel [7591-33]S8
Demos, Stavros G. 7561 CoChr, 7561 S1 SessChr, [7561-02]S1, [7561-08]S1, [7581-12]S3
Dempewolf, Anja [7602-05]S1
DenBaars, Steven P. [7602-43]S9, [7616-19]S4
Deng, Bin [7560-23]S4, [7560-24]S6
Deng, Dawei [7576-52]SPS1
Deng, Shengling [7606-51]SPS3, [7607-35]S8
Deng, Yong [7557-26]SPS1
Deng, Zilan [7619-21]S4
Denis, Ronald [7558-28]SPS1
Deniset-Besseau, Ariane [7550-48]S10, [7569-57]S8, [7599-13]S3
Denisov, Vladimir I. [7580-104]SPS2
Denkceken, Tuba [7573-31]S7
Denker, Boris I. [7598-04]S1
Denninghoff, Kurt [7573-28]S7, [7573-43]SPS1
Dennis, Allison M. [7575-12]S5
Dennis, Richard B. [7580-26]S7
Dennis, Robert C. [7576-23]S6
Densmore, Adam [7606-10]S4, [7606-13]S5, [7606-23]S7
Dentino, Andrew [7593-29]S6
Denvir, Donal [7570-31]S6
Deodhar, Kodand D. [7568-83]S2
Deotare, Parag B. [7609-07]S2, [7609-10]S3
Depeursinge, Christian [7569-50]S7, [7570-09]S2, [7570-13]S3
Deppe, Dennis G. 7610 ProgComm, [7611-26]S6, [7616-02]S1
Deranlot, Cyrille [7603-57]S5
Derderian, Gregory [7550-72]SPS1, [7594-18]S5
Derderian, Jeffrey P. [7594-18]S5
Derickson, Dennis J. [7554-96]SPS1
DeRosa, Maria C. [7577-16]S4
Dertinger, Thomas [7571-44]S9
Desbiens, Louis [7580-69]SPS2
Desbiolles, Pierre [7576-33]S8
Descour, Michael R. [7558-07]S2, [7558-24]S6, [7558-24]S2, [7590-09]S2
Desirena Enriquez, Haggeo [7598-51]S12
Desjeans-Gauthier, Philippe [7584-14]S6, [7584-14]S10
Desmet, Kristina [7552-12]S3
Desmulliez, Marc P. Y. [7597-29]S7
Desroches, Yan [7592-03]S1
Detwiler, Thomas F. [7621-18]S5
Detz, Hermann [7616-22]S5, [7616-62]S14
Deuber, Francois O. [7619-17]S4
Deutsch, Christoph [7616-62]S14
Devauges, Viviane [7569-33]S5, [7577-27]S6
Devaux, Eloise [7577-19]S5
Deveaud-Pledran, Benoit [7600-08]S2
Devenson, Jan [7616-37]S9
Devi, Gayathri [7576-02]S1, [7576-56]SPS1, [7576-57]SPS1
Devilez, Alexis [7571-09]S2
Devito, Mark A. [7583-01]S1, [7583-04]S1, [7583-46]SPS2
Devor, Anna [7569-91]SPS1
DeWald, Daryl B. [7568-81]SPS1
Dewhurst, Mark [7561-22]S4
Dey, Dibyendu [7601-08]S2
Deyev, Sergey M. [7575-34]S10
Dhabai, Sanjay [7594-34]S9
Dhalla, Al-Hafeez Z. [7554-79]S12
Dhara, Surajit [7618-33]S9
Dhawan, Anuj [7577-06]S2, [7577-11]S3
Dhennin, Jérémie [7592-02]S1, [7592-09]S2
Dholakia, Kishan [7555-43]S9, [7568-39]S1, 7613 ProgComm
Di Bernardino, Marco [7568-16]S5
Di Carlo, Aldo 7597 ProgComm, 7597 S7 SessChr, [7597-09]S2, [7597-12]S3, [7597-66]S14
Di Franco, Cinzia [7608-05]S1
Di Lieto, Alberto [7614-02]S1, [7614-06]S2, [7614-08]S3
Di Teodoro, Fabio 7580 ProgComm, 7580 S3 SessChr, [7580-05]S1
Di Tommaso, Annalisa [7598-45]S11
Diagne, Mohamed A. 7608 ProgComm, 7608 S8 SessChr
Dianov, Eugeny M. [7598-04]S1, [7580-39]S9, [7580-43]S10
Dias, Frederic [7580-80]SPS2
Diaspro, Alberto 7569 ProgComm
Diaz, Francesc [7578-14]S3
DiBernardo, Barry [7548A-09]S
Dickensheets, David L. 7558 ProgComm, 7558 S5 SessChr, 7594 ProgComm, 7594 S1 SessChr, [7594-04]S6, [7594-04]S2, [7594-12]S4
Dickinson, J. Thomas 7584 ProgComm, [7584-03]S1, 7586 ProgComm, 7586 S3 SessChr, [7586-09]S2
Dickinson, James E. [7584-27]S10
Diddams, Scott [7579-33]S8
Diebold, Eric D. [7589-23]S6
Diebold, Gerald J. 7564 ProgComm, 7564 S6 SessChr
Diels, Jean-Claude M. 7579 ProgComm
Diem, Max 7560 ProgComm
Dieppedale, Christel [7592-09]S2
Diethel, Tom [7573-14]S3
Dietrich, Klaus [7607-21]S5
Dietrich, Sascha [7569-35]S5
Dietz, R. [7597-40]S9
Dietz, Tim [7548A-09]S
Dietzek, Benjamin [7560-26]S1
Diggs, Darnell E. 7599 ProgComm
DiGiovanni, David J. [7580-51]S12
Digonnet, Michel J. F. SC984 Inst, 7598 Chr, [7612-11]S3
Dijkhuis, Jaap I. [7600-04]S1
DiLazaro, Tom [7578-60]S14
Dillon, Daren [7595-04]S1
Dimakov, Sergey A. [7579-02]S1
DiMarzio, Charles A. 7564 ProgComm, 7564 S12 SessChr, 7570 ProgComm, 7570 S5 SessChr, [7570-04]S1, [7570-18]S4, [7570-25]S5
Dimitriev, Alexandre [7551-29]S7
Dimitriev, D. V. [7610-15]S4
Dimofte, Andreea [7551-08]S2, [7551-13]S3, [7551-43]SPS1
Dimov, Stefan S. [7590-11]S2
Dimroth, Frank [7597-02]S1
Dinca, Alina [7574-14]S2
Ding, Chaoliang [7579-49]SPS2
Ding, Ding [7597-08]S2, [7614-11]S3, [7616-07]S2, [7617-11]S3
Ding, Edwin [7580-71]SPS2, [7580-73]SPS2
Ding, Jianfu [7598-24]S6
Ding, Lu [7564-110]SPS1
Ding, Lu [7608-31]S7
Ding, Shi-You [7571-02]S1
Ding, Yiwu [7572-13]S3
Ding, Yujie J. 7600 ProgComm, 7600 S2 SessChr, [7600-15]S4
Dingel, Benjamin TrackChr, 7620 Chr, 7620 S2 SessChr, 7620 S3 SessChr, 7620 S1 SessChr, [7620-07]S3, 7621 Chr
Dinten, Jean-Marc [7548B-48]S4, [7557-06]S2, [7557-12]S3, [7557-28]SPS1, [7573-42]SPS1
Dinu, Raluca [7599-16]S4, [7599-18]S5
Dinyari, Nima [7611-08]S2
Dion, Carolyne [7569-94]SPS1
Diop, Mamadou [7555-35]S7
Diouf, Alioune [7595-11]S2, [7595-21]S4
Distel, Martin [7564-62]S9
Dittrich, Helmar [7583-30]S7
Dixon, Lisa [7619-03]S1
Djallilian, Hamid R. [7548C-177]S2
Djemel, Lellouchi [7592-02]S1
Djie, Hery S. [7616-01]S1
Djordjevic, Ivan B. [7621-17]S5, [7621-19]S6, [7621-21]S6, [7621-23]S6
Djurabekova, Flyura [7586-07]S2, [7586-23]SPS2
Dlugosch, Brian [7617-24]S5
Do, Binh Trong [7578-65]S15
Do, My [7599-38]S10
Do, Young Rag [7617-62]SPS3
Doany, Fuad E. [7615-23]S6
Dobre, George [7549-03]S1, [7554-88]SPS1
Dobrev, Todor [7584-33]S11
Dobroiu, Serban [7574-12]S2
Doerr, Christopher R. [7605-08]S3
Doerr, Daniel [7548A-03]S
Dogheche, E. [7608-35]S8
Dohn, Søren [7615-09]S3
Doi, Kohei [7597-22]S5, [7597-85]SPS3
Dolfi, Daniel [7608-41]S9, [7612-28]S7
Dolgos, Gergely [7588-13]S3
Dollinger, Klaus [7562-41]S9
Domachuk, Peter [7606-40]S11
Dombi, Péter [7600-39]S9
Domingo, Concepcion [7577-40]SPS1, [7577-41]SPS1
Domke, Katrin [7569-13]S2
Donk, Yaroslav [7583-50]SPS2
Donati, Silvano 7597 ProgComm
Donegan, John F. [7575-11]S5, [7606-45]SPS3
Dong, Chen-Yuan [7548A-25]S, [7550-58]SPS1, [7550-64]SPS1, [7555-57]SPS1, [7561-38]S5, 7569 ProgComm, 7569 S7 SessChr, [7569-52]S7, [7569-54]S8, [7569-73]SPS1, [7569-75]SPS1
Dong, Jianwen [7619-21]S4
Dong, Jing [7562-44]SPS1, [7562-45]SPS1
Dong, Liang [7569-07]S1
Dong, Lixin [7548D-120]S4, [7557-08]S2
Dong, Po [7607-03]S1
Dong, Qi [7583-35]S8
Dong, Weimin [7583-01]S1, [7583-04]S1, [7583-48]SPS2
Donley, Dennis 7569 ProgComm
Donner, Sabine [7554-27]S4
Dooley, Kathryn A. [7560-15]S6
Doolittle, Lawrence R. [7581-23]SPS2
Doradzinski, Roman [7602-11]S3
Doran, Bruce [7554-15]S3
D'Orazio, Antonella [7598-45]S11
Dörfel, Falk [7583-08]S2
Döring, Sven [7589-30]S8
Doroshenko, Maxim E. [7578-75]SPS2, [7578-76]SPS2
Dörr, Daniel [7569-100]SPS1
Dorsaz, Julien [7602-67]S15
Dorsch, Friedhelm SympChair
Dorschner, Terry A. [7580-59]S14
Dorshow, Richard B. [7551-26]S6, [7551-27]S7, 7576 ProgComm, 7576 S10 SessChr
dos Santos, Edson P. [7560-07]SPS1, [7560-02]S1
dos Santos, Jean N. [7549-15]S2, [7549-20]S, [7552-16]S3
dos Santos, Nathalia V. [7551-34]SPS1
Dosche, Carsten [7569-106]SPS1, [7569-107]SPS1, [7576-41]S10
Dostalova, Tatjana [7549-08]S1, 7549 ProgComm
Dosunmu, Olufemi I. [7607-33]S8
Dou, Xinyuan [7607-24]S6, [7607-26]S6
Doughman, Yong-Qiu [7548D-116]S3
Douglas, Erica [7603-38]S9
Douglas, Shane M. [7549-27]S
Douglas, William E. [7599-36]S9
Douglass, Michael R. 7596 Chr, 7596 S1 SessChr
Douillard, Ludovic [7599-35]S9
Doukas, Apostolos G. [7548A-02]S
Doumont, Jean-luc WS897 Inst, WS908 Inst
Douplik, Alexandre [7555-42]S9
Doushkina, Valentina V. SC983 Inst
Dow, John [7569-85]SPS1
Dowling, Jonathan P. 7611 ProgComm, 7611 S7 SessChr, [7611-10]S3, [7611-14]S3, [7611-32]S7
Downes, Andrew [7569-109]SPS1
Doyle, John [7582-61]SPS2
Doyle, Jonathan K. [7606-04]S1
Drabe, Christian 7594 S5 SessChr, [7594-02]S5, [7594-02]S1
Drachenberger, Derrek R. [7580-65]S15
Draga, Ronald [7548B-60]S6, [7548B-34]S1
Draijer, Matthijs J. [7563-17]S4
Drakakis, Emmanuel [7548G-162]S5
Draudt, Andrew [7564-82]S12
Dreischer, Thomas [7587-03]S1
Dreiske, Pete [7608-70]S15
Dreisow, Felix [7589-28]S7, [7589-43]S8, [7589-43]S12
Drese, Klaus S. [7593-22]S4
Drexler, Wolfgang 7550 ProgComm, 7550 S5 SessChr, 7550 S11 SessChr, [7550-44]S9, [7550-55]S11, 7554 ProgComm, 7554 S5 SessChr, [7554-17]S3, [7554-22]S4, [7554-30]S5
Dreze, Rebekah A. [7555-15]S3
Dries, J. Christoph 7598 Chr
Driessen, Alfred [7559-02]S, [7604-02]S1
Driscoll, Kristina [7608-21]S5
Drobchak, Oksana Z. [7548B-65]SPS1
Drobizhev, Mikhail A. [7576-15]S4, [7599-30]S8, [7599-31]S8, [7599-43]S11
Drolet, Mathieu [7580-69]SPS2, [7580-96]SPS2
Drowley, Cliff [7617-38]S7
Druon, Frederic [7569-33]S5, [7550-29]S6, [7580-28]S7, [7589-02]S1, [7589-19]S5
Du, Jihua [7583-17]S4
Du, Keming [7578-23]S5, [7578-71]S16, [7585-25]S12, [7585-25]S6
Du, Yan [7577-06]S2
Du, Zhenhui [7572-17]SPS1
du Plessis, Monuko [7605-10]S3, [7606-37]S10, [7606-54]SPS3, [7607-34]S8

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Duan, Guanghua [7598-70]SPS3
Duan, Huigao [7591-10]S3
Duan, Jun [7584-34]S11
Duane, Peter [7591-12]S3
Dubinskii, Mark 7580 ProgComm,
7580 S12 SessChr
Dubinsky, Galina [7562-39]S9
Duboisset, Julien [7569-57]S8, [7599-
13]S3
Dubowski, Jan J. [7577-12]S4, 7584
ProgComm, 7584 S3 SessChr,
7586 Chr, 7586 S1 SessChr, [7586-
06]S1
Dubrasquet, Romain [7580-04]S1
Duc, Huynh Thanh [7600-27]S6
Ducharme, Alfred D. SC156 Inst
Dudley, John [7569-98]SPS1, [7580-
80]SPS2, [7598-49]S12
Dudley, Peter [7597-44]S10
Dudorov, Vadim V. [7588-20]S4
Duelk, Marcus [7602-67]S15
Duesing, Jan [7589-38]S5, [7589-38]
S9
Dufft, Daniela [7579-45]S11
Dufort, Sandrine [7576-49]S12
Dufour, J. [7616-34]S8
Dufour, Marc L. [7548D-113]S2,
[7548D-115]S3, [7549-04]S1,
[7567-17]S4
Duke, Austin R. [7548G-159]S4,
[7548G-161]S4
Duke, Charles B. [7600-17]S4
Duker, Jay S. [7550-43]S9, [7550-56]
S11
Dukes, Albert D. [7571-36]S10
Duk-II, Suh [7599-54]SPS3
Duma, Virgil-Florin [7556-10]S3
Dumeige, Yannick [7612-25]S7
Dummer, Matthew M. [7557-14]S3
Dumon, Pieter [7554-46]S7, [7604-17]
S4
Dumont, Guy A. [7555-38]S8
Dunbar, Erwin [7594-04]S6, [7594-04]
S2
Duncan, Donald D. 7563 Chr, [7563-
03]S1, [7566-08]S2, [7570-11]S3,
[7573-12]S3
Dunham, Bruce M. [7581-22]SPS2
Dunn, Andrew K. [7563-19]S4, [7573-
05]S2, [7596-05]S2
Dunn, Jason M. [7555-06]S2, [7573-
48]SPS1
Dunsby, Christopher [7564-109]
SPS1
Duparré, Michael [7579-21]S6, [7579-
23]S6
Dupont, Jairton [7582-47]S10
Dupont, Tiphaine [7606-42]SPS3
Dupuis, Russell D. 7602 S15 SessChr,
[7602-44]S9
Durán-Sánchez, Manuel [7580-98]
SPS2, [7582-24]S6
Durkin, Amanda [7567-02]S1
Durkin, Anthony J. 7548A
ProgComm, 7548A S SessChr,
7556 ProgComm, 7556 S6
SessChr, [7567-05]S2, [7573-17]S4
Durr, Nicholas J. [7569-62]S9, [7577-
36]S8
Durresti, Arjan 7620 ProgComm
Durst, Michael E. [7569-92]SPS1
Duscher, Gerd [7586-13]S3, [7586-24]
SPS2
Düsing, Jan Friedrich [7590-05]S1
Dutt, Gurudev 7611 ProgComm
Dutta, Achyut K. 7621 Chr, 7621 S6
SessChr
Duval, Marie-Alix [7548E-131]S3,
[7567-06]S2
Duverger-Aruffo, Claire [7598-23]S6
Duvet, Ludovic [7596-13]S3
Duvic, Madeleine [7572-21]SPS1
Dwelle, Jordan C. [7554-92]SPS1
Dwilinski, Robert [7602-11]S3
Dyba, Marcus [7578-67]S16
Dybert, Nicole L. [7585-06]S2
Dyng, Mary 7552 ProgComm,
[7552-04]S1
Dziedzina, Marcus [7579-45]S11
Dziekian, Thomas [7555-17]S4

E

Earman, Allen M. 7607 ProgComm,
[7607-42]S1, [7607-42]S10
Eary, Janet F. [7564-41]S6
Eaton, Frank D. 7588 ProgComm
Eaton, Shane M. [7589-29]S7
Ebbecke, Jens [7609-06]S2
Ebbesen, Thomas [7577-19]S5,
[7577-32]S7
Eberhardt, Gabriele [7585-24]S12,
[7585-24]S6
Eberhardt, Ramona [7580-52]S12,
[7580-86]SPS2, 7585 ProgComm,
[7585-04]S1, [7589-30]S8, [7595-
17]S3
Ebermann, Martin [7594-32]S9
Ebert, Bernd [7555-17]S4
Ebert, Philipp [7602-32]S7
Ebert, Robby [7589-39]S5, [7589-39]
S9, [7589-50]SPS2
Ebil, Ozgenc [7599-20]S5, [7606-30]
S8, [7609-22]S5
Ebisui, Akira [7593-04]S1
Ebner, Timothy J. 7548G ProgComm
Ebrahim-Zadeh, Majid 7582
ProgComm
Echiadis, Angelos [7556-24]S6
Eckardt, Robert C. 7582 ProgComm
Ecker, Ben [7596-06]S2
Eckersley, Robert [7564-109]SPS1
Eckert, Jocelyn [7548G-161]S4
Economou, Sophia E. [7600-33]S8
Eda, Hideo [7557-17]S4, [7557-36]
SPS1
Edalatipour, Masoud [7607-44]SPS3
Edamatsu, Keiichi 7597 ProgComm
Edamura, Tadanaka [7616-27]S6,
[7616-61]S14
Edelmann, Thomas A. [7592-10]S2
Eden, J. Gary [7581-19]S4, [7581-20]
S4
Edmiston, Greg [7594-17]S5
Edo, Susumu [7618-27]S7
Edoff, Marika [7603-12]S3
Edwards, Clive [7568-29]S3
Edwards, Elizabeth H. [7607-33]S8
Edwards, Gareth T. [7616-64]SPS3
Ee, Yik-Khoon [7602-52]S12, [7617-
16]S3
Eells, Janis T. [7552-12]S3
Effenberger, Frank J. [7621-12]S4
Eftekhari, Ali A. [7569-79]SPS1, [7609-
30]S7, [7609-48]S11
Eftekharian, Amin [7608-20]S4
Eggeling, Christian 7571 ProgComm,
[7571-34]S10, [7574-06]S1
Eggers, Douglas [7593-15]S3
Eggert, Helge [7613-12]S3
Eggleton, Benjamin J. 7580
ProgComm, [7606-40]S11, [7609-
37]S9
Egilmiz, Mehmet [7600-21]S5
Egli, Marcel [7570-09]S2
Egorova, Olga N. [7580-43]S10
Egoz, Inbal [7562-40]S9
Ehrlich, Marcelo [7553-10]S3
Ehrmann, Klaus [7550-88]SPS1
Eichel, Justin [7550-12]S3
Eichenholz, Jason M. 7561 S3
SessChr, [7561-03]S1, [7568-60]S6
Eichhorn, Marc [7582-36]S8
Eichler, Hans-Joachim 7579
ProgComm, 7579 S7 SessChr,
[7579-45]S11, [7606-41]S11
Eichler, Jürgen P. [7619-40]SPS3
Eickhoff, Martin [7597-20]S5
Eickholt, Casey [7580-36]S9
Eidam, Tino [7580-34]S8, [7580-57]
S13, [7580-85]SPS2, [7580-91]
SPS2
Eigenwillig, Christoph M. [7554-41]S7,
[7554-51]S8, [7554-56]S8
Eikenberry, Wayne [7602-14]S3
Einishi, Toshihiko [7598-64]SPS3
Eisele, Holger [7602-32]S7, [7610-11]
S3, [7610-13]S3
Eiseman, Julie [7551-28]S7
Eisenberg, Eric C. [7580-03]S1
Eisermann, Sebastian [7603-04]S1
Eitel, Richard [7553-07]S2
Ekici, Ozgur [7577-36]S8
Ekins-Daukes, Nicholas J. 7597
ProgComm, [7597-04]S1
El Beheiry, Mohamed [7553-25]SPS1
El Haj, Alicia [7566-18]S4
Elagin, Vadim [7577-25]S6
El-Amraoui, Mohammed [7609-36]S8
Elbers, Joerg-Peter [7621-04]S2
Eldada, Louay A. 7605 Chr, 7605 S6
SessChr, 7605 S7 SessChr, 7605
S1 SessChr, [7605-14]S5
Eldesouki, Munir M. [7574-26]S4
Elezzabi, Abdul Y. [7600-39]S9, 7600
CoChr, 7600 S8 SessChr, 7600 S12
SessChr, [7600-21]S5, [7600-38]
S9, [7600-69]SPS3
Elfick, Alistair [7569-109]SPS1
Elgass, Kirstin [7568-12]S6, [7568-38]
S1
Elgcrona, Gunnar [7578-26]S7
Elia, Angela [7608-05]S1
Eliceiri, Kevin W. 7569 ProgComm,
[7569-44]S6
Elissalde, Catherine [7603-28]S7
El-Kady, Ihab F. 7609 S6 SessChr,
[7609-29]S7
Elkin, Nikolay [7580-72]SPS2
Elkins, Dennis F. [7580-15]S4, [7580-
15]S6, [7580-15]S1
Ellerby, Gwenn [7559-22]S, [7572-18]
SPS1
Ellinghaus, Paul [7606-54]SPS3
Ellington, Andrew [7576-24]S6
Elliott, John T. [7576-16]S4
Elliott, Jonathan [7555-35]S7
Ellis, A. Robert [7591-24]S6, [7604-22]
S5
Ellis, Darrel L. [7548A-20]S
Ellis, Glenn A. [7583-09]S2
Ellis, Matt [7594-08]S3, [7594-09]S3
Elmaanaoui, Badr [7554-92]SPS1
El-Naggar, Adel K. 7548C S1 SessChr,
[7548C-68]S1
Eloy, Jean-Christophe 7594
ProgComm, 7594 S6 SessChr
Elsaesser, Thomas [7616-52]S12
El-Sharkawy, Yasser H. [7551-23]S6
El-Sherif, Ashraf F. [7578-79]SPS2
El-Siblani, A. [7596-14]S4
Elsnab, John [7593-27]S5
Elsner, Peter [7554-90]SPS1
Elson, Daniel S. [7555-08]S2, [7555-
18]S4, [7556-01]S1, [7561-07]S1,
[7564-109]SPS1
Elwell, Clare E. [7564-112]SPS1
Elyahou, Kapon [7615-19]S5
Emec, Soner [7599-34]S9
Emelianov, Stanislav Y. [7550-06]
S2, 7564 ProgComm, 7564 S2
SessChr, 7564 S10 SessChr,
[7564-07]S2, [7564-09]S2, [7564-
61]S9, [7564-65]S9, [7564-95]
SPS1, [7564-99]SPS1, [7564-114]
SPS1, [7564-118]SPS1, [7574-04]
S1, [7576-19]S5, [7576-51]S12
Emond, Frédéric [7568-44]S5
Emonts, Michael [7583-53]SPS2
Enaida, Hiroshi [7550-69]SPS1
Enderlein, Jörg 7571 Chr, [7571-17]
S5, [7571-31]S9, [7571-44]S9
Endo, Masamori [7579-11]S4, [7581-
05]S1
Enejder, Annika M. [7569-05]S1
Engenhorst, Markus [7591-26]S6
Enggheta, Nader [7600-23]S5, [7604-
41]S9
Engholm, Magnus [7580-07]S2
Engl, Karl [7617-72]S10
England, Robert J. [7609-45]S10
Englert, Lars [7586-18]S4, [7600-32]
S7
Englund, Dirk R. [7609-08]S3, [7611-
23]S5, [7611-27]S6
Ennsner, Karin [7604-08]S2
Enouz-Vedrenne, Shaima [7603-57]S5
Eom, Joo Beom [7557-29]SPS1
Eom, Tae Joong [7555-58]SPS1
Ephrat, Pinhas [7564-113]SPS1,
[7564-119]SPS1
Epperlein, Peter W. SC975 Inst
Epstein, Richard I. 7614 Chr, [7614-
02]S1, [7614-06]S2
Era, Masanao [7599-47]S12
Erbele, Isaac [7552-11]S2
Erbert, Goetz [7582-02]S4, [7582-02]
S6, [7582-02]S1, [7554-52]S8,
[7582-03]S2, [7582-07]S2, [7582-
59]SPS2, [7583-22]S5, [7583-30]
S7, [7583-43]SPS2, [7616-14]S3,
[7616-36]S8, [7616-53]S12, [7616-
55]S13, [7616-57]S13
Erdmann, Rainer [7568-61]S4, [7568-
87]S6, [7569-26]S4, [7569-32]S5,
[7569-82]SPS1, [7569-106]SPS1,
7571 Chr, 7571 S4 SessChr, 7571
S3 SessChr, 7571 S8 SessChr,
7571 S9 SessChr, 7571 S1
SessChr, 7571 S SessChr, [7571-
13]S4, [7571-39]SPS1
Erdoğan, Gülgün [7573-31]S7
Erdogan, Turan [7598-27]S6
Eremtentchouk, Mikhail [7600-29]S7
Ergin, Aysegül [7567-18]S4
Erhardt, Christian [7560-06]S2
Erichsen, Iris [7556-31]S8
Erickson, Sarah J. [7555-25]S5
Erickson, Marica [7551-29]S7
Erkintalo, Miro [7598-49]S12
Erkmen, Baris I. [7587-22]S3
Erlinger, Anthony F. [7568-86]S3
Ermilov, Sergey [7564-24]S4, [7564-
56]S8, [7564-67]S10, [7564-73]
S11, [7564-74]S11
Ernst, Mathias [7578-03]S1
Ernst, Stefan [7569-29]S4, [7571-24]
S7
Erpelding, Todd N. [7564-43]S7,
[7564-69]S10
Erry, Gavin R. [7570-40]SPS1
Ersoy, Okan K. [7584-30]S11
Ertmer, Wolfgang A. 7613 ProgComm,
7613 S4 SessChr, [7613-25]S7
Erzgräber, Hartmut [7597-62]S13
Escobar, Hugo Murua [7613-25]S7
Esenaliev, Rinat O. 7564 ProgComm,
7564 S8 SessChr, [7564-52]S8,
[7564-53]S8
Esenturk, Okan [7600-17]S4
Esfahani, Matin [7591-17]S5
Esmaeelpour, Marieh [7550-55]S11

Index of Authors, Chairs, and Committee Members

Esmonde-White, Francis W. [7548F-140]S1, [7548F-147]S2, [7560-15]S6
Esmonde-White, Karen A. [7548F-147]S2
 Esparza, Diego [7617-63]SPS3
 Espirito Santo, Ana Maria [7568-14]SPS1
 Esquinas, Peter [7580-12]S3, [7582-14]S4
 Esquivias, Ignacio [7597-46]S10, [7597-54]S12, [7616-50]S12, [7616-51]S12
 Essaian, Stepan [7582-01]S4, [7582-01]S6, [7582-01]S1
 Esser, Dagmar [7584-06]S2, [7589-31]S8, [7591-20]S5
 Esser, Dominik [7578-22]S5
 Esterhammer, Regina [7564-108]SPS1
Estrera, Joseph P. [7598-38]S9
 Etchenique, Roberto [7548G-154]S2
Etoh, Takeharu G. [7598-32]S8
 Etrich, Christoph [7604-12]S3
 Eum, Y. S. [7602-41]S9
 Eura, Shigeru [7557-17]S4
 Evanoff, David D. [7599-09]S2
Evans, Conor L. 7551 S3 SessChr, [7551-17]S4, [7551-18]S4
 Evans, Craig A. [7616-26]S6
 Evans, Gary A. 7616 S13 SessChr
 Evans, Keith R. [7602-26]S6, [7602-59]S13, [7602-63]S14, [7602-77]S11, [7602-77]SPS3
 Evans, Rodger [7562-38]S8
 Everett, W. Neil [7548C-98]S5
Eversole, Daniel S. [7577-36]S8, [7589-49]SPS2
 Ewald, Hartmut [7572-08]S2
Ewing, Joseph [7557-16]S4, [7567-19]S4
 Exner, Horst [7589-39]S5, [7589-39]S9, [7589-50]SPS2
 Extermann, Jérôme [7594-19]S6
 Eychmüller, Alexander 7575 ProgComm, [7575-47]S9
 Eyink, Kurt G. [7608-71]S13, 7610 Chr, [7610-22]S5
 Eyyuboglu, Halil T. [7588-18]S4, [7588-23]S4

F

Faber, Dirk J. [7550-47]S9
 Fabre, Nathalie [7609-21]S5
 Fabre, Norbert [7590-21]SPS2
 Fabron, Christophe [7596-13]S3
 Facão, Margarida [7582-41]S9
 Fäcke, Thomas [7619-17]S4
 Fadeeva, Elena [7548C-99]S5
Fadullah, Jarir [7620-13]S4
 Faglia, Guido [7603-40]S9
 Fagot, Dominique [7548A-01]S3
 Fahr, Stephan [7604-12]S3
Fainman, Yeshaiahu 7605 ProgComm, [7606-19]S6, [7607-04]S1
 Faisst, Birgit [7578-69]S16
 Faist, Jerome [7616-21]S5
 Falahpour, Maryam [7587-32]S5
 Falanga, Matthew [7603-44]S10
 Fallah, Alireza [7549-11]S2
 Fallert, J. [7597-40]S9
 Fallica, Giorgio G. [7606-05]S2
 Fan, Chun-Yang [7548C-176]S2
 Fan, Haiming [7610-38]SPS3
 Fan, Huiyan [7598-62]SPS3
 Fan, Jenyu [7616-58]S14
 Fan, Jingyun [7611-16]S4
 Fan, Li [7583-20]S5
 Fan, Lingling [7554-112]SPS1
 Fan, Mai-Yi S. [7552-08]S2

Fan, Shanhui [7553-25]SPS1, [7582-30]S7, 7597 ProgComm, [7601-10]S2, [7604-23]S5, [7605-22]S8, 7609 ProgComm, 7612 ProgComm, [7612-11]S3
 Fan, Tso Yee [7578-40]S10
Fan, Xudong [7579-30]S7, 7604 ProgComm, 7604 S8 SessChr, [7604-09]S2, [7604-38]S8, [7606-32]S9
 Fang, Changge [7568-27]S5
 Fang, Qiyin [7555-20]S4, [7574-26]S4
 Fang, Yen-Hsiang [7602-74]S11, [7602-74]SPS3
 Fang, Yunnan [7609-24]S6
Fanjul-Vélez, Félix [7548A-08]S, [7548F-145]S2, [7562-10]S3
Fantini, Sergio 7557 ProgComm
 Farahani, Keyvan 7557 ProgComm
 Farahi, Salma [7564-88]SPS1
Faraon, Andrei [7609-08]S3, [7611-23]S5, [7611-27]S6, [7611-28]S6
 Farca, George [7618-47]S3
 Fardi, Hamid [7597-78]SPS3
 Farfan, B. [7609-29]S7
 Farias, Patricia M. A. [7575-04]S2, [7575-07]S3, [7575-10]S4, [7575-24]S8
 Farinelli, William A. [7548A-02]S
 Farkas, Daniel L. TrackChr, 7568 Chr
 Farley, Kevin [7580-09]S2
 Farnum, Edward [7582-40]S9
 Faroni, Julia [7580-09]S2
 Farr, William H. [7587-25]S4, [7587-27]S4
 Farrell, Dorothy [7575-26]S9
 Farrell, Thomas J. [7551-31]S7
 Farris, Leslie [7559-16]S, [7574-17]S3
Farsari, Maria [7591-04]S1
 Farsiu, Sina [7550-19]S4, [7550-60]SPS1
 Farwell, Gregory [7555-01]S1
 Farwell, Nathan H. [7588-29]SPS2
 Fassi, Stephanie [7570-12]S3
 Fatemi, Fredrik K. [7612-13]S3
 Fatome, Julien [7598-22]S5
 Fattal, David A. [7574-23]S4, [7591-25]S6
Fauchet, Philippe M. 7553 Chr, 7553 S1 SessChr, [7553-03]S1, [7553-14]S4, 7574 ProgComm, 7606 ProgComm, 7606 S7 SessChr, [7606-25]S7, [7606-34]S9, [7606-39]S10
 Faucon, Marc [7589-36]S5, [7589-36]S9
 Faulkner, David W. 7620 ProgComm
 Favard, Cyril [7569-105]S4
 Favazza, Christopher P. [7564-06]S1, [7564-34]S5, [7564-66]S9
 Fawcett, Helen [7553-19]S5
 Faye, David [7582-36]S8
 Featherstone, John D. 7549 ProgComm
 Fedeli, Jean-Marc [7606-42]SPS3, [7606-26]S7, [7606-22]S7
 Feder, Denise [7568-59]S3, [7575-37]S11
 Fedor, Adam [7591-31]S8
 Fedorov, Andrey [7609-16]S4
Fedorov, Vladimir V. [7578-52]S13, [7578-53]S13, [7578-54]S13, [7578-55]S13
Fedosovs, Robert [7564-32]S5
 Fedosov, Ivan V. [7563-11]S2
 Fedotov, Yuri [7580-74]SPS2
 Feeler, Ryan [7583-03]S1, [7583-18]S4
 Fezell, Daniel F. [7602-43]S9
 Fehlauer, Holger [7589-09]S3
 Feigl, Torsten [7584-29]S10

Feili, Dara [7584-19]S7, [7584-19]S11
 Feise, David [7582-59]SPS2, [7583-30]S7
 Fejer, Martin M. [7582-30]S7
 Feld, Michael S. [7562-03]S1, [7568-65]S6, [7568-66]S4
 Feldman, Marc D. [7562-28]S7
 Feldmann, Claus [7562-25]S6
 Fell, Andreas [7585-27]S12, [7585-27]S6
 Feltin, Eric [7602-67]S15, [7616-18]S4
 Felty, Danielle [7593-29]S6
 Feltz, Anne [7575-16]S6
 Fendrich, David [7616-52]S12
 Feneberg, Martin [7602-64]S15
 Feng, Dazeng [7607-03]S1
 Feng, Ning-Ning [7607-03]S1
 Feng, Shaoqi [7605-24]S9
 Feng, Shih-Wei [7597-76]S8, [7617-45]S9
 Feng, Songlin [7610-33]S8
 Feng, Tian [7591-21]S5
 Fenner, Wayne R. 7587 ProgComm
 Fenske, Roger [7580-26]S7
Fercher, Adolf F. [7554-78]S12
 Ferezouz, Isabelle [7573-07]S2
 Ferguson, Daniel [7555-26]S6
 Ferguson, Halie [7565-07]S3
 Ferguson, Joseph D. [7602-33]S7
 Ferguson, R. Daniel [7561-27]S4, [7550-34]S7, [7550-35]S7
 Ferguson, Robert [7567-03]S1
 Fergusson, James R. [7554-17]S3
Fermann, Martin E. SC744 Inst, [7569-07]S1
Fernandes, Luis A. [7591-17]S5, [7584-22]S8, [7584-22]S12
 Fernandez, Enrique J. [7550-40]S8
Fernandez, Joaquin [7614-09]S3, [7598-03]S1, 7614 S2 SessChr
 Fernandez-Lafuente, Roberto [7575-09]S4
 Féron, Patrice [7612-25]S7
 Ferrand, Jerome [7604-39]S8
 Ferrão de Paiva Martins, Rodrigo 7603 ProgComm, [7603-37]S9
Ferrara, Davon W. [7586-05]S1, [7603-31]S7
 Ferrara, Lorenzo [7589-10]S3
 Ferrari, Jefferson L. [7598-48]S1
Ferrari, Maurizio [7598-23]S6, [7604-34]S7
 Ferraro, Mike S. [7587-01]S1
 Ferreira, I. [7603-37]S9
 Ferreira, Mário [7582-23]S6, [7582-41]S9
 Ferret, Pierre [7603-61]SPS3
 Ferrier, Lydie [7608-26]S6
 Ferro, Daniela P. [7568-56]S2, [7568-57]S2
 Ferroni, Matteo [7603-40]S9
Fetterman, Harold R. [7579-32]S8
 Feuillet, Guy [7603-61]SPS3
 Fève, Jean-Philippe 7580 ProgComm
Fibrich, Martin [7549-08]S1, [7578-75]SPS2, [7578-78]SPS2
 Fiebig, Christian [7582-59]SPS2
 Fiedorowicz, Henryk [7584-29]S10, [7586-16]S4
 Fife, Douglas [7565-04]S2
 Figi, Harry [7599-19]S5, [7599-58]SPS3
 Figueiredo, Jose M. L. [7608-17]S4
Figueroa, Manuel A. [7576-61]SPS1
Fiks, Ilya [7568-21]S5
 Filemyr, Timothy [7578-08]S2
 Files, Leigh A. 7596 ProgComm, 7596 S1 SessChr
 Filimonov, Grigory A. [7588-20]S4
 Filin, Alex [7582-12]S3
 Filippov, Valery N. [7580-42]S10

Fillardet, Thierry [7583-40]SPS2
 Filloux, Pascal [7608-31]S7
 Fily, Arnaud [7583-24]S5
 Fini, John M. [7580-51]S12
Finlay, Jarod C. 7551 S7 SessChr, [7551-07]S2, [7551-08]S2, [7551-12]S3, [7551-13]S3, [7551-38]SPS1, [7551-43]SPS1
 Fino, Elodie [7548G-154]S2
 Finzen, Frederick C. [7549-09]S1
 Fiol, Gerrit [7610-23]S6, [7615-22]S6
 Fiorentino, Marco [7616-29]S7, [7616-29]S12
 Fiorini-Debuisschert, Céline [7599-35]S9
 Firstov, Sergey V. [7580-39]S9
 Fischer, Alec [7602-44]S9
Fischer, David G. [7570-11]S3, [7573-12]S3
 Fischer, Frank [7555-16]S4, [7568-15]S2, [7570-41]SPS1
 Fischer, Georg M. [7576-34]S9
 Fischer, Joachim [7591-02]S1
 Fischer, Martin C. [7569-10]S2, [7569-87]SPS1
Fischer, Robert E. SC552 Inst, SC003 Inst
 Fish, Galina [7574-22]S4
 Fisher, John [7566-02]S1
Fisher, Robert A. SC206 Inst
 Fishman, Andrew J. [7548C-171]S5, [7548G-190]S, [7548G-191]S
 Fishman, Tal [7608-65]S14
 Fite, Brett Z. [7566-04]S1
 Fitzgerald, Alissa M. 7592 S6 SessChr, [7592-07]S2
 Fitzgerald, Barry W. [7563-32]SPS1
 Flagg, Edward B. [7611-26]S6
 Flament, Marco [7618-14]S3
 Flamm, Daniel [7579-23]S6
 Flämmich, Michael [7617-42]S8
 Flanders, Dale C. [7554-50]S8
 Flask, Chris A. [7548E-130]S3
 Flatfé, Michael E. [7608-76]S16
 Fleissner, Joachim [7608-69]S15
Fleming, Christine P. [7548D-109]S1, [7554-03]S1
 Fleming, Graham R. [7561-14]S2, [7600-50]S12
Fletcher, Luke B. [7584-17]S7, [7584-17]S11, [7589-32]S8, [7589-42]S8, [7589-42]S12
 Fletcher, Steven [7576-48]S11
 Fleury, Blaise [7617-31]S6
 Flores, Donald [7599-22]S6
 Flores-Rosas, Ariel [7580-98]SPS2, [7582-24]S6
 Florjanczyk, Miroslaw [7594-28]S8
 Flowers, Peter T. SC982 Inst
 Fluerau, Costel [7555-12]S3
 Foguth, Alexandra L. [7591-37]SPS2
 Föhn, Thomas [7580-82]SPS2
 Földes-Papp, Zeno [7568-48]S1, [7569-37]S6
 Foley, Matthew [7603-17]S4
Fong, Alexandre Y. [7596-16]S4
 Fong, Mary [7608-14]S3
Fonseca, Eduardo J. S. [7610-21]S5
Font, Carlos [7587-01]S1
 Fontanella, Andrew [7561-22]S4
 Fontanilla-Urdaneta, Rosangela C. [7619-29]SPS3
 Fontes, Adriana [7568-59]S3, [7575-04]S2, [7575-07]S3, [7575-10]S4, [7575-24]S8, [7575-37]S11
 Fontes, Yuri C. [7578-72]SPS2
 Fontoura, Ingrid [7560-13]SPS1
 Foran, David J. [7557-32]SPS1
Forbes, Andrew 7579 ProgComm, [7579-05]S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Forchel, Alfred W. B. 7610
ProgComm, [7611-22]S5, [7600-44]
S10, [7608-03]S1
- Forcinone, David [7554-10]S2
- Ford, Peter C. [7575-41]SPS1
- Fore, Samantha [7569-32]S5, [7569-
106]SPS1, [7571-13]S4
- Forestiere, Carlo [7577-34]S7
- Fornahl, Udo [7583-55]SPS2, [7583-
56]SPS2
- Forrer, Martin** [7583-12]S3
- Förstner, Jens [7600-27]S6
- Fort, Alain F. 7599 ProgComm, [7599-
12]S3, [7599-24]S6, [7604-28]S6
- Fort, Emmanuel [7570-36]S7, [7571-
38]S10, 7577 S7 SessChr, [7577-
27]S6, [7608-28]S6
- Fortágh, József [7578-86]SPS2
- Fortin, Michel [7558-12]S3, [7567-09]
S2, [7567-10]S3, [7568-44]S5
- Fortunati, Ilaria [7582-46]S10, [7582-
54]SPS2
- Fortunato, Elvira M. C. 7603
ProgComm, 7603 S8 SessChr,
7603 S9 SessChr, [7603-33]S8,
[7603-37]S9
- Fortune, Torben R. [7608-59]S12
- Foster, F. Stuart [7564-85]S12
- Foster, Thomas H. 7551 ProgComm
- Foubert, Kevin [7608-37]S8
- Foulad, Allen [7548C-89]S3
- Foulger, Stephen H. [7591-37]SPS2,
[7599-08]S2, [7599-09]S2, [7599-
62]SPS3
- Fourkas, John T. [7591-03]S1
- Fournier, Jean-Marc R.** 7613
ProgComm
- Fourspring, Kenneth D.** [7596-17]S4
- Foussekis, Michael A. [7602-33]S7
- Fowlkes, J. Brian [7564-75]S11
- Foy, Paul R. [7598-40]S10
- Fragala, Joseph** [7593-37]S7
- Fragoso, Alex [7593-22]S4
- Frampton, Robert [7598-37]S9
- Franceschi, Renny T. [7548F-143]S1
- Francis, Tariq [7577-16]S4
- Frank, Albert [7594-20]S6
- Frank, Ian W. [7609-10]S3
- Franke, Alexander [7583-08]S2
- Franke, Bülent A. [7579-45]S11,
[7606-41]S11
- Franke-Arnold, Sonja [7613-20]S6
- Franson, James D. 7611 ProgComm
- Fraser, Alex** [7598-17]S4
- Fraser, Derek [7583-24]S5
- Fraser, Gerald T.** 7567 ProgComm,
7567 S1 SessChr, 7567 S3
SessChr
- Fraser, James M. [7554-34]S5, [7584-
31]S11, [7590-02]S1
- Fraser, Scott E. [7554-16]S3, 7569
ProgComm
- Fratzl, Peter 7548F ProgComm
- Frazier, Matthew [7608-22]S5
- Frechet, Jean M. J. [7576-12]S3,
[7576-34]S9
- Freddi, Stefano [7574-02]S1
- Frede, Maik [7580-88]SPS2
- Fredericks, Peter [7577-45]SPS1
- Freedman, David [7595-03]S1
- Freeman, Erica [7548E-135]S4,
[7548G-152]S1, [7548G-153]S1,
[7548G-166]SPS1
- Freeman, Wade T. [7587-01]S1
- Freeman, William [7576-18]S5
- Freese, Wiebke [7591-34]S3
- Freidank, Sebastian [7568-82]S4
- Freilich, Mark [7548D-117]S3, [7554-
01]S1, [7554-64]S10
- Freire, Maria do Rosário S. [7552-14]
S3, [7552-16]S3
- French, Paul M.** 7569 ProgComm,
[7570-16]S4, 7571 ProgComm,
[7573-15]S4, 7576 ProgComm,
[7593-02]S1
- Freniere, Edward R. [7597-52]S11
- Frens, Maarten 7548G ProgComm
- Frentzen, Matthias [7549-16]S, [7549-
21]S
- Frenz, Martin** 7564 ProgComm, 7564
S10 SessChr, 7564 S7 SessChr,
[7564-26]S4, [7564-76]S11, [7564-
131]SPS1, [7577-38]S8
- Fressengeas, Nicolas [7603-46]S10
- Freude, Wolfgang [7597-56]S12,
[7621-07]S2
- Freudiger, Christian W. [7569-06]S1,
[7569-20]S3
- Freund, Ronald 7621 ProgComm
- Freundlich, Alexandre 7597
ProgComm, [7597-07]S2
- Frey, Randy [7550-08]S2
- Frey, Wolfgang [7564-61]S9
- Fricke, Jörg [7583-43]SPS2, [7616-53]
S12, [7616-55]S13
- Fried, Daniel** 7549 Chr, 7549 S2
SessChr, [7549-02]S1, [7549-05]
S1, [7549-07]S1, [7549-24]S3,
[7549-25]S, [7549-26]S, [7549-27]S
- Fried, Nathaniel M.** 7548B
ProgComm, 7548B S1 SessChr,
7548B S3 SessChr, [7548B-37]
S2, [7548B-46]S4, [7548B-50]
S4, [7548B-51]S4, [7548B-53]S5,
[7548B-54]S5, [7548G-192]S
- Friedberg, Joseph S. [7551-43]SPS1,
[7565-10]S3
- Friedman, Robert [7548G-160]S4
- Friedmann, Patrick [7583-27]S6
- Frieland, Shai [7558-22]S5, [7558-22]
S1
- Friess, Benedikt [7611-22]S5
- Frimmer, Martin [7600-37]S9
- Frischeisen, Jörg [7617-40]S8
- Frist, Duane [7587-15]S3
- Frith, Gavin P. [7580-09]S2
- Fritz, Rafael [7597-18]S4
- Frolov, Sergey V. [7579-02]S1
- Fronm, Michael [7550-30]S6, [7589-
12]S4
- Fromy, Stephane [7580-76]SPS2
- Fronheiser, Matthew P. [7564-67]S10,
[7564-73]S11, [7564-74]S11
- Fry, Alan R.** [7578-44]S11
- Fu, Deyi [7602-12]S3
- Fu, Jie [7584-28]S10, [7585-28]S12,
[7585-28]S6
- Fu, Kai-Mei C.** [7611-07]S2, [7611-
09]S2, [7611-21]S5
- Fu, Libin [7569-07]S1
- Fu, Q [7561-32]S5
- Fu, Shaojun [7578-23]S5, [7578-71]
S16
- Fu, Xiansong [7597-77]SPS3
- Fu, Yi [7569-01]S
- Fuchs, Frank [7603-08]S2
- Fuchs, Frank [7608-08]S2, [7616-60]
S14
- Fuentes Tapia, Israel [7619-28]SPS3,
[7619-29]SPS3
- Fuerbach, Alexander [7589-27]S7
- Fuerst, Tobias [7585-02]S1
- Fuh, Andy Y.** 7618 ProgComm, 7618
S10 SessChr, [7618-14]S9, [7618-
34]S9
- Fuhrmann, Daniel A. [7609-06]S2
- Fujii, Akihiko [7618-16]S4
- Fujii, Masamitsu [7577-45]SPS1
- Fujii, Shuichi [7594-14]SPS2
- Fujii, Tomohiko [7619-23]SPS3
- Fujiii, Katsushi [7602-01]S1
- Fujimaki, Shimpei [7585-15]S4
- Fujimoto, James G.** SympChair,
SC312 Inst, [7550-43]S9, [7550-56]
S11, [7550-70]SPS1, 7554 Chr,
7554 S2 SessChr, [7554-08]S2,
[7554-49]S8, [7570-19]S4
- Fujikawa, Hiroshi 7602 ProgComm,
7603 ProgComm
- Fujisaki, Joji [7576-07]S2
- Fujita, Kazuo [7616-61]S14
- Fujita, Masayuki [7578-18]S4
- Fujiwara, Hideki [7579-48]SPS2,
[7611-34]SPS3
- Fujiwara, Kenzo [7617-58]SPS3
- Fujiwara, Makoto [7607-27]S7
- Fujiwara, Masazumi [7611-34]SPS3
- Fukuda, Hiroshi [7606-27]S8
- Fukuda, Mitsuo [7577-45]SPS1,
[7604-48]SPS3
- Fukui, Takashi [7608-25]S6
- Fukumiy, Kohei [7598-64]SPS3
- Fukuyama, Shingo [7618-37]S10
- Fulga, Florin [7574-14]S2, [7574-21]
S4
- Fuller, Alfred R.** [7550-89]SPS1
- Furihata, Chie [7560-05]S2
- Furlani, Edward P. [7574-15]S3
- Furniss, David [7604-30]S7
- Furno, Mauro [7617-43]S8
- Furuse, Hiroaki [7578-18]S4
- Furuta, Shinichi [7616-61]S14
- Fusil, Stéphane [7603-57]S5
- Futamura, Yasuhiro [7575-38]SPS1
- Fwu, Peter Tramyoon [7569-54]S8

G

- Gaathon, Ophir [7605-21]S8
- Gabler, Thomas [7580-92]SPS2,
[7583-08]S2
- Gabrielyan, Gevorg [7582-01]S4,
[7582-01]S6, [7582-01]S1
- Gach, H. Michael [7548E-133]S3,
[7548E-134]S3
- Gachet, David [7569-97]SPS1
- Gacoin, Thierry [7575-02]S2, [7575-
45]S9
- Gadret, Gregory [7609-36]S8
- Gaffney, Patrick J. [7576-37]S9
- Gagliardi, Alessio [7597-09]S2
- Gagliardi, Robert M.** [7587-21]S3
- Gai, Xin [7609-37]S9
- Gaj, Jan A.** 7600 ProgComm
- Gakkestad, Jakob [7592-17]S3
- Gal, Udi [7559-35]S
- Galagan, Boris I. [7598-04]S1
- Galán, Jose Vicente [7604-17]S4
- Galán, Miguel [7583-15]S3
- Galanzha, Ekaterina I. [7564-39]S6,
[7564-51]S8, 7565 S3 SessChr,
[7565-09]S3
- Galarneau, Pierre** 7579 ProgComm
- Galbally-Kinney, Kristin L. [7551-14]
S3, [7581-21]S4
- Galdi, Alice [7603-30]S7
- Gale, Bruce K. 7593 ProgComm,
[7593-27]S5
- Gale, Richard [7592-11]S2
- Galey, Jean-Baptiste [7548A-01]S
- Galindo, P. L. [7610-09]S3
- Galipeau, David W. [7597-05]S1
- Gallagher, Kevin A. [7548D-112]S2
- Gallant, Pascal [7558-12]S3, [7568-
44]S5
- Gallego, Daniel [7564-22]S4
- Gallinat, Stefan [7568-15]S2, [7570-
41]SPS1
- Galstad, Chris [7583-54]SPS2
- Galstyan, Vardan [7603-40]S9
- Galun, Eithan [7589-11]S4
- Galvanauskas, Almantas 7580
ProgComm, [7580-33]S8
- Galvez, Enrique J.** 7613 Chr, 7613
S8 SessChr, 7613 S1 SessChr,
[7613-22]S6
- Galway, Graham [7559-21]S
- Gambhir, Sanjiv S. [7560-17]S5,
[7560-19]S1, [7574-05]S1, [7575-
31]S10
- Gamelin, John** [7564-78]S11
- Gamez, David [7548B-52]S5
- Gammon, Daniel G. [7611-20]S5,
[7611-24]S5
- Gan, Wei-Tat A. [7554-87]SPS1
- Gananathan, Poorani G. [7577-29]S6
- Gandhi, Thulasidharan** [7557-07]S2
- Gandhibakhche, Amir H.** 7561
ProgComm, [7561-36]S5, [7561-50]
SPS1, [7576-12]S3, [7576-72]SPS1
- Gandola, Kent [7555-28]S6
- Ganesan, Kumaravelu [7604-03]S1
- Ganesan, S. [7577-29]S6, [7582-48]
S10
- Gannot, Israel** 7559 Chr, 7559
S SessChr, [7559-35]S, 7561
ProgComm, 7576 ProgComm,
7576 S8 SessChr, BO137 Chr
- Gansel, Justyna K. [7586-14]S3
- Gao, Bruce Z.** [7566-20]S4
- Gao, Feng** [7557-02]S1, [7557-20]
SPS1, [7557-21]SPS1, [7557-22]
SPS1, [7557-23]SPS1, [7557-24]
SPS1, [7557-25]SPS1, [7570-45]
SPS1
- Gao, Guojun [7598-62]SPS3
- Gao, Jie [7605-15]S6, [7609-43]S10
- Gao, Liang [7555-09]S2, [7570-35]S7
- Gao, Tingjuan** [7571-14]S4
- Gao, Weihua** [7550-23]S4, [7550-26]
S5, [7550-37]S7
- Gao, Xiaohu [7564-41]S6
- Gao, Yang [7585-07]S2, [7585-08]S2
- Gapontsev, Denis V. 7580 ProgComm,
7580 S13 SessChr
- Gapontsev, Valentin P.** [7583-09]S2
- Garpsch, Al** [7576-39]S10
- Garabedian, Patrick [7580-76]SPS2
- Garai, Ellis [7558-23]S5, [7558-23]S1,
[7560-19]S1
- Garbacik, Erik T. [7569-14]S2
- Garcia, Jaime [7606-13]S5
- Garcia, Jonathan [7603-61]SPS3
- Garcia, Vincent [7603-57]S5
- García, Jorge M. [7610-09]S3
- García Arellano, Anmi** [7584-43]
SPS2
- García Juárez, Alejandro [7620-08]S3,
[7620-10]S3
- García-Adeva, Angel J. [7614-09]S3
- García-Blanco, Sonia 7592
ProgComm, 7592 S3 SessChr,
[7592-03]S1, 7594 ProgComm,
7594 S8 SessChr, 7594 S7
SessChr
- García-Ramos, Jose Vicente [7577-
40]SPS1, [7577-41]SPS1
- García-Revilla, Sara [7598-03]S1
- García-Rubio, Luis [7572-14]S3
- García-Tijero, Jose-Manuel [7616-51]
S12
- García-Urbe, Alejandro** [7572-21]
SPS1
- Garczynski, Jerzy [7602-11]S3
- Gardecki, Joseph A.** [7548D-107]S1,
[7560-14]S5
- Gardes, Frederic Y. [7606-26]S7,
[7606-44]SPS3, [7608-18]S4
- Gardin, Samuele [7582-46]S10, [7582-
54]SPS2
- Gardner, Craig M. [7561-16]S3
- Gardner, Patrick [7598-37]S9
- Gareau, Dan [7566-12]S3, [7548A-19]
S, [7548A-26]S, [7555-48]S10

Index of Authors, Chairs, and Committee Members

- Gargesha, Madhusudhana [7554-21] S4
- Gariain, Ray F. [7550-32]S6
- Garmund, Martin K. [7580-87]SPS2
- Garno, Jayne C. [7593-36]S7
- Gartner, Paul [7602-35]S8
- Gärtner, Claudia SC532 Inst, [7593-09]S2, [7593-22]S4
- Gasecka, Alicja [7569-105]S4
- Gashev, Anatoliy [7572-20]SPS1
- Gaskill, Jack D.** SC017 Inst
- Gatenholm, Paul [7569-05]S1
- Gather, Malte C. [7617-42]S8
- Gattass, Rafael R. [7591-03]S1
- Gault, Melanie A. [7548G-161]S4
- Gaur, Girija [7574-19]S4
- Gauthier, Bruno [7548D-115]S3
- Gauthier, Daniel J. 7612 ProgComm, [7612-05]S1
- Gautier, Simon [7603-46]S10
- Gavuin, Michael [7597-52]S11
- Gavel, Donald T. 7595 ProgComm, [7595-04]S1, [7595-06]S2
- Gavião, Maria Beatriz D. [7549-23]S
- Gaviot, Etienne [7604-06]S1
- Gawith, Corin [7578-37]S9
- Gayral, Bruno [7602-36]S8, [7610-34] S8
- Gazula, Deepa [7615-05]S2
- Gbur, Greg 7588 ProgComm
- Ge, Jianping [7593-03]S1, [7609-40] S9
- Ge, Yuncheng 7565 ProgComm
- Gebavi, Hrvoje [7598-72]SPS3
- Gebert, Andreas [7568-82]S4
- Gebhart, Steven C. [7573-24]S6
- Gebre, Tadiyos T. [7585-09]S2
- Gederas, Odrun [7548B-58]S6
- Gee, Sangyoun** [7580-83]SPS2
- Gee, Shirley J. [7574-20]S4
- Gehlbach, Peter [7550-02]S1
- Gehner, Andreas 7595 ProgComm
- Geib, Kent M. 7615 ProgComm
- Geiger, Jens [7578-25]S4, [7578-25] S6, [7578-25]S1
- Geilhardt, Frank [7621-14]S4
- Geis, Michael G. [7618-19]S5
- Geiser, Markus [7616-27]S6
- Geissbuehler, Stefan [7571-25]S7, [7571-35]S10
- Geißler, Daniel [7572-12]S3, [7575-14] S5
- Geissler, Stefan [7554-95]SPS1
- Gelesky, Marcos A. [7610-21]S5
- Gelikonov, Grigory V. [7554-97]SPS1, [7554-109]SPS1
- Gelikonov, Valentin M. [7554-109] SPS1, [7548B-41]S2, [7554-97] SPS1
- Gellermann, Werner 7572 ProgComm
- Gellie, Pierre [7608-31]S7
- Gentilini, Desirée [7597-09]S2
- Genty, Frédéric [7597-11]S3
- Genty, Goery [7580-80]SPS2, [7598-49]S12
- Geohegan, David B. 7586 Chr, 7586 S4 SessChr, [7586-03]S1, [7586-13]S3, [7586-24]SPS2
- Georgakoudi, Irene 7566 ProgComm
- Georgas, Michael [7579-51]S3
- George, Brandon J. [7554-96]SPS1
- George, Sharon [7584-03]S1
- George, Thomas F.** [7548F-173]S
- Georges, Patrick [7550-29]S6, [7569-33]S5, [7580-28]S7, [7580-106] SPS2, [7589-02]S1, [7589-19]S5
- Georges, Thierry** [7578-28]S7, [7578-29]S7
- Georgy, A. [7589-05]S2
- Geradts, Joseph [7573-23]S6
- Gérard, Davy [7571-09]S2, [7577-19] S5
- Gerd, Sulz [7560-06]S2
- Gerhardt, Nils C. [7554-101]SPS1, [7597-18]S4, [7597-26]S6
- Gerhold, Michael D.** [7577-06] S2, 7603 ProgComm, 7603 S1 SessChr, 7603 S2 SessChr, [7603-42]S10
- Gerlach, Philipp [7615-17]S4
- Germann, James A. [7571-36]S10
- Germann, T. D. [7597-27]S6, [7597-53]S12
- Gerritsen, Hans C.** 7569 ProgComm, 7569 S5 SessChr, [7569-24]S4
- Gerry, Christopher C. [7611-11]S3
- Gerstmann, Derek [7554-25]S4
- Gerthsen, Dagmar [7597-65]S14
- Gertsch, Andreas G.** [7564-57]S8
- Gerwig, Christian [7594-11]S4
- Geske, Jon** [7615-13]S4
- Gessner, Thomas [7594-38]SPS2
- Gétin, Stéphane [7613-31]SPS3
- Gettman, Matthew T. 7548B ProgComm, [7548B-44]S3
- Ghadami, Saeed [7584-44]SPS2
- Ghambaryan, Sona S. [7551-39]SPS1
- Gharekhan, Anita H.** [7563-08]S1
- Ghazaryan, Robert K. [7551-39]SPS1
- Ghijzen, Michael** [7557-38]SPS1, [7567-16]S4
- Ghini, Giacomo [7574-11]S2
- Ghioni, Massimo [7571-15]S5, [7608-85]S18
- Ghiringhelli, Fabio [7580-92]SPS2
- Ghosh, Anjan K.** [7604-37]S8
- Ghosh, Chuni [7615-14]S4, [7615-16] S4
- Ghosh, Joyee [7612-07]S2
- Ghosh, Rupamanjari [7612-07]S2
- Ghosh, Mohamad** [7548D-119]S4
- Ghukasyan, Vladimir 7569 SPS1 SessChr, [7569-31]S5
- Giacomelli, Michael G.** [7573-18]S4
- Giambastiani, Giuliano [7574-11]S2
- Giancane, Saverio [7548B-33]S1
- Gianchandani, Yogesh B. [7593-201] S, [7593-201]S, [7593-201]S, [7593-201]S
- Gianella, Michele [7608-07]S2
- Giannetti, Ambra [7559-08]S, [7574-11]S2
- Giannopolous, Antonios V. [7615-11] S3
- Gibbons, Nicholas [7591-16]S4, [7609-05]S2
- Gibbs, Hyatt M. [7597-65]S14
- Gibson, Brant C. [7604-03]S1
- Giese, David [7591-11]S3
- Giesen, Adolf 7578 ProgComm
- Giesen, Christoph [7602-19]S4
- Giessen, Harald W. [7585-21]S5, [7600-20]S5
- Gigan, Sylvain [7554-80]S12, [7555-13]S3
- Gil, Bernard 7602 S8 SessChr, [7602-06]S2
- Gil, Sang-Geun** [7619-27]SPS3
- Gilbert, Karen [7615-18]S5
- Gilbertson, Timothy A. [7568-81]SPS1
- Gilbreath, G. Charmaine 7587 ProgComm, [7587-01]S1, 7588 ProgComm
- Gilchrist, Kristin H. [7558-21]S5, [7558-21]S1
- Giles, Robert H.** 7601 ProgComm, 7601 S4 SessChr, [7601-03]S1, [7601-04]S1
- Gilet, Philippe [7603-61]SPS3, [7615-18]S5
- Gilfert, Christian [7616-03]S1
- Gilks, Blake [7561-18]S3
- Gill, William N. [7592-18]S4
- Gillen, James R. [7590-08]S2, [7590-14]S3
- Gillenwater, Ann M. [7548C-68]S1
- Gillenwater, Ann M. [7569-62]S9
- Gillispie, Gregory [7555-02]S1
- Gilly, Juergen [7583-23]S5, [7583-27] S6
- Gin, Aaron V.** [7604-22]S5
- GINESTE, Jean-Michel [7554-24]S4
- Girolas, Arnim [7583-43]SPS2, [7616-36]S8
- Ginzburg, Pavel [7612-29]S8
- Gioffrè, Mariano [7606-12]S4
- Gioux, Sylvain [7557-05]S2
- Giovane, Laura [7615-02]S1
- Girkin, John [7550-81]SPS1, [7569-114]SPS1
- Giske, Arnold [7578-67]S16
- Gittins, Christopher [7561-27]S4
- Gittler, Elvira [7594-32]S9
- Givens, Monique [7572-11]S3
- Gladisch, Andreas [7621-14]S4
- Gladish, James C.** [7566-08]S2
- Gladkova, Natalia [7548B-41]S2
- Gladney, Glenn A. [7596-11]S3
- Glazenberg, Rene [7598-35]S9
- Glazner, Greg** [7551-24]S6
- Glazowski, Christopher** [7570-24]S5
- Glebov, Alexei L.** 7607 Chr, 7607 S2 SessChr
- Glebov, Leonid** [7578-45]S11, [7580-33]S8, [7580-63]S15, [7580-65] S15, [7580-103]SPS2, [7583-38]S8, 7598 ProgComm, [7598-28]S7
- Glebova, Larissa [7580-103]SPS2
- Glennie, Diana L. [7551-31]S7
- Glesener, John W.** 7598 Chr, [7598-38]S9
- Glickman, Randolph** [7548B-52] S5, 7562 ProgComm, 7562 S3 SessChr
- Gligorijevic, Bojana [7593-15]S3
- Gloter, Alexandre [7603-57]S5
- Glozman, Alex [7608-65]S14
- Gluckstad, Jesper** [7613-03]S1, 7613 CoChr
- Glukhikh, Igor V. [7579-02]S1
- Gmachl, Claire F.** [7608-14]S3, 7616 ProgComm, [7616-42]S10, [7616-62]S14
- Gmitro, Arthur F.** 7558 ProgComm, 7558 S3 SessChr, [7558-08]S2, [7558-19]S4
- Gmür, Max [7607-18]S5, [7607-21]S5
- Gnass, Dietmar [7578-67]S16
- Goano, Michele [7603-02]S1
- Goda, Keisuke** [7589-25]S6
- Godavarty, Anuradha** [7548E-138]S4, [7555-25]S5
- Godbout, Nicolas [7558-13]S3
- Goddard, Nicholas [7589-39]S5, [7589-39]S9
- Godwal, Yogesh [7564-32]S5
- Goelz, Daniel [7621-24]S6
- Goetz, Peter G. [7587-01]S1
- Goetzinger, Erich [7550-54]S11
- Gogneau, Noelle [7608-86]S18
- Goins, Beth A. [7568-63]S4
- Gokden, Burc [7608-11]S3, [7609-14] S4, [7608-95]S1, [7608-96]S3
- Golant, Konstantin [7580-42]S10
- Golberg, Alex [7550-28]S6
- Golbraikh, Ephim [7588-07]S2
- Golberg, Brian D. [7554-64]S10
- Goldberg, Lew [7578-60]S14
- Golden, Joel P. [7553-07]S2
- Goldfarb, F. [7612-07]S2
- Goldin, Robert [7561-07]S1
- Goldschmidt, Elizabeth A. [7611-16] S4
- Goldsmith, Jeffrey [7573-25]S6
- Goldstein, Steven A. [7548F-140]S1
- Goldys, Ewa M. 7568 ProgComm, 7571 ProgComm
- Golka, Sebastian [7602-45]S10
- Gollnick, Sandra O. 7565 ProgComm
- Gollub, Alexandre H. [7590-13]S2
- Golubiatnikov, German Y. [7557-18]S4
- Gomer, Charles J. 7551 ProgComm, [7551-09]S3
- Gomes, Anderson S. L. [7582-42]S9
- Gomes, Andrew J.** [7556-19]S5, [7559-13]S, [7567-13]S3
- Gomes, Suzete A. O. [7568-59]S3, [7575-37]S11
- Gómez Colín, Rocio R. [7620-08]S3
- Gómez Sancha, Fernando [7548B-63]S7
- Gomez-Iglesias, Alvaro [7597-54]S12
- Gomez-Sjoberg, Rafael [7568-02]S3
- Gomi, Fumi [7550-57]S11
- Gonçalves, Gonçalo [7603-33]S8, [7603-37]S9
- Gonçalves, Rogéria Rocha [7598-48] S1
- Goncharov, Vadim K. [7610-20]S5
- Goncharuk, Andrey N. [7613-05]S2
- Gong, Hui [7548E-128]S2, [7557-26] SPS1
- Gong, Qian [7610-33]S8
- Gong, Yiyang [7609-08]S3
- Gonnet, Cédric [7580-82]SPS2
- Gono, Kazuhiro 7556 ProgComm, [7561-26]S4
- Gonschior, Cornell** [7559-17]S, [7559-34]S
- Gonthier, Francois** [7580-44]S11
- Gonzalez, L. [7610-09]S3
- Gonzalez, Leonel P. [7582-44]S10, [7582-57]SPS2
- Gonzalez, Timothy [7574-25]S4
- Gonzalez, Y. [7610-09]S3
- Gonzalo, Jose A. [7584-04]S1
- Goodhue, William D. [7601-04]S1
- Goodman, Steven J. [7577-45]SPS1
- Goodno, Gregory D. [7580-11]S3
- Goodwin, Richard [7566-20]S4
- Gooijer, Frans [7598-14]S4
- Gopinath, Ashwin** [7553-05]S2, [7553-15]S4, [7577-34]S7
- Gopinath, Juliet T. [7578-40]S10
- Gora, Michalina** [7550-18]S4
- Gorbach, Dmitry V. [7562-10]S3
- Gorczyńska, Iwona** [7550-16]S3, [7550-43]S9, [7550-56]S11, [7550-70]SPS1
- Gordeev, Nikita Y.** [7610-20]S5, [7616-54]S13
- Gordon, Ariel [7616-40]S9
- Gordon, Simon [7600-09]S2
- Gorletta, Tatiana [7565-25]SPS1, [7574-02]S1
- Gorny, Krzysztof R. [7548B-44]S3
- Gorodetsky, Andrei A.** [7601-06]S1
- Gorritxategi, Eneko [7559-07]S
- Gorshkov, Alexey V. [7582-61]SPS2
- Gorshkov, Vyacheslav N. [7588-03]S1, [7588-10]S2
- Gorski, Waldemar [7576-23]S6
- Gorczyka, Mateusz** [7600-58]S14
- Gorzalanny, Christian [7548A-10] S, [7555-16]S4, [7555-54]SPS1, [7568-15]S2
- Gossage, Kirk W.** [7548A-13]S
- Goswami, Debabrata** [7569-72]SPS1
- Goto, Hiroshi [7550-25]S5
- Goto, Ryo [7599-47]S12
- Gotschall, Thomas [7580-46]S11

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Gottlieb, Ray [7552-23]S4
Gottmann, Jens [7590-04]S1, [7591-20]S5
Gottschall, Thomas [7580-30]S8
Götzinger, Erich [7550-27]S5, [7554-57]S9, [7554-59]S9, [7554-62]S9
Gougoloff, Robert [7549-12]S2
Gould, Toby [7566-18]S4
Gourevitch, Alex [7617-38]S7
Gourley, Paul L. 7574 ProgComm
Gouveia-Neto, Artur S. [7568-06]S2, [7582-51]SPS2, [7598-48]S1
Govindjee, G [7561-12]S2
Govindjee, Rajni 7561 S5 SessChr
Govorov, Alexander O. [7575-11]S5
Goyal, Anish K. [7578-40]S10
Goyette, Thomas M. [7601-04]S1
Grabherr, Martin 7615 ProgComm, 7615 S5 SessChr, [7615-06]S2
Gradinaru, Claudiu [7576-48]S11
Gradkowski, Kamil [7610-26]S6
Gradt, Dietmar [7571-04]S1, [7571-42]SPS1
Graf, Thomas 7579 ProgComm, [7579-17]S4, [7579-22]S6
Grafe, Mario [7592-20]S4
Grafton, Meggie G. [7553-06]S2, [7593-21]S4
Graham, Alan [7569-85]SPS1
Graham, Luke A. 7615 ProgComm
Graham, Matthew W. [7600-50]S12
Grajciar, Branislav [7554-78]S12
Gramotnev, Dmitri K. [7577-45]SPS1
Granada, Juan F. [7548D-112]S2
Granados-Agustin, Fermin-Solomon [7584-43]SPS2
Grande Grande, Abel [7619-28]SPS3
Grandjean, Nicolas 7602 ProgComm, [7602-67]S15, [7608-16]S4, [7616-18]S4
Granek, Filip [7585-27]S12, [7585-27]S6
Granja, Manuela M. C. [7568-06]S2
Grant, Gerald [7561-04]S1
Granucci, Francesca [7565-25]SPS1
Grasselli, Giorgio [7548G-164]SPS1
Grassi, Emmanuel [7596-13]S3
Grasso, Daniel M. [7583-35]S8
Gratton, Daniel [7587-06]S2
Gravier, Julien J.-M. [7576-49]S12
Gravrand, Olivier [7608-63]S13
Gray, Bonnie L. 7593 ProgComm, 7593 S2 SessChr, [7593-13]S2, [7593-30]S6, [7593-39]SPS2, [7593-42]SPS2
Gray, Malcolm B. [7579-46]S11
Gray, Stephen K. [7577-24]S5
Grazu, Valeria [7575-09]S4, [7575-18]S7
Grazulis, Lawrence [7610-22]S5
Grech, Pierre [7616-31]S7, [7616-31]S12
Green, Alex A. [7600-50]S12
Green, Anthony [7564-64]S9
Green, Lekara [7598-73]SPS3
Greenham, Neil C. [7599-54]SPS3
Greentree, Andrew D. [7604-03]S1
Greenwood, Punima D. L. [7616-10]S2
Gregg, Jeffrey [7578-59]S14
Grego, Sonia [7558-21]S5, [7558-21]S1
Gregor, Ingo [7571-17]S5
Gregory, Kenton W. 7548D Chr, 7548D S4 SessChr
Gregory, Mark [7587-13]S2
Greier, Roman [7560-24]S6
Greilich, Alex [7600-45]S11
Grein, Christoph H. [7608-70]S15
Greiner, Christoph M. 7604 Chr, 7604 S5 SessChr
Greiner, Mark T. [7603-10]S3
Greivenkamp, John E. SC690 Inst
Grenier, Jason R. [7584-22]S8, [7584-22]S12, [7591-17]S5
Grenier, Paul [7558-12]S3, [7568-44]S5
Gresillon, Samuel [7571-38]S10, [7608-28]S6
Gretz, Norbert [7560-12]S3, [7608-06]S2
Griebner, Uwe [7578-14]S3, [7578-81]SPS2
Grier, David G. 7613 ProgComm, [7613-09]S3, [7619-03]S1, [7619-04]S1
Griffiths, Christian [7590-11]S2
Griffiths, Gary [7576-12]S3, [7576-72]SPS1
Grigoropoulos, Costas P. 7585 ProgComm, 7586 ProgComm
Grigoryev, Ilya S. [7599-36]S9
Grillet, Christian [7606-40]S11, 7609 S8 SessChr, [7609-37]S9
Grimbergen, Matthijs [7556-30]S8, [7548B-34]S1, [7548B-60]S6
Grimm, Bernhard [7579-45]S11
Grimm, Stephan [7580-107]SPS2
Grimmond, Brian [7557-09]S3
Grimshaw, Mike [7583-01]S1, [7583-04]S1, [7583-46]SPS2, [7583-48]SPS2
Grinvald, Amiram [7555-23]S5
Grist, Samantha M. [7593-13]S2
Grobnic, Dan [7589-15]S5
Grodzinski, Piotr 7574 ProgComm
Groeninger, Günther [7583-28]S6
Groetsch, Stefan [7617-72]S10
Grohe, Andreas 7585 ProgComm
Groma, Géza I. [7600-40]S10
Gronenborn, Stephan [7615-15]S4, [7615-17]S4
Groom, Kristian M. [7616-10]S2
Grosa, Gregory [7604-36]S8
Grosberg, Alexander Y. [7613-09]S3
Gross, Michel [7564-88]SPS1, [7573-07]S2, [7576-33]S8
Gross, Simon [7589-27]S7
Grossauer, Harald [7564-30]S5, [7564-108]SPS1
Grosse, Philippe [7615-18]S5
Grossman, Nir [7548G-162]S5
Grossman, Steve [7608-65]S14
Grote, James G. TrackChr, SympChair, 7599 ProgComm, [7599-21]S6
Grounds, Miranda D. [7554-25]S4
Gruber, Andras [7548E-125]S1, [7568-11]S2
Gruber, John B. [7576-23]S6
Grudin, Anatoly B. 7580 ProgComm, 7580 S7 SessChr
Gruebele, Martin [7569-22]S3
Grulkowski, Ireneusz [7550-16]S3, [7550-70]SPS1, [7554-37]S6, [7554-39]S6, [7554-74]S11
Grün, Hubert [7564-21]S4
Grundfest, Warren S. 7555 Chr, 7555 S9 SessChr, 7555 S10 SessChr, [7555-22]S5, [7555-39]S8
Grüner-Nielsen, Lars [7580-87]SPS2
Grunwald, Ruediger [7579-25]S6, [7586-20]SPS2, [7613-07]S2
Gryczynski, Ignacy [7571-05]S1, [7571-21]S6, [7574-31]SPS1
Gryczynski, Zygmunt K. 7571 Chr, 7571 S10 SessChr, 7571 S SessChr, 7571 S6 SessChr, 7571 S SessChr, 7571 S2 SessChr, [7571-05]S1, [7571-21]S6, [7574-31]SPS1
Grzybowski, Richard R. [7584-27]S10, [7607-36]S9
Gu, Baijie [7612-27]S7
Gu, Bo 7584 Chr, 7584 S2 SessChr, 7585 ProgComm
Gu, Hao [7595-23]S4
Gu, Min 7569 ProgComm, [7589-41]S8, [7589-41]S12, 7598 ProgComm
Gu, Pei-Fu [7617-68]SPS3
Gu, Shi [7548D-116]S3, [7554-21]S4
Gu, Tao [7599-22]S6
Gu, Tian [7607-16]S4
Gu, Tingyi [7605-15]S6, [7609-11]S3
Gu, Xijia J. [7580-100]SPS2, [7580-101]SPS2, [7580-102]SPS2
Gu, Ying [7565-16]S4
Gu, Yueqing [7576-08]S2, [7576-52]SPS1
Gualda, Emilio [7569-112]SPS1, [7569-113]SPS1, [7595-14]S6
Guan, Xing G. [7583-48]SPS2
Guarino, Andrea [7583-21]S5
Gubenko, Alexey E. [7607-31]S8
Guddala, Sriram [7598-23]S6
Güdde, Jens [7600-55]S13
Gudla, Prabhakar [7568-27]S5
Gueguen, Yann [7559-30]S3
Guenther, James K. 7615 Chr, 7615 S3 SessChr, [7615-05]S2
Guenther, Derek A. [7576-42]S10
Guernsey, Byron K. [7568-73]S3
Guerra, Maria [7565-06]S2
Guerrini, Luca [7577-40]SPS1
Guevara, Edgar [7573-45]SPS1
Gugel, Hilmar [7578-67]S16
Guglielmi, Massimo [7582-46]S10, [7582-54]SPS2
Guha, Shekhar [7582-44]S10, [7582-57]SPS2
Guha Neogi, Tuhin [7607-35]S8
Gui, Li [7604-26]S6
Guijarro-Leach, Juan [7566-09]S2
Guillemain, Elisa [7553-03]S1
Guillevic, Erwan [7598-01]S1
Guimaraes, Carla A. [7568-77]SPS1, [7574-18]S3, [7574-28]S4
Guimaraes, Orlando [7551-33]SPS1
Guimard, Denis [7610-12]S3
Guina, Mircea [7578-36]S9
Guisan, Jose Manuel [7575-09]S4
Gulam Razul, Sirajudeen [7554-87]SPS1
Guldemann, Benedikt [7594-39]S8
Gulsen, Gultekin [7548E-132]S3, 7557 ProgComm, 7557 S1 SessChr, [7557-07]S2, [7557-09]S3, [7557-34]SPS1, [7557-35]SPS1, [7557-38]SPS1, [7567-16]S4
Gumennik, Alexander [7604-33]S7
Gunadi, Sonny [7564-112]SPS1
Gunn, L. Cary 7606 ProgComm
Gunnarsson, Linda [7551-29]S7
Gunning, Patrick T. [7576-48]S11
Gunta, Sri [7576-36]S9
Gunter, Peter P. [7599-58]SPS3, [7604-29]S6, 7582 ProgComm, [7582-31]S7, [7599-11]S3, [7599-19]S5
Günther, Detlef [7586-11]S3
Guo, Baiming [7615-14]S4, [7615-16]S4
Guo, Baoping [7578-87]SPS2
Guo, Chunlei [7586-01]S1, [7589-40]S6, [7589-40]S10
Guo, Dingkai [7616-63]S14
Guo, Jianxia [7551-28]S7
Guo, Jin [7565-12]S4
Guo, Junpeng [7577-14]S4, [7577-15]S4
Guo, Kevin [7576-12]S3, [7576-34]S9, [7576-72]SPS1
Guo, L. J. [7564-89]SPS1, [7564-96]SPS1, [7564-97]SPS1, 7610 ProgComm
Guo, Lili [7564-59]S9
Guo, Mingsheng [7548A-20]S3
Guo, Peixuan [7571-06]S2
Guo, Wei Lian [7606-43]SPS3
Guo, Wenjing [7565-18]SPS1
Guo, X. [7564-145]SPS1
Guo, Xiaoyu [7601-19]S4
Guo, Yunbo [7553-02]S1
Guo, Zijian [7564-18]S3, [7564-43]S7
Guol, Shi Hao [7617-13]S3
Gupta, Arun K. [7564-101]SPS1
Gupta, James A. [7616-49]S11
Gupta, Manisha [7600-13]S3
Gupta, Nishant [7591-22]S6
Gupta, Piyush [7593-29]S6
Gupta, Rekha [7561-19]S3
Gupta, Sharad [7576-58]SPS1
Gupta, Uma [7586-08]S2
Gurfinkel, Yuri I. 7572 ProgComm
Gurjar, Rajan S. [7555-55]SPS1
Guryanov, Alexey N. [7580-43]S10
Gusev, Vitaliy [7600-42]S10
Gustafsson, Mats G. L. 7570 ProgComm, 7570 S2 SessChr
Gustavsson, Johan S. [7615-04]S2
Gutheinz, Lee [7579-26]S6
Guthoff, Rudolf F. [7550-01]S1, [7550-30]S6, [7550-49]S10
Gutierrez, Gloria E. [7548F-149]S3
Gutierrez, Oscar [7563-12]S1
Gutt, Richard [7617-54]S11
Guttman, Markus [7590-12]S2
Guy, Martin [7579-44]S11
Guyatt, Neil [7598-75]S9
Guyon, Laurent [7557-12]S3, [7573-42]SPS1
Guyot, Laurent [7577-18]S4
Gweon, Dae Gab [7558-27]SPS1, [7568-25]SPS1
Gwilliam, Russell M. [7606-14]S5, [7606-15]S5, [7606-16]S5, [7606-55]SPS3, [7606-56]SPS3
Gwo, Shangir 7602 ProgComm
Gyulkhandanyan, Aram G. [7551-39]SPS1
Gyulkhandanyan, Grigor V. [7551-39]SPS1
Gyulkhandanyan, Lusine Z. [7551-39]SPS1
-
- ## H
- Ha, Jinyong [7554-04]S1
Ha, Jun-Seok [7602-01]S1
Haag, Lars [7586-18]S4
Haag, Matthias [7583-14]S3
Haaheim, Jason R. [7593-37]S7
Haas, Claus-Ruediger [7578-23]S5, [7578-71]S16
Haase, Michael A. [7617-72]S10
Haase, Otto W. 7618 ProgComm
Haavardsholm, Trym Vegard [7548A-12]S2
Habermeier, Hanns-Ulrich 7603 ProgComm, 7603 S6 SessChr, 7603 S7 SessChr, [7603-27]S6
Habraken, Steven J. M. [7613-14]S4
Habrusseva, Tatiana [7608-02]S1
Hache, François [7569-57]S8, [7599-13]S3
Hack, Michael G. [7617-03]S1
Hackbarth, Steffen [7551-05]S2
Hacker, Henry D. BO111 ProgComm
Hackett, Shawn W. [7581-18]S4
Haddadi, A. [7608-96]S3
Hader, Jorg [7597-25]S6, [7578-35]S9
Hadjigeorgiou, Katerina [7560-09]S2

Index of Authors, Chairs, and Committee Members

- Hädrich, Steffen [7580-30]S8, [7580-46]S11, [7580-85]SPS2
 Haeberle, Henry [7558-23]S5, [7558-23]S1
 Haering, Sigfried [7577-36]S8, [7589-49]SPS2
 Hafez, Moustapha [7596-10]S3
Hagan, David J. [7600-07]S2
 Hagemann, Christian [7580-86]SPS2
 Hagen, Rainer [7619-17]S4
 Hagen-Eggert, Martin [7554-111]SPS1
 Haglund, Asa [7615-04]S2
Haglund, Richard F. 7584 S4
 SessChr, [7584-08]S3, [7585-06]S2, 7586 ProgComm, 7586 S2
 SessChr, [7586-05]S1, [7597-37]S8, [7603-31]S7
 Hahn, Berthold [7617-23]S4
 Hahn, Stephen M. [7551-13]S3, [7551-43]SPS1
 Haisler, Vladimir A. [7610-15]S4
Hajjarian Kashani, Zeinab [7620-14]S4
Hajj Hassan, Mohamad [7574-25]S4
 Hajnal, Joseph V. [7570-16]S4, [7573-15]S4
 Hakalahti, Leena [7593-43]SPS2
 Hakuta, Kohzo 7612 ProgComm, 7612 S9 SessChr, [7612-04]S1
 Halder, Nilanjan [7606-02]S1
 Halim, Tommy [7559-17]S
 Hall, Denis R. [7578-20]S5
 Hall, Eric M. [7602-43]S9
 Hall, Gunnsteinn [7569-44]S6
 Hall, Lee J. [7594-27]S8
 Haller, Merrick C. 7588 ProgComm, [7588-11]S3
 Halme, Jussi [7590-06]S1
 Haloui, Hatim [7585-16]S4
 Halsall, Matthew [7606-16]S5, [7606-55]SPS3, [7606-56]SPS3
 Halter, Markus [7607-18]S5, [7607-19]S5, [7607-21]S5
 Halter, Michael [7576-16]S4
 Halterman, Klaus [7580-60]S14
 Haltmeier, Markus [7564-25]S4
 Hama, Yukihiko [7576-60]SPS1
 Hamann, Bernd [7550-89]SPS1
 Hamblin, Michael R. 7552 Chr, 7552 S1 SessChr, [7552-05]S1, [7552-09]S2, 7565 ProgComm, 7565 S1 SessChr, [7565-02]S1, [7565-03]S1
 Hamdoon, Zaid [7548C-72]S1, [7548C-73]S1, [7548C-74]S1, [7548C-92]S4, [7548C-94]S4, [7548C-96]S5, [7548C-102]S5, [7548C-103]S5, [7548C-180]S4
Hammer, Daniel X. [7548E-122]S1, 7550 ProgComm
 Hammer, Daniel 7550 S9 SessChr
Hammer, Daniel X. [7550-34]S7, [7550-35]S7, [7555-26]S6, [7561-27]S4, [7576-36]S9
 Hammock, Bruce D. [7574-20]S4
 Hammond, Richard 7582 ProgComm
 Hamza, Ahmed M. [7555-34]S7, [7556-36]SPS1
 Hamza, Aya M. [7555-34]S7, [7556-36]SPS1
 Hamza, Mohammed Yahya [7555-34]S7, [7556-36]SPS1
 Hamza, Mostafa [7555-34]S7, [7556-36]SPS1
 Hamzavi, Iltefat 7548A ProgComm, 7548A S SessChr
 Han, Cheng-Nan [7617-05]S2
 Han, Dae-Seob [7610-27]S6
 Han, Il Ki [7583-41]SPS2
 Han, Jin-Hee [7574-20]S4, [7576-31]S8
 Han, Jung [7617-44]S9, [7617-45]S9
Han, Kyusung [7592-28]S5
 Han, Myung-Soo [7599-57]SPS3, [7603-65]SPS3, [7608-51]S11, [7610-36]SPS3
 Han, Ping [7602-12]S3
 Han, S. H. [7606-53]SPS3
Han, Song-Hee [7599-54]SPS3
 Han, Tsai-Jung [7569-105]S4
 Han, Wenjuan [7578-77]SPS2
 Han, Young-Geon [7598-20]S5
 Han, Zhanghua [7600-38]S9
 Hanáček, František [7597-70]SPS3
 Hanada, Sanshiro [7575-38]SPS1
 Hanada, Toru [7618-26]S7
 Hanada, Yasutaka [7584-25]S9
 Hand, Duncan P. [7585-03]S1
 Handara, Vincent A. [7602-29]S6
 Handel, Peter H. 7602 S4 SessChr, [7602-20]S5, [7602-21]S5, [7602-22]S5
 Haney, Michael W. [7607-16]S4
 Hanf, Stefan [7580-57]S13
 Hanlon, Eugene B. [7573-25]S6
 Hann, Swook [7603-65]SPS3, [7608-51]S11, [7610-36]SPS3
 Hanna, Jun-ichi 7618 ProgComm
 Hanna, Marc [7550-29]S6, [7580-28]S7, [7589-02]S1
 Hanneke, David [7611-05]S1
 Hannon, Mathew [7584-28]S10, [7585-28]S12, [7585-28]S6
Hansen, Anja [7550-38]S8
 Hansen, Delbert [7570-38]S7
 Hansen, Kim P. [7580-48]S11
 Hansen-Hagge, Thomas E. [7593-22]S4
 Hanson, Eric L. [7590-16]S3
 Hanson, George [7564-42]S6
 Hanson, Stephen R. [7554-28]S4
 Hao, Bing [7617-72]S10
 Hao, Erhong [7593-36]S7
 Haq, Moeed [7593-13]S2
 Haque, Moez [7609-38]S9
 Hara, Shinjiro [7608-25]S6
Harada, Yasuhiro [7618-37]S10, [7619-07]S2
Harb, Ahmad [7609-26]S6
 Harb, Charles C. [7613-21]S6
 Hard, Robert [7553-29]S
 Harde, Hermann [7564-49]S7
 Harding, David [7578-01]S1
Harding, Kevin G. WS609 Inst
 Hardoon, David R. [7573-04]S1
 Hardt, David E. [7593-08]S2
Harduar, Mark [7558-29]SPS1, [7580-101]SPS2, [7580-102]SPS2
 Hardy, Christopher R. [7578-87]SPS2
 Hardy, Nickolas [7615-11]S3
 Harikrishna, P. V. [7592-15]S3
Hariri, Lida P. [7548D-11]S2, [7558-09]S2
Hariri, Sepideh [7550-65]SPS1, [7554-15]S3
 Harker, Andrew T. [7580-92]SPS2
 Härkönen, Antti [7578-36]S9
 Harle, Jamie [7566-07]S2
 Harmand, Jean-Christophe 7608 ProgComm, 7608 S7 SessChr
 Harmelin, Alon [7563-15]S3
 Harren, Frans [7582-20]S5
Harrington, James A. 7559 S SessChr, [7559-35]S
 Harris, David M. 7549 ProgComm
 Harris, James S. [7548G-155]S2, [7615-12]S3
 Harris, Martin R. 7558 ProgComm
 Harris, Stephen E. [7612-32]S9
Harrison, Christopher K. 7592 ProgComm
 Harrison, Nathan [7576-26]S7
 Harrison, Paul [7616-26]S6
 Harrison, Rick [7577-36]S8
Harrison, Tyler [7564-03]S1, [7564-68]S10
 Hart, Christian [7567-03]S1
Harter, Donald J. SympChair
 Harter, Klaus [7568-12]S6, [7568-38]S1
 Hartland, Gregory V. [7600-12]S3
Hartman, Keith [7560-17]S5
 Hartmann, Michael [7590-12]S2
Hartsough, Neal E. [7557-07]S2
 Hartwig, Lars [7589-50]SPS2
 Hartzell, Allyson L. 7592 ProgComm, 7592 S5 SessChr, [7595-09]S2
 Haruna, Masamitsu [7554-94]SPS1, [7562-36]S8
 Harvey, Daniel [7584-27]S10
 Harwood, Adrian [7554-22]S4
 Hasan, Tayyaba 7551 CoChr, 7551 S2 SessChr, [7551-03]S1, [7551-14]S3, [7551-17]S4, [7551-18]S4, [7551-25]S6, [7551-44]SPS1, [7551-45]SPS1, [7554-60]S9, [7576-01]S1
Hasan, Zameer U. TrackChr, 7611 Chr, 7611 S3 SessChr, [7611-02]S1, 7614 ProgComm, [7614-07]S2
 Hasegawa, Kazuo [7598-08]S2, [7598-57]SPS3
 Hasegawa, Noboru [7589-45]SPS2
 Hasegawa, Satoshi [7584-39]SPS2
 Hasegawinkel, Julie M. [7560-23]S4
 Hashemi, Nastaran [7553-07]S2
 Hashim, Affeendi H. [7607-23]S6
Hashimoto, Mamoru [7569-21]S3, [7569-70]SPS1
 Hashimoto, Maria Cristina E. [7552-17]S3
 Hashimoto, Youichi [7607-07]S2
 Hasler, Karl-Heinz [7554-52]S8, [7582-02]S4, [7582-02]S6, [7582-02]S1, [7582-03]S2, [7616-55]S13
Hasman, Erez 7591 ProgComm
 Hassan, Mahbub 7620 ProgComm
 Hassan, Moinuddin [7561-36]S5, [7561-50]SPS1
 Hassel, Petra [7589-07]S3
 Hasselbeck, Michael [7614-10]S3, [7614-13]S4
 Hatami, Nisa [7548D-106]S1
Hatanaka, Kousuke [7564-47]S7
 Hathaway, Mark [7554-18]S3
Hatheway, Alison E. SC781 Inst
 Hattersley, Simon [7554-107]SPS1
 Hauer, Jürgen [7600-40]S10
 Haug, Franz-Joseph [7603-09]S3
 Haugan, Heather [7608-71]S13
Haus, Joseph W. [7580-108]SPS2, [7582-25]S6, [7582-34]S7
 Hausken, Tom [7580-18]S5
 Havenith, Martina [7600-18]S4
 Havermeyer, Frank [7579-14]S1, [7581-13]S3, [7598-26]S6
 Havrilla, David L. [7578-12]S3, [7583-10]S2
 Hawkins, Aaron R. 7591 ProgComm, 7591 S8 SessChr, [7591-08]S2, [7606-09]S4
 Hawkins, Samuel D. [7608-59]S12
 Hawkins, Sean [7575-20]S7
 Hawkins, Thomas W. [7598-40]S10
 Hawrylak, Pawel [7608-88]S19
 Hay, William C. [7569-18]S3
Hayasaki, Yoshio [7584-13]S5, [7584-13]S9, [7584-39]SPS2
 Hayashi, Tomoaki [7562-32]S7
 Hayashida, Tetsuya [7598-32]S8
Hayat, Majeed M. [7608-83]S18
 Hayes, John R. [7580-06]S1, [7580-35]S9
Haynes, Roger [7580-84]SPS2
 Hayward, Joseph E. [7551-31]S7
 Haywood, Eric C. [7562-19]S5
 Hazama, Hisanao [7562-26]S6
 He, Bin [7572-26]SPS1
He, Fei [7584-45]SPS2
 He, Hexiang [7619-21]S4
 He, J. [7610-10]S3
 He, Jun [7610-18]S4
 He, Min [7554-87]SPS1
 He, Min [7595-10]S2
 He, Peijie [7552-10]S2
 He, Shikun [7554-16]S3
 He, Wan-Li [7618-24]S7
 He, Wei [7571-14]S4
He, Xiangnan [7585-08]S2, [7585-09]S2
 He, Yabai [7582-18]S5
 He, Yuan [7599-51]S5
 He, Zhi-yong [7565-22]SPS1
 Headley, Clifford 7580 ProgComm, [7580-51]S12
 Headley, William R. [7608-18]S4
 Heaven, Michael C. 7581 Chr, 7581 S4 SessChr, [7581-04]S1, [7581-07]S1
Hebden, Jeremy C. [7573-11]S3
 Hebeisen, Monika [7568-16]S5
 Heberle, Albert P. [7600-20]SPS5
 Hebling, János [7600-40]S10
 Heck, Martijn J. R. [7606-31]S8
 Hedges, Morgan P. [7611-06]S1
 Heeren, J. [7575-47]S9
 Hefter, Glenn [7601-16]S4
 Hefter, Ulrich [7580-20]S5
 Hegarty, Stephen P. [7608-02]S1
 Heggelund, Paul [7569-101]SPS1
 Hegmann, Frank A. [7600-65]S15
 Hehl, Gregor [7569-09]S1
 Hehnen, Markus P. 7614 S3 SessChr, [7614-03]S1
 Hehua, Xu [7598-52]SPS3
 Heidari, Esmaeil [7548E-137]S4
 Heidrich, Helmut 7604 ProgComm
Heidrich, Marco [7570-15]S4, [7554-27]S4, [7589-12]S4
 Heidt, Gerald L. 7619 ProgComm
Heikenfeld, Jason C. 7594 ProgComm, OE123x Chr
 Heikkilä, Oskari [7597-13]S3
 Heikkinen, Mikko [7607-39]S9
 Heilemann, Mike [7571-30]S9
 Heilweil, Edwin J. [7600-17]S4
 Heindel, Tobias [7608-03]S1
 Heine, Frank F. [7587-13]S2
Heinemann, Stefan W. 7583 ProgComm, 7583 S4 SessChr
 Heinisch, Josef [7556-31]S8
 Heinrich, Emilie [7576-49]S12
Heinrich, Matthias [7589-28]S7, [7589-43]S8, [7589-43]S12
 Heinrich, Wolfgang [7616-14]S3
Heinz, Tony F. 7586 ProgComm
 Heinze, Alexander [7598-15]S4
 Heizen, Daniel J. [7596-09]S3
 Heiroth, Sebastian [7586-11]S3
 Heise, Gerhard [7585-32]S12, [7585-32]S6
 Heiss, Andreas [7585-32]S12, [7585-32]S6
Heisterkamp, Alexander [7550-01]S1, [7550-30]S6, [7554-27]S4, 7589 Chr, 7589 S2 SessChr, [7589-07]S3, [7589-09]S3, [7613-25]S7, [7570-15]S4
 Helander, Michael G. [7603-10]S3
 Helbig, Manfred [7598-15]S4
Held, Marie [7568-29]S3
 Helgert, Christian [7604-12]S3
 Helguera, Maria [7556-21]S5

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Hell, Stefan W. 7569 ProgComm, [7569-02]S, [7571-29]S8, [7571-34]S10, [7574-06]S1
- Hellemaans, Volker [7554-48]S7
- Hellesø, Olav G. [7613-31]SPS3, [7604-31]S7, [7613-26]S7
- Hellmann, Christian [7579-12]S4, [7589-21]S6, [7594-15]S5
- Hellstrom, Jonas [7578-26]S7
- Hellwig, Angela [7596-18]S3
- Hellwig, Christian [7585-32]S12, [7585-32]S6
- Helm, P. Johannes** [7569-101]SPS1
- Helmbrecht, Michael A.** [7595-10]S2
- Helmrich, Guenther [7564-49]S7
- Helsel, Mark P. [7594-08]S3
- Helvajian, Henry TrackChr, 7584 ProgComm, [7584-12]S4
- Hemenway, B. Roe [7607-36]S9
- Hemmati, Hamid** 7587 Chr, 7587 S1 SessChr, [7587-09]S2
- Hemmer, Michaël [7578-43]S11
- Hemmer, Philip R.** 7611 Chr, 7611 S5 SessChr, 7611 S6 SessChr, 7612 Chr, [7612-17]S4
- Hemo, Itzhak [7589-11]S4
- Hempel, Thomas [7602-05]S1
- Henary, Maged [7576-06]S2
- Hendargo, Hansford C.** [7548G-158]S3
- Henderson, Angus J. [7580-12]S3, 7582 ProgComm, 7582 S4 SessChr, [7582-14]S4
- Hendow, Sami T.** [7584-42]SPS2
- Hendrickson, Joshua [7597-65]S14
- Hendriske, Johan [7592-25]S5
- Heneka, Patricia [7556-21]S5
- Henini, Mohamed [7608-19]S4
- Henkel, Christoph [7603-26]S6
- Henkel, Nan [7564-52]S8
- Henkel, Thomas [7593-01]S1
- Henneberger, Fritz 7597 Chr, [7597-42]S9
- Hennessey, Ricky [7548A-26]S
- Hennig, Guido 7584 Chr, 7584 S6 SessChr, 7589 S10 SessChr
- Hennig, Petra [7583-29]S6, [7616-54]S13
- Henning, Albert K. 7592 ProgComm, 7593 S7 SessChr
- Henning, Ian D. [7597-59]S13
- Hennings, David** [7548A-04]S
- Henry, Matthew 7585 ProgComm
- Henry, Michele [7552-12]S3
- Henry, Samuel C. [7601-07]S2
- Heo, Young Woo [7603-38]S9
- Her, Tsinghua [7579-07]S2, 7591 ProgComm
- Herbeck-Engel, Petra [7591-15]S4
- Herber, Ralf [7621-03]S2
- Herbsommer, Juan A. [7602-29]S6
- Herbstman, Jeffrey F. [7585-20]S5, [7585-31]SPS2
- Herchenroeder, J. [7593-42]SPS2
- Herek, Jennifer L. [7569-14]S2
- Heritier, Jean-Marc Y. [7578-44]S11
- Herman, Brian A. 7569 ProgComm
- Herman, Peter R.** SympChair, [7584-06]S2, [7584-22]S8, [7584-22]S12, [7585-14]S3, [7589-14]S4, [7589-31]S8, [7589-34]S8, [7591-17]S5, [7593-06]S1, [7609-38]S9
- Hermann, Boris** [7550-55]S11
- Hermans, Martin [7590-04]S1
- Hernandez, Julio E. [7561-30]S4
- Hernandez, V. [7548G-193]S
- Hernandez, Vincent J. [7587-21]S3
- Hernández, María J. [7603-05]S2
- Herr, Doug [7598-76]SPS3
- Herrington, C. Simon [7555-43]S9, [7568-39]S
- Herrmann, Carina [7560-12]S3, [7608-06]S2
- Herrmann, Michael [7571-04]S1, [7571-42]SPS1
- Herrmann, Rolf [7548G-158]S3
- Hersam, Mark C. [7600-50]S12
- Herten, Dirk-Peter [7571-18]S5
- Herve, Lionel [7548B-48]S4, [7557-28]SPS1, [7557-06]S2, [7557-12]S3, [7573-42]SPS1
- Hess, Ortwin** 7612 ProgComm, [7612-30]S8
- Hessner, Sebastian [7598-29]S7
- Hetzfel, Fred [7551-24]S6
- Heuken, Michael [7602-19]S4, 7617 ProgComm, 7617 S3 SessChr, [7617-24]S5
- Hewitt, Kevin C. [7577-02]S1
- Hewko, Mark D. [7548D-115]S3, [7549-04]S1
- Heymer, Andrea [7566-16]S4, [7568-23]S2
- Hibbs-Brenner, Mary K. [7557-14]S3
- Hibino, Yoshinori [7604-01]S1
- Hibon, Vincent [7598-75]S9
- Hibst, Raimund [7555-19]S4
- Hickmann, Jandir M.** [7582-47]S10, [7610-21]S5, [7612-18]S5
- Hicks, Robert [7597-10]S3
- Hicks, Wesley L. [7553-29]S
- Higaki, Shingo [7558-14]S3
- Higashihata, Mitsuhiro [7586-10]S3
- Higashino, Takeshi [7620-15]SPS3
- Hilbert, Michael [7574-06]S1
- Hildebrandt, Matthias [7580-88]SPS2
- Hildebrandt, Niko** [7572-12]S3, [7575-13]S5, [7575-14]S5
- Hill, C.** [7587-27]S4
- Hill, Diana [7572-12]S3
- Hill, Geoff [7597-04]S1
- Hill, R. [7561-07]S1
- Hille, Carsten [7569-106]SPS1, [7569-107]SPS1
- Hillier, Karla [7594-32]S9
- Hillhouse, Hugh W. [7600-36]S8
- Hillman, Elizabeth M. C.** 7548G ProgComm
- Hillman, Lloyd W. [7573-28]S7
- Hillman, Timothy R. [7554-44]S7
- Hillmann, Dierck [7548C-75]S1
- Hillmer, Hartmut [7591-26]S6
- Hillrichs, Georg [7559-17]S, [7559-34]S
- Hiltunen, Jussi [7598-11]S3
- Himel, Marc D.** [7591-31]S8
- Himmel, Michael [7571-02]S1
- Hinchcliffe, Nicholas [7616-26]S6
- Hinckley, John M. [7602-53]S12
- Hinds, Monica T. [7554-28]S4
- Hink, Paul L.** [7598-35]S9
- Hinkle, Gary C. WS936 Inst
- Hinkov, Boris [7608-08]S2
- Hinton, David R. [7554-16]S3
- Hiraiwa, Koji [7615-01]S1
- Hirao, Akihiro [7551-30]S7
- Hirao, Kazuyuki [7600-41]S10
- Hirata, Shoji [7583-31]S7
- Hirata, Yoshinori [7589-33]S8, [7589-48]SPS2
- Hirayama, Hideki [7617-52]S11
- Hirobayashi, Shigeki [7554-66]S10
- Hiramoto, Takuya [7584-16]S6, [7584-16]S10
- Hirschberg, Henry 7548E Chr, 7548E S2 SessChr, 7548E S4 SessChr, [7548E-132]S3, [7548E-133]S3, 7548G ProgComm
- Hirsl, Petr [7578-74]SPS2
- Hirst, Linda S.** 7618 S6 SessChr, [7618-15]S4
- Hirtz, Jean-Pierre [7580-76]SPS2
- Hiruma, Kenji [7608-25]S6
- Hiscocks, Mark P. [7604-03]S1
- Hiitosugi, Taro [7603-32]S7
- Hitzenberger, Christoph K.** [7550-27]S5, [7550-54]S11, 7554 ProgComm, 7554 S9 SessChr, [7554-57]S9, [7554-59]S9, [7554-62]S9, [7561-36]S5
- Ho, Arthur** 7550 Chr, 7550 S4 SessChr, [7550-20]S4, [7550-86]SPS1, [7550-88]SPS1
- Ho, Chi-Han [7569-41]S6
- Ho, Ho-pui [7565-14]S4
- Ho, I-Chen [7601-19]S4
- Ho, Jun Hui** [7562-45]SPS1, [7562-44]SPS1
- Ho, Kai-Ming [7602-70]S11, [7602-70]SPS3
- Ho, Khek Yu [7560-11]S1
- Ho, Ron [7607-01]S1, [7607-02]S1
- Ho, Seng-Tiong [7599-18]S5
- Ho, Stephen [7593-06]S1, [7609-38]S9
- Ho, Tze-Yee [7555-56]SPS1
- Hochberg, Michael [7604-27]S6
- Hode, Lars [7552-01]S1
- Hode, Tomas L. M. 7552 ProgComm, [7552-01]S1, [7552-03]S1, 7565 ProgComm, [7565-06]S2
- Hodges, Aaron L. [7583-46]SPS2
- Hodgson, Craig [7598-27]S6
- Hodgson, Norman SC752 Inst, 7578 Chr, 7578 S14 SessChr, 7578 S6 SessChr, 7580 S4 SessChr, 7582 S1 SessChr
- Hoebbers, F. [7548C-181]S5
- Hoecker, Sabine [7560-12]S3, [7608-06]S2
- Hoefler, Thomas [7582-06]S2
- Hoefling, Sven [7611-22]S5
- Hoellger, Kyle [7560-23]S4
- Hoelscher, John [7610-22]S5
- Hoepfener, Christiane [7553-14]S4
- Hof, Martin [7571-03]S1
- Hofer, Bernd** [7550-55]S11, [7554-17]S3, [7554-22]S4, [7554-30]S5
- Hofer, Martin [7578-62]S15, [7578-63]S15
- Höfer, Bernd [7616-60]S14
- Höfer, Marcel [7555-16]S4
- Höfer, Marco [7578-22]S5
- Höfer, Ulrich 7600 S14 SessChr, [7600-55]S13
- Hoffmann, Axel** [7602-27]S6, [7602-30]S7, [7602-38]S8, [7603-04]S1, 7610 ProgComm
- Hoffmann, Birgit [7569-35]S5
- Hoffmann, Hans-Dieter 7578 ProgComm, 7578 S16 SessChr, 7578 S3 SessChr, [7578-22]S5
- Hoffmann, Heike [7550-30]S6, [7589-12]S4
- Hoffmann, Thomas [7616-14]S3, [7616-55]S13
- Hofkens, Johan 7571 ProgComm
- Höfling, Sven [7600-44]S10, [7608-03]S1
- Hofman, Erik [7569-24]S4
- Hofmann, Martin R. [7554-101]SPS1, [7597-18]S4, [7597-26]S6
- Hofmann, Simone [7617-43]S8
- Hofstetter, Daniel [7608-93]S12
- Hogan, William [7557-14]S3
- Hogen-Esch, Theo [7555-53]SPS1
- Hogg, James [7555-33]S7
- Hogg, Richard A. [7616-05]S1, [7616-10]S2
- Hogset, Anders [7548C-180]S4
- Hohenberg, H. [7575-47]S9
- Hohmuth, Rico [7578-58]S14
- Hoi, Siew Kit [7593-16]SPS2
- Holfeld, Benjamin A. [7569-62]S9
- Hollingsworth, Jennifer A. 7575 ProgComm
- Hollins, Richard C. BO111 ProgComm
- Hollowell, Andrew E. [7590-08]S2, [7590-14]S3
- Hollywood, Mark [7570-31]S6
- Holmes, Andrew S. 7584 ProgComm
- Holmes, Jon** [7554-107]SPS1
- Holmes, Timothy J.** [7550-17]S3, [7550-66]SPS1
- Holness, Alex [7593-18]S3
- Holotta, Markus [7564-30]S5, [7564-108]SPS1
- Holtén, Dewey [7576-11]S3
- Holtgrave, Jeremy [7581-18]S4
- Holtom, Gary R. [7569-45]S6, [7569-84]SPS1
- Holtz, Mark [7602-62]S14
- Holzwarth, Charles W.** [7579-51]S3
- Homan, Kimberly [7564-61]S9, [7564-99]SPS1, [7564-114]SPS1, [7574-04]S1, [7576-19]S5
- Homburg, Oliver** [7579-20]S5
- Hommerich, Uwe H. [7578-38]S10, [7578-89]SPS2
- Homoelle, Doug C. [7595-01]S1
- Homola, Jiri 7553 ProgComm
- Hon, Nick K. [7582-35]S8
- Honda, Norihiro** [7562-13]S4, [7562-47]SPS1
- Honda, Toshio 7619 ProgComm
- Honda, Yoshio [7602-02]S1
- Hondebrink, Erwin [7593-17]S4
- Honea, Eric C.** 7580 ProgComm, 7580 S14 SessChr, [7580-03]S1
- Hönel, Dennis [7619-17]S4
- Honeyman, Marshall** WS971 Inst
- Honeysett, Jack [7564-107]SPS1
- Hong, Jih-Sin [7602-50]S10
- Hong, Jin-Bon [7569-73]SPS1
- Hong, Kihyon [7599-23]S6
- Hong, Kyung Jin [7599-57]SPS3
- Hong, Minghui** 7585 ProgComm
- Hong, Nampyo [7572-19]SPS1
- Hong, Nguyen Tuan [7592-28]S5
- Hong, Steve M. [7617-05]S2
- Hong, Sung-Hoon [7605-29]SPS3
- Hong, Tae Y. [7599-40]S10, [7601-17]S4
- Hong, Tao [7582-61]SPS2
- Hong, Yeon-Ki [7584-36]SPS2
- Hong, Yu-lin [7562-27]S6, [7574-09]S1
- Hongo, Akihito [7559-03]S
- Hönig, Gerald [7602-38]S8, [7610-15]S4
- Honkanen, Seppo K. [7580-10]S2, [7580-97]SPS2, 7598 ProgComm, [7598-11]S3, [7598-12]S3, [7606-50]SPS3
- Hooper, Luke [7548C-90]S3
- Hoopes, P. Jack [7551-44]SPS1
- Hoover, Peter L. [7580-59]S14
- Hopkins, F. Kenneth 7599 ProgComm
- Hopkins, Ken M. [7607-18]S5
- Hopkins, Leo N. [7548E-137]S4
- Hopkinson, Mark [7610-24]S6, [7616-10]S2
- Hopman, Sybille [7585-27]S12, [7585-27]S6
- Hopper, Colin 7548C ProgComm, 7548C S SessChr, 7548C S1 SessChr, 7548C S4 SessChr, [7548C-67]S1, [7548C-72]S1, [7548C-73]S1, [7548C-74]S1, [7548C-92]S4, [7548C-94]S4, [7548C-96]S5, [7548C-102]S4

Index of Authors, Chairs, and Committee Members

- S5, [7548C-103]S5, [7548C-174]S1, [7548C-180]S4, [7573-04]S1, [7573-14]S3
- Hoppmann, Eric [7579-30]S7
Horak, Peter [7580-35]S9
Horenstein, Mark N. [7595-03]S1
Hori, Nobuyasu [7555-41]S9
Horley, Ray J. [7580-92]SPS2
Horn, Alexander [7600-32]S7
Hornaff, Marcel [7585-04]S1
Hornbeck, Larry J. 7596 Chr, 7596 S3 SessChr
Horng, Ray-Hua [7602-50]S10, 7617 S10 SessChr, [7617-53]S11
Horsnell, John [7548C-70]S1
Horst, Folkert [7607-18]S5, [7607-19]S5, [7607-20]S5
Horst, Swantje [7597-65]S14
Hörstmann-Jungemann, Maren [7590-04]S1
Horwitz, James S. TrackChr
Hosaka, Masahiro [7576-75]S2
Hoshino, Akiyoshi [7575-38]SPS1
Hoshino, Kazunori [7591-11]S3
Hosny, Neveen A. [7569-108]SPS1
Hosoda, Takashi [7616-66]S2
Hossain, Nadir [7616-07]S2
Hossain, Tim [7593-23]S4
Hosseini, Amir [7607-38]S9, [7607-43]SPS3, [7609-44]S10
Hosseini Teherani, Ferechteh 7608 ProgComm
Hostein, Richard [7608-86]S18
Hostutler, David A. [7583-38]S8
Hotte, Louis [7587-06]S2
Hou, Chia-Hung [7602-04]S1
Hou, Yen-Ju [7602-40]S9
Houbertz, Ruth [7591-40]SPS2, 7607 ProgComm, 7607 S7 SessChr, [7607-29]S7
Houizot, Patrick [7598-22]S5
Hoult, Anthony P. [7580-22]S6, [7590-02]S1
Hourcade, Jean-Charles [7608-01]S
Hovakimyan, Marine [7550-01]S1
Hoving, Willem 7585 CoChr, 7585 S3 SessChr, 7607 ProgComm
How, Mon-Hsin [7551-12]S
Howard, Daniel J. [7579-30]S7
Howard, Scott S. [7569-89]SPS1
Howell, John C. 7612 ProgComm, 7612 S7 SessChr, [7612-15]S4
Howlander, Matiar R. [7592-16]S3
Hoy, Christopher L. [7548C-98]S5
Hoyer, Patricia B. [7558-09]S2
Hsieh, Bao-Yu [7564-08]S2, [7564-10]S2
Hsieh, Chin-Ling [7575-22]S8
Hsieh, Hsiu-Ming [7617-51]S10
Hsieh, Jiun-Tai [7575-06]S3
Hsieh, Ming-Fong [7617-46]S9
Hsieh, Min-Hsun [7602-60]S14, [7617-05]S2
Hsieh, Wan-Yun [7599-22]S6
Hsieh, Yao-Sheng [7555-24]S5
Hsu, Chia Chen [7618-13]S3
Hsu, Chih-Cheng [7618-40]SPS3
Hsu, Chih-Chun [7569-31]S5
Hsu, Chih-Ting [7548A-25]S
Hsu, Fu-Jie [7551-35]SPS1
Hsu, Hsan-Yin [7596-08]S2
Hsu, Hsiusheng [7604-11]S2
Hsu, Hsu-Kuan [7618-36]S10
Hsu, K. [7554-93]SPS1, [7554-52]S8
Hsu, Kuei-Chu [7582-11]S3, [7609-54]SPS3
Hsu, Ming-Chi [7602-08]S2, [7602-60]S14
Hsu, Po-Hung [7564-104]SPS1
Hsu, Ta-Cheng [7602-08]S2, [7602-60]S14
- Hsu, Wei-Chen [7561-25]S4
Hsu, Yih-Chih [7565-08]S3, [7551-12]S
S
Hsueh, Chiu-Mei [7550-58]SPS1, [7550-64]SPS1
Hsueh, Kuang-Po [7603-66]SPS3
Hsueh, Yu-Ting [7621-20]S6
Hu, Changhong [7557-10]S3, [7564-75]S11
Hu, Cuiying [7570-07]S2
Hu, Dan [7580-03]S1
Hu, Evelyn L. [7609-15]S4, [7617-31]S6
Hu, Fangrong [7595-22]S4
Hu, Fung-Rong [7550-64]SPS1
Hu, Hui [7604-26]S6
Hu, Juejun [7604-05]S1
Hu, Lili [7598-62]SPS3
Hu, Min [7591-25]S6
Hu, Qing [7616-24]S6
Hu, Sijung [7556-24]S6
Hu, Song [7550-62]SPS1, [7564-05]S1, [7564-06]S1, [7564-90]SPS1, [7564-91]SPS1, [7564-124]SPS1, [7564-125]SPS1
Hu, Wenchong [7610-29]S7
Hu, Wentao [7583-51]SPS2
Hu, Xiaolong [7591-10]S3
Hu, Ya-Ting [7599-50]SPS3
Hu, Yida [7551-13]S3, [7551-37]SPS1, [7551-38]SPS1
Hu, Youfang [7606-44]SPS3
Hu, Yue [7599-51]S5
Hu, Zhendong [7590-01]S1
Hu, Zhilin [7548D-109]S1, [7554-03]S1, [7554-09]S2, [7556-13]S3
Hua, Hua [7559-09]S
Huang, Baohua [7553-02]S1
Huang, Bo-Jyun [7568-75]S2
Huang, Chen-Han [7577-03]S1, [7608-38]S8, [7608-39]S10
Huang, Chuanyong [7554-103]SPS1
Huang, Chun Hong [7606-43]SPS3
Huang, Chun-Yuan [7598-43]S10
Huang, Edward K. [7608-60]S13
Huang, Gang [7581-23]SPS2
Huang, Gen-Sheng [7602-52]S12
Huang, Haiyu [7607-24]S6
Huang, He [7602-71]S11, [7602-71]SPS3
Huang, Hong Wen [7617-13]S3
Huang, Hsin-Tao [7617-06]S2
Huang, Hua [7583-46]SPS2
Huang, Jiwei [7550-61]SPS1, [7551-32]S7, [7556-28]S7, [7557-16]S4, [7567-19]S4
Huang, Kai-Feng [7578-34]S8, [7613-01]S1
Huang, Kun [7557-16]S4
Huang, Lei [7565-21]SPS1
Huang, Lingyun [7564-41]S6
Huang, Lixin [7595-22]S4
Huang, Naiyan [7548A-16]S, [7565-16]S4
Huang, Qin [7558-20]S4
Huang, S. C. [7578-34]S8
Huang, San-Yi [7598-63]SPS3, [7618-34]S9
Huang, Shenghong [7580-33]S8
Huang, Sheng-Shuo [7609-56]SPS3
Huang, Sheng-Wen [7564-41]S6, [7564-89]SPS1, [7564-96]SPS1
Huang, Shih-Cheng [7617-53]S11
Huang, Shuan-Yu [7598-54]SPS3, [7618-14]S9
Huang, Su [7599-18]S5
Huang, Tuo [7608-11]S3
Huang, Wei-Ping [7609-52]S11
Huang, Yingyan [7599-18]S5
- Huang, Ying-Ying [7552-05]S1, [7552-09]S2
Huang, Yi-Pai [7617-06]S2
Huang, Yi-Yu [7548B-35]S1
Huang, Yu [7602-44]S9
Huang, Yujian [7606-08]S3
Huang, Yu-Ru [7600-42]S10, [7601-14]S3
Huang, Yu-Yen [7591-11]S3
Huang, Z. Rena [7606-51]SPS3, [7607-35]S8, 7617 ProgComm
Huang, Zheng [7551-24]S6, 7565 ProgComm, 7565 S4 SessChr, [7565-15]S4
Huang, Zhiwei [7560-11]S1, [7569-61]S9, [7569-126]SPS1
Hubenthal, Frank [7586-18]S4
Huber, Heinz P. [7585-32]S12, [7585-32]S6
Huber, Robert A. [7550-18]S4, [7554-41]S7, [7554-51]S8, [7554-56]S8
Huber, Rupert 7600 ProgComm, [7600-01]S, [7600-63]S15
Huby, Nolwenn [7604-06]S1
Huck, Volker [7548A-10]S, [7555-16]S4, [7555-54]SPS1, [7568-15]S2
Huebner, Bernd [7621-02]S1, [7621-02]S10
Huebner, Christopher [7599-08]S2
Huffaker, Diana L. 7610 Chr, [7610-10]S3, [7610-26]S6, [7610-30]S7
Huffman, Debra [7572-14]S3
Hugger, Stefan [7616-60]S14
Hughes, Barbara [7600-36]S8
Hughes, David H. 7611 ProgComm
Hughes, Mark [7598-08]S2, [7598-57]SPS3
Hughes, Michael [7549-03]S1, [7554-63]S10, [7554-88]SPS3
Hughes, Thomas E. [7576-15]S4
Hughes, Jake [7568-02]S3
Hughes, Maxime [7616-10]S2
Hui, Rongqing [7554-54]S8
Huignard, Jean-Pierre 7608
ProgComm, 7608 S14 SessChr, 7608 S SessChr
Hul'ko, Oksana [7606-16]S5, [7606-55]SPS3, [7606-56]SPS3
Hülsermann, Ralf [7621-13]S4, [7621-14]S4
Hülsewede, Ralf [7583-29]S6
Hultqvist, Adam [7603-12]S3, [7603-14]S3
Hume, Kelly R. [7569-39]S6
Humpolickova, Jana [7571-03]S1
Hung, Chien-Hsiang [7617-06]S2
Hung, Yu-Chueh [7579-32]S8
Hung, Yukai [7564-16]S3
Hunger, Johannes [7601-16]S4
Hunt, Alan J. [7585-20]S5, [7585-31]SPS2
Hunt, Jeffrey H. [7598-37]S9
Hunt, Shawn D. [7568-67]S4, [7568-69]S5
Hüntner, Martin [7591-32]S8
Hunter, John [7555-48]S10
Hunziker, Christoph [7599-19]S5, [7599-58]SPS3
Hunziker, Urs W. [7584-26]S10
Huo, Li [7554-12]S2, [7558-11]S3, [7569-69]S9, [7569-86]SPS1
Hurlbut, Walter C. [7582-33]S7, [7601-15]S3
Hurley, William [7558-26]S6, [7558-26]S2
Hurst, Sawan [7568-11]S2
Hurtado, Antonio [7597-59]S13
Huser, Thomas R. [7569-78]SPS1, 7571 ProgComm, [7571-14]S4, [7571-32]S9
- Husko, Chad A. [7605-15]S6, [7608-40]S9
Hussain, Shahab [7620-03]S2, [7620-05]S2, [7620-12]S4
Hutchings, Joanne C. [7548C-70]S1
Hutchings, Matthew [7616-04]S1
Hutchings, Natalie [7550-12]S3
Hutt, Marvin [7596-11]S3
Hüttmann, Gereon [7548C-71]S5, [7548C-75]S1, [7550-03]S1, [7554-45]S7, [7554-48]S7, [7554-111]SPS1, [7568-82]S4
Huyet, Guillaume [7608-02]S1, [7610-26]S6
Hwang, Jeeseong 7556 ProgComm, 7556 S7 SessChr
Hwang, Jenn-Shyong [7600-24]S5
Hwang, Jeong-Ki 7615 ProgComm, [7615-02]S1
Hwang, Jeoung-Yeon [7618-45]SPS3
Hwang, Sung Min [7602-66]S15
Hwang, Tae-Jong [7599-33]S9
Hwu, R. Jennifer 7601 ProgComm, 7601 S4 SessChr
Hybl, John D. [7578-40]S10
Hylton, Nicholas [7606-16]S5, [7606-55]SPS3, [7606-56]SPS3
Hyun, Chulho [7550-65]SPS1, [7550-12]S3
-
- I
Iakovlev, Vladimir [7615-19]S5
Ianoul, Anatoli [7559-21]S
Ibarra-Escamilla, Baldemar [7580-98]SPS2, [7580-108]SPS2, 7582 ProgComm, 7582 S9 SessChr, [7582-24]S6, [7582-25]S6
Ibarra-Torres, Juan Carlos [7568-78]S
Ibey, Bennett L. [7548G-156]S3, [7562-19]S5, [7562-20]S5, [7562-21]S5
Ibn El Ahrach, Hicham [7599-12]S3, [7599-24]S6, [7604-28]S6
Ibragimov, Tahir D. [7618-41]SPS3
Ichikawa, Tomoki [7602-76]S11, [7602-76]SPS3
Iftimia, Andreea [7566-18]S4
Iftimia, Nicusor [7548E-122]S1, [7550-35]S7, [7555-26]S6, [7561-27]S4, [7576-36]S9
Ihlefeld, Jon R. [7604-22]S5
Ikeda, Kazuhiro [7606-19]S6
Ikeda, Kazuhiro [7607-04]S1
Ikonik, Zoran [7606-24]S7, [7616-26]S6
Ikuno, Yasushi [7550-57]S11
Ilan, Harel [7604-33]S7
Ilchenko, Vladimir S. 7579 Chr, 7579 S2 SessChr, [7579-31]S8
Ilev, Ilko [7553-12]S3, 7559 ProgComm, [7559-26]S, [7559-33]S, 7586 ProgComm
Ilgner, Justus F. R. 7548C Chr, 7548C S5 SessChr, 7548C S4 SessChr, [7548C-99]S5
Il'inskaya, Natalya [7609-16]S4
Il'n, Yuri V. Il'n [7597-49]S1
Im, Chang-Hwan [7548E-129]S2
Im, Dong-Min [7607-25]S6, [7607-30]S7
Im, Jisun [7603-54]S12
Imai, Shinichi [7580-16]S4, [7580-16]S6, [7580-16]S1
Imai, Suguru [7615-01]S1
Imasaki, Kazuo [7578-18]S4
Imgrund, Philipp [7583-16]S4
Imhoff, Dominique [7603-57]S5
Imhoff, Sebastian [7597-19]S4
Imi, Emiko [7561-43]SPS1
Immucci, Andrea [7564-113]SPS1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Inada, Natalia M. [7551-33]SPS1, [7555-32]S6
- Inavalli, Krishna V.** [7613-18]S5
- Indjin, Dragan [7616-26]S6
- Ingram, Davis [7577-39]S8
- Inoue, Azusa [7599-15]S4
- Inoue, Shin-ichiro [7599-15]S4
- Inoue, Tomoya [7597-57]S12
- Intemann, Steffan [7615-06]S2
- Intes, Xavier** 7557 Chr, 7557 S1 SessChr, 7557 S3 SessChr, [7557-44]S1, [7557-45]S2
- Inui, Tetsuro [7621-05]S2
- Invernizzi, Alessandro [7550-17]S3
- Ionin, Andrey A.** [7581-02]S1
- Ioppolo, Tindaro** [7579-28]S7
- Irazoqui, Pedro P. [7593-21]S4
- Irby, Pierre B. [7548B-53]S5, [7548B-54]S5
- Irfan, Muhammad [7587-20]S3
- Ironsides, Charles N.** [7608-17]S4
- Irudayaraj, Joseph M. [7571-16]S5
- Irvine, Scott E. [7600-39]S9
- Irwin, Daniel [7557-08]S2
- Isabelle, Martin [7548C-70]S1
- Isabelle, Martin E.** [7551-44]SPS1
- Isaenko, Ludmila I. [7582-13]S4
- Isamoto, Keiji [7554-98]SPS1
- Isella, Giovanni [7600-10]S3
- Isenberg, Gerard [7554-09]S2
- Ishibashi, Tatsuro [7550-69]SPS1
- Ishida, Mitsuru [7610-12]S3
- Ishige, Ryouhei [7618-27]S7
- Ishihara, Miya** [7564-105]SPS1, 7566 ProgComm, 7566 S3 SessChr, [7566-05]S2, [7573-29]S7
- Ishii, Katsunori [7562-13]S4, [7562-26]S6, [7562-47]SPS1
- Ishii, Norihiro [7619-14]S3
- Ishii, Shinya [7578-18]S4
- Ishikawa, Ikuko [7584-25]S9
- Ishikawa, Ken [7618-33]S9
- Ishikawa, Kenichi L. [7597-28]S7
- Ishikawa, Masatoshi [7594-05]S6, [7594-05]S2
- Ishikawa, Mitsuru [7575-46]S9
- Ishikawa, Shuichi [7548D-110]S2
- Ishikawa, Takuya [7615-01]S1
- Ishikawa, Yasuhiko [7606-27]S8
- Ishikura, Norihiro [7612-24]S6
- Ishimaru, Ichiro [7572-06]S1
- Ishino, Masahiko [7589-45]SPS2
- Ishiyama, Junichi [7559-03]S
- Ishow, Elena [7589-06]S2
- Isikman, Serhan O.** [7568-86]S3
- Islam, Md. Shahidul** [7548E-135]S4, [7548G-152]S1, [7548G-153]S1, [7548G-166]SPS1
- Islam, Shahid [7548A-27]SPS1
- Ismail, Nur [7559-02]S
- Israel, Avraham [7568-43]S6
- Isshiki, Takaaki [7548D-110]S2
- Itabashi, Seiichi [7606-27]S8
- Itagaki, Toshiki [7554-100]SPS1
- Itani, Koichi [7593-04]S1
- Itani, Sara [7573-25]S6
- Ito, Akio [7616-61]S14
- Ito, Arisa [7548D-108]S1, [7551-40]SPS1
- Ito, Hiroshi [7598-08]S2, [7598-57]SPS3
- Ito, Satoshi [7583-31]S7
- Ito, Yoshiro** [7584-21]S7, [7584-21]S11
- Itri, Rosangela [7567-07]S2
- Itzkan, Irving [7573-25]S6
- Itzler, Mark A.** 7608 ProgComm, 7608 S11 SessChr, [7608-81]S17
- Ivanov, Borislav L. [7550-33]S6
- Ivanov, Edward V. [7608-61]S13
- Ivanova, Lena [7602-32]S7, [7610-13]S3
- Ivantsov, Vladimir A. [7616-17]S4
- Ives, Jeffrey [7572-11]S3
- Ives, Neil [7583-06]S1
- Iwai, Hidenao [7570-33]S7
- Iwai, Katsumasa [7559-03]S, [7559-05]S, [7559-09]S
- Iwai, Norihiro [7615-01]S1
- Iwanaga, Shigeki [7555-41]S9
- Iwanczk, Jan S. [7557-07]S2
- Iwase, Osamu [7580-16]S4, [7580-16]S6, [7580-16]S1
- Iwata, Fujio** 7619 ProgComm
- Iwatsuki, Katsumi [7620-11]S4
- Iwaya, Keiichi [7550-25]S5
- Iwaya, Motoaki [7602-58]S13, [7602-76]S11, [7602-76]SPS3, [7617-01]S1
- Iwayama, Yoshihide [7619-06]S2
- Iyamperumal, Palani A.** [7584-35]S12, [7584-35]S6
- Iyer, Gopal [7571-44]S9, [7575-48]S10
- Iyomasa, Claudine M. [7550-84]SPS1
- Izatt, Joseph A.** [7548G-158]S3, [7550-19]S4, [7550-53]S11, [7550-60]SPS1, 7554 Chr, 7554 S1 SessChr, [7554-14]S3, [7554-20]S3, [7554-79]S12, [7558-21]S5, [7558-21]S1, [7561-22]S4
- Izhaky, David [7555-23]S5
- Izyumskaya, Natalia [7602-79]S4

J

- Jack, Barry [7613-20]S6
- Jackson, Jeremy J. [7586-24]SPS2
- Jackson, Stuart D. [7582-36]S8
- Jacob, James J.** [7582-28]S6
- Jacobs, Bert [7561-32]S5
- Jacobs, Verne L. [7612-20]S5
- Jacobsen, David A.** [7597-52]S11
- Jacquart, Aurelie [7589-06]S2
- Jacques, Steve** [7548A-26]S, [7562-07]S2, [7566-12]S3, [7573-27]S7, TrackChr, SC029 Inst, [7548A-15]S, [7548A-19]S, [7554-28]S4, [7554-73]S11, [7555-48]S10, 7562 ProgComm, [7562-01]S1, 7564 ProgComm, 7564 S11 SessChr, 7573 ProgComm
- Jacquet, Joel [7585-29]SPS2, [7598-70]SPS3, [7597-11]S3
- Jaedicke, Volker [7554-101]SPS1
- Jaeger, Michael** [7564-26]S4, [7564-76]S11, [7564-131]SPS1
- Jaeger, Roland [7615-06]S2
- Jaeggi, Dominik [7583-21]S5
- Jaehme, Hendrik [7597-26]S6
- Jaehnke, Torsten [7613-12]S3
- Jaffe, Claudia B. [7556-33]S6
- Jaffe, Steven M. [7556-33]S6
- Jaffer, Farouc A. [7557-11]S3
- Jagadish, Chennupati** 7605 ProgComm
- Jahnke, Frank [7602-35]S8
- Jahns, Juergen** [7613-07]S2, 7607 ProgComm
- Jaillon, Franck [7554-38]S6
- Jain, Apurva** [7580-63]S15
- Jain, ATul [7550-32]S6
- Jain, Raj 7620 Chr, 7620 S2 SessChr, 7620 S4 SessChr
- Jain, Sonal [7561-19]S3
- Jain, Vijay K. [7593-30]S6
- Jakab, Arpad [7575-05]S3
- Jakobs, Tatjana C. [7550-45]S9
- Jakobsen, Dan P. [7580-87]SPS2
- Jakovels, Dainis [7557-19]S4
- Jalali, Bahram [7582-35]S8, [7589-25]S6
- Jalali, Munib P. [7578-07]S2
- Jalili-Kashtiban, R. [7606-55]SPS3, [7606-56]SPS3
- Jambreck, Joachim [7609-06]S2
- James, David [7555-08]S2
- James, Richard A. [7594-02]S5, [7594-02]S1
- Jameson, Andrew D. [7582-32]S7
- Jamshidi, Arash [7596-08]S2
- Jan, Chia-Ming [7577-10]S3
- Jancsó, Zoltán [7552-21]S4
- Jang, Ho Won [7617-66]SPS3
- Jang, Jaeduck** [7570-44]SPS1
- Jang, Jae-Won** [7593-33]S7
- Jang, Jurms [7599-52]SPS3
- Jang, Kyung Kook [7599-45]S12
- Jang, Tae-Hoon [7602-41]S9
- Jang, Taeseok [7617-04]S2
- Jankovic, Ladislav [7564-43]S7, [7564-69]S10
- Janousek, Jiri [7613-21]S6
- Jansen, Duco** [7548G-159]S4, [7548G-160]S4, 7548G Chr, [7548G-161]S4, 7562 Chr, 7562 S7 SessChr
- Jansen, Florian [7580-90]SPS2
- Janssens, Stefaan [7599-38]S10
- Janvier, Nicolas [7578-28]S7, [7578-29]S7
- Janyani, Vijay** [7598-66]SPS3
- Janz, Siegfried [7594-28]S8, 7606 ProgComm, [7606-10]S4, [7606-13]S5, [7606-23]S7
- Jarczyński, Manfred [7583-56]SPS2
- Jarocki, Roman [7584-29]S10
- Jarow, Jonathan P. [7548B-50]S4, [7548B-51]S4
- Jarrett, Steven M. [7578-92]S7
- Jarvi, Mark T. [7554-35]S6
- Jarvis, Thomas [7600-29]S7
- Jaschke, Werner [7564-108]SPS1
- Jasieniak, Jacek [7582-46]S10, [7582-54]SPS2
- Jau, Hung-Chang [7618-34]S9
- Jauregui, Cesar [7580-13]S3, [7580-55]S13, [7580-49]S11, [7580-57]S13, [7580-90]SPS2
- Javanmard, Mehdi [7593-28]S5
- Javidi, Bahram** SC979 Inst
- Jaworowicz, Katarzyna [7608-63]S13, [7608-64]S14
- Jay, Amrita [7548C-72]S1, [7548C-73]S1, [7548C-74]S1
- Jay, Louis** [7569-94]SPS1
- Jazbinsek, Mojca [7599-11]S3, [7599-19]S5, [7599-58]SPS3
- Jechow, Andreas** [7582-07]S2, [7583-37]S8
- Jedrzejczyk, Daniel [7582-59]SPS2, [7583-43]SPS2
- Jee, Shiou-Hwa [7552-08]S2
- Jefvert, Tom [7615-11]S3
- Jelezko, Fedor 7611 ProgComm
- Jelinek, Michal** [7578-74]SPS2, [7578-75]SPS2, [7549-08]S1
- Jelinkova, Helena [7549-08]S1, [7559-05]S, 7578 ProgComm, 7578 S5 SessChr, 7578 S8 SessChr, [7578-75]SPS2, [7578-76]SPS2, [7578-78]SPS2, [7578-82]SPS2, [7578-84]SPS2
- Jemal, Abdelmonem [7599-24]S6, [7604-28]S6
- Jen, Alex K. Y.** [7579-32]S8, 7599 ProgComm, 7599 S6 SessChr, [7599-18]S5, [7607-48]SPS3, [7599-14]S4
- Jenkins, Michael W.** [7548D-116]S3, [7548G-161]S4, [7554-09]S2, [7554-21]S4
- Jenkins, Peter** [7552-01]S1, [7552-03]S1
- Jensen, Ole B. [7554-52]S8, [7582-02]S4, [7582-02]S6, [7582-02]S1
- Jensma, Jaap [7598-14]S4
- Jeon, Heonsu [7591-13]S3, [7609-60]SPS3, [7609-61]SPS3, 7617 Chr, 7617 S2 SessChr, [7617-60]SPS3
- Jeon, K. S. [7602-41]S9
- Jeon, Mansik** [7554-91]SPS1, [7555-21]S5, [7556-12]S3
- Jeon, Min Yong [7580-105]SPS2
- Jeon, Seok-Hee [7619-24]SPS3
- Jeon, Seung-Ran [7602-51]S12
- Jeong, Eunjae [7599-53]SPS3
- Jeong, Hyeonjoo [7568-53]SPS1
- Jeong, Hyun-Woo [7554-61]S9
- Jeong, Kwan [7573-09]S2
- Jeong, Myung Yung [7554-47]S7, [7554-55]S8, [7554-82]S12, [7605-26]SPS3
- Jeong, Soon Moon [7618-33]S9
- Jeong, Tung H.** 7619 ProgComm
- Jeong, Younchan 7580 ProgComm, 7580 S2 SessChr
- Jepsen, Peter U. [7600-16]S4
- Jerjes, Waseem K. 7548C ProgComm, 7548C S5 SessChr, [7548C-67]S1, [7548C-72]S1, [7548C-73]S1, [7548C-74]S1, [7548C-92]S4, [7548C-94]S4, [7548C-96]S5, [7548C-102]S5, [7548C-103]S5, [7548C-174]S1, [7548C-180]S4, [7573-04]S1
- Jerram, Paul [7598-75]S9
- Jesacher, Alexander [7569-48]S7, [7595-13]S3
- Jespersen, Kim G. [7580-87]SPS2
- Jessup, Malcolm [7598-73]SPS3
- Jester, Bryan [7589-03]S1
- Jester, James V. [7589-03]S1
- Jetschke, Sylvia [7580-08]S2, [7598-09]S2
- Jetter, Michael [7602-31]S7
- Jeyasingh, Ebenezer [7561-11]S1
- Jeynes, Christopher [7606-14]S5
- Jeziorska-Chapman, Anna M. [7618-46]S10
- Jha, Anand [7613-20]S6
- Jha, Nisha [7582-49]SPS2
- Jha, Vinaya [7606-53]SPS3
- Jhabvala, Christine A.** 7608 ProgComm, 7608 S10 SessChr
- Jhiang, Sissy M. [7568-50]S3
- Jho, Young-Dahl [7603-03]S1
- Ji, Junhua [7580-56]S13, [7580-58]S13, [7598-47]S11
- Ji, T. [7618-14]S9
- Jia, Chenglong 7603 S5 SessChr, [7603-23]S5
- Jia, Congxian [7564-41]S6
- Jia, Yali [7548E-125]S1, [7554-36]S6, [7566-15]S4, [7566-18]S4, [7568-11]S2
- Jian, Zhongping [7554-106]SPS1
- Jianfeng, Xu [7591-21]S5
- Jiang, Chun [7609-11]S3
- Jiang, Fengyi [7617-48]S10
- Jiang, Hongrui 7553 ProgComm
- Jiang, Hongxing** [7598-44]S10, [7602-34]S7, [7602-62]S14, [7608-52]S11
- Jiang, Huabei** 7548F ProgComm, [7548F-170]S3, [7548F-172]S
- Jiang, James Y. [7550-56]S11, [7555-51]S10, [7566-02]S1
- Jiang, Jia [7598-24]S6
- Jiang, Jingying 7563 ProgComm, [7563-21]SPS1
- Jiang, Junfeng [7554-54]S8
- Jiang, Kai [7603-24]S6

Index of Authors, Chairs, and Committee Members

- Jiang, Lan 7585 ProgComm, [7585-17]S4
- Jiang, Minshan** [7554-110]SPS1
- Jiang, Shubin** 7598 Chr
- Jiang, Tingting [7568-89]SPS1
- Jiang, Wen-Han** 7595 ProgComm
- Jiang, Yan [7564-03]S1
- Jiang, Zhi [7569-22]S3
- Jiang, Zongcheng [7599-22]S6
- Jiani, Mohsen [7597-69]SPS3
- Jiao, Jane J. [7549-25]S, [7549-26]S
- Jiao, Jianzhong** SC958 Inst
- Jiao, Shuliang** [7554-29]S5, [7554-110]SPS1
- Jiao, Yan [7573-04]S1, [7573-11]S3, [7573-14]S3, [7573-26]S7, [7573-48]SPS1
- Jiao, Yang** [7553-23]S6, [7574-19]S4
- Jichlinski, Patrice** 7548B ProgComm, 7548B S6 SessChr, 7548B S5 SessChr, [7548B-57]S6
- Jillella, Priyanka A.** [7558-04]S1, [7558-16]S4, [7558-17]S4
- Jimenez, Giselle [7603-40]S9
- Jimenez-Flores, Rafael [7569-102]SPS1
- Jimí, Hiroyuki [7617-58]SPS3
- Jin, Chaoyuan [7610-24]S6
- Jin, Chunguang [7559-22]S
- Jin, Danliang [7599-18]S5
- Jin, Dayong [7568-36]S5
- Jin, Meng [7557-24]SPS1, [7557-25]SPS1
- Jin, Michael H. C. 7599 ProgComm
- Jin, S. R. [7616-07]S2
- Jin, Shang-zhong [7617-68]SPS3
- Jin, Xiao [7551-22]S6
- Jin, Xiaofan [7548G-155]S2
- Jin, Xing [7568-63]S4
- Jin, Xu [7583-05]S1
- Jin, Yongdong [7564-41]S6
- Jin, Young-Jun [7584-36]SPS2
- Jindra, Nichole M. [7548G-163]S5, [7562-49]SPS1
- Jing, Li [7602-34]S7
- Jo, Javier A.** [7554-32]S5, [7561-23]S4
- Jocou, Laurent [7604-36]S8
- Joffre, Manuel [7560-20]S3
- Johann, Robert [7560-06]S2
- Johannessen, Rolf [7592-17]S3
- John, Renu [7554-69]S11, [7555-21]S5, [7576-35]S9
- John, Sajev** [7609-01]S1
- Johns, Stephen [7592-13]S3
- Johnson, Bart [7554-50]S8
- Johnson, Christopher [7555-28]S6
- Johnson, Eric G. [7580-14]S3, [7580-61]S14
- Johnson, Erik [7613-22]S6
- Johnson, G. Allan [7557-04]S1
- Johnson, Klein [7557-14]S3, [7615-20]S5
- Johnson, Matthew B. [7608-72]S14, [7616-47]S11
- Johnson, Michael [7593-27]S5
- Johnson, Noble M. [7593-32]S6, [7606-06]S3, [7616-17]S4
- Johnson, Ralph H. [7615-05]S2
- Johnson, Roger [7553-11]S3
- Johnson, Seth [7618-47]S3
- Johnson, Shane R.** [7597-08]S2, [7597-19]S4, [7614-11]S3, [7616-07]S2, [7617-11]S3
- Johnson, Steven G. SC608 Inst
- Johnston, Keith P. [7562-28]S7, [7564-118]SPS1, [7576-28]S7, [7577-39]S8
- Johnston, Nicholas S. [7570-30]S6, [7577-17]S4
- Johnston, Richard S. [7569-12]S2
- Johnston, William K. [7548B-38]S2
- Jokerst, Nan M.** [7607-17]S4, [7616-28]S7, [7616-28]S12
- Jomard, François [7603-46]S10
- Jonak-Auer, Ingrid [7605-09]S3
- Jonathan, Enock [7563-23]S5
- Jones, Alan L. [7593-21]S4
- Jones, Christopher R. [7582-39]S9
- Jones, David C. [7580-66]S15
- Jones, Richard [7606-14]S5
- Jones, Steven M. [7550-36]S7, [7595-01]S1
- Jonnal, Ravi S. [7550-23]S4, [7550-26]S5, [7550-37]S7
- Joo, Chulmin** [7569-64]S9
- Joo, Jinho [7603-36]S8
- Joos, Karen M.** 7550 ProgComm, 7550 S9 SessChr, [7550-33]S6
- Jose, Iven [7568-83]S2
- Joseph, Cecil S.** [7601-03]S1
- Joseph, John [7615-10]S3
- Joseph, Rani [7619-20]S4
- Joseph, Shiju [7554-24]S4
- Joshi, Ajay [7579-51]S3
- Joshi, Pratixa P. [7564-61]S9, [7564-65]S9, [7564-114]SPS1, [7564-118]SPS1, [7574-04]S1
- Joss, Benjamin [7584-26]S10
- Jou, Ming-Jiunn [7602-60]S14, [7617-05]S2
- Joud, Fadwa [7576-33]S8
- Jouhti, Tomi [7578-27]S7
- Journet, Bernard A.** [7598-13]S3, [7598-25]S6
- Jovanovic, Nemanja [7580-24]S6, [7589-16]S5
- Jovin, Thomas M. 7575 Chr
- Ju, Jianjun [7599-51]S5
- Ju, Li [7579-42]S10
- Ju, Myeong Jin [7556-39]SPS1, [7557-29]SPS1
- Juang, Chih-Feng [7599-03]S1
- Jubin, Daniel [7607-19]S5, [7607-20]S5
- Judge, Elizabeth [7568-52]S3
- Juhasz, Tibor [7548F-15]S3, [7562-43]SPS1, [7589-01]S3
- Jules, Jean-Charles [7609-36]S8
- Julien, Carine [7589-06]S2
- Julien, François H. [7602-45]S10, 7608 ProgComm, 7608 S4 SessChr
- Julien, Moreau [7577-33]S7
- Jun, Chang-Duk [7568-76]S1
- Jun, Do Han [7592-28]S5
- Junesand, Carl [7606-01]S1
- Jung, Bongsu [7562-15]S4, [7576-58]SPS1
- Jung, Byungjo [7548A-18]S, [7548F-146]S2
- Jung, Donggeun [7603-36]S8
- Jung, Eun Joo [7554-47]S7, [7554-55]S8
- Jung, Hyundon [7602-55]S12
- Jung, In Hwan [7599-53]SPS3
- Jung, In-II [7572-10]S2, [7572-19]SPS1
- Jung, Jae-Yun [7548C-97]S5
- Jung, Jan A. [7600-21]S5
- Jung, Tak [7602-70]S11, [7602-70]SPS3
- Jung, Unsang** [7554-91]SPS1, [7555-21]S5, [7556-12]S3
- Jung, Woonggyu [7555-21]S5, [7556-12]S3, [7556-14]S4, [7558-15]S4, [7593-05]S1
- Jung, Yookyung [7564-86]S12
- Jung, Young-Jin [7548E-129]S2
- Jungbluth, Bernd [7578-24]S4, [7578-24]S6, [7578-24]S1, [7578-25]S4, [7578-25]S6, [7578-25]S1
- Junghans, Jeremy [7583-03]S1, [7583-18]S4
- Junior, Jonatas S. [7568-14]SPS1
- Junker, Marlee [7573-23]S6
- Juodawlkis, Paul W. [7616-33]S8
- Juodkazis, Saulius** 7591 ProgComm, 7591 S5 SessChr, [7591-18]S5, [7591-19]S5
- Jurbergs, David** [7619-17]S4
- Jurna, Martin [7569-14]S2
- Juskaitis, Rimas [7569-38]S6, [7570-28]S6
- Just, Florian [7580-107]SPS2
- Just, Tino [7548C-71]S5, [7548C-75]S1
- Juvé, Vincent [7600-02]S1

K

- Kaajakari, Ville [7592-29]S5
- Kaatz, Martin [7554-90]SPS1, [7555-16]S4, [7564-92]SPS1
- Kadantsev, Eugene [7608-88]S19
- Kadar, Tamar BO111 ProgComm
- Kadlec, Christelle [7602-26]S6
- Kadlec, Filip [7602-26]S6
- Kado, Masataka [7589-45]SPS2
- Kado, Yuichi [7601-12]S3
- Kador, Lothar [7619-42]S4
- Kadwani, Pankaj [7580-61]S14
- Kagami, Manabu [7605-07]S2
- Kageyama, Takeo [7615-01]S1
- Kahn, Fred** [7552-19]S4
- Kahn, Joseph M. [7588-01]S1
- Kaierle, Stefan [7580-99]SPS2
- Kailsnath, Madana [7610-35]SPS3
- Kailuweit, Peter [7597-02]S1
- Kaindl, Robert A. 7600 ProgComm
- Kainerstorfer, Jana M. [7561-36]S5
- Kaino, Toshikuni 7599 Chr, 7599 S4 SessChr, [7599-06]S2, [7605-07]S2
- Kaiser, Martin [7603-04]S1
- Kaiser, Ute [7602-64]S15
- Kajic, Vedran [7550-55]S11
- Kajihara, Takuro [7548D-108]S1
- Kajzar, François 7599 Chr, 7599 S12 SessChr, [7599-21]S6
- Kako, Satoshi [7602-38]S8
- Kaku, Masanori [7581-09]S2
- Kalagin, Aleksandr K. [7610-15]S4
- Kalchenko, Vyacheslav** [7563-15]S3
- Kaliff, R. [7560-26]S1
- Kalisky, Ofra [7582-43]S10
- Kalisky, Yehoshua Y.** SC861 Inst, [7578-56]S14, 7582 ProgComm, 7582 S3 SessChr, [7582-43]S10
- Kalkman, Cor J. [7555-30]S6
- Kalkman, Jeroen [7550-47]S9
- Kalkowski, Gerhard [7589-30]S8
- Käll, Mikael [7551-29]S7
- Kalmes, Pamela [7591-15]S4
- Kaloshia, Vladimir [7616-54]S13
- Kalt, Heinz 7597 S11 SessChr, [7597-40]S9
- Kalusniak, Sascha [7597-42]S9
- Kaluza, Greg L. [7548D-112]S2
- Kaluzny, Bartlomej J. [7550-18]S4
- Kalyuzhnyy, Nikolaj [7610-20]S5
- Kamensky, Vladislav A. [7557-18]S4, [7568-46]S2, [7577-25]S6
- Kameoka, Jun** [7577-04]S2
- Kamijo, Koji [7619-14]S3
- Kamimura, Masao [7576-22]S6
- Kaminska, Bozena [7557-37]SPS1, [7562-08]S2, [7562-09]S2, [7562-11]S3, [7568-34]S6, [7577-35]S8, [7593-13]S2
- Kamiya, Mako [7576-09]S3, [7576-60]SPS1
- Kamiya, Shinichi [7615-01]S1
- Kamiyama, Satoshi** [7602-58]S13, [7602-76]S11, [7602-76]SPS3, 7617 ProgComm, 7617 S10 SessChr, [7617-01]S1
- Kamm, Andreas [7585-04]S1
- Kamoun, Saber [7599-24]S6, [7604-28]S6
- Kamp, Martin [7583-26]S6, [7608-03]S1, [7611-22]S5
- Kämpfe, Thomas [7591-34]S8
- Kämpfner, Hartmut [7587-13]S2
- Kampfrath, Tobias [7600-63]S15
- Kan, Hirofumi [7602-76]S11, [7602-76]SPS3, [7616-27]S6, [7616-61]S14
- Kan, Hung Chih [7618-13]S3
- Kanda, Masahiro [7607-28]S7
- Kandaswamy, Prem K. [7602-45]S10
- Kane, Daniel J.** [7616-06]S2
- Kaneda, Kei [7617-58]SPS3
- Kaneda, Yushi [7578-35]S9, [7597-25]S6
- Kaneko, Yukio [7602-58]S13
- Kang, Boyoung [7599-33]S9, [7599-40]S10, [7601-17]S4
- Kang, Chan-min [7591-39]SPS2
- Kang, DongKyun** [7548C-79]S2, [7558-03]S1, [7558-04]S1
- Kang, Dongyeon [7548F-146]S2
- Kang, Hobin [7549-05]S1, [7549-25]S, [7549-26]S
- Kang, Hyun Wook** 7548B ProgComm, 7548B S6 SessChr, 7548B S1 SessChr, [7548B-47]S4, [7548B-49]S4
- Kang, Jeon Woong [7569-88]SPS1
- Kang, Jin U.** [7550-02]S1, [7559-24]S
- Kang, Jin Ho [7599-07]S2
- Kang, Jin Ung** 7559 ProgComm
- Kang, Ju-Hyung [7598-41]S10, [7609-17]S4, [7610-16]S4, [7618-44]SPS3
- Kang, Lin [7611-35]S7
- Kang, Sung-Yong [7618-44]SPS3
- Kang, Tae Gon [7593-05]S1
- Kang, Wei [7554-03]S1, [7554-09]S2
- Kang, Yujung [7548D-118]S4
- Kanick, Stephen C. [7548C-83]S2
- Kanjilal, Dinakar [7603-56]S12
- Kannengiesser, Christian [7578-31]S8
- Känsäkoski, Markku [7593-43]SPS2
- Kanskar, Manoj [7583-54]SPS2
- Kanzelmeyer, Sebastian [7580-88]SPS2
- Kao, Fu-Jen [7569-31]S5, [7618-40]SPS3
- Kao, Tsung-Ting [7602-40]S9
- Kaplan, Aaron M. [7598-42]S10
- Kaplan, David [7553-05]S2, [7553-15]S4
- Kapoor, Amita [7597-56]S12
- Kapoor, Avinashi [7582-49]SPS2
- Kapoor, Ketan [7550-44]S9
- Kapoor, Rakesh [7559-23]S, [7559-25]S, [7559-27]S, [7559-28]S
- Kappel, Constantin [7569-26]S4
- Kapsokalyvas, Dimitrios [7548A-07]S, [7569-104]SPS1, [7550-74]SPS1
- Kapusta, Peter [7568-61]S4, [7569-32]S5, [7569-82]SPS1, [7569-107]SPS1, [7571-13]S4
- Karabut, Maria [7548B-41]S2
- Karabutov, Alexander A. [7564-79]S11
- Karachinsky, Leonid Y. [7597-53]S12, [7616-54]S13
- Karaiskaj, Denis [7600-49]S12
- Karakullukcu, Baris [7548C-83]S2, [7548C-91]S4
- Karami Taheri, Hossein [7609-49]S11
- Karandashev, Sergey [7609-16]S4
- Karaveli, Şeyda [7573-31]S7

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Karimi, Koohyar [7548C-87]S3
Karioja, Pentti [7607-39]S9
Kariuki, Michael [7564-50]S7
Karl, William C. [7570-21]S4
Karle, Timothy J. [7608-86]S18
Karlsen, Scott R. [7583-07]S2, [7583-13]S3, [7583-32]S8, [7583-47]SPS2
Karlssohn, Hakan [7578-26]S7
Karlsson, Magnus [7582-09]S3
Karni, Yoram [7583-11]S3, [7583-50]SPS2
Karnowski, Karol M. [7550-18]S4
Karnutsch, Christian [7606-40]S11
Karp, Jeffrey [7576-07]S2
Karpjouk, Andrei B. [7564-07]S2, [7564-65]S9
Karpman, Maurice S. 7592
ProgComm
Kartazae, V. [7561-41]SPS1
Kartazae, Vladimir A. [7561-06]S1, [7582-56]SPS2
Kärtner, Franz X. [7579-51]S3
Karwa, Amol [7551-26]S6, [7551-27]S7
Kasatkina, Irene V. [7554-109]SPS1
Kascáková, Slávka [7548C-184]S4
Kasemann, Raphael [7578-22]S5
Kasevich, Mark A. [7611-29]S7
Kashyap, Raman [7614-05]S2
Kaspari, Christian [7583-05]S7
Kasprzak, Jacek 7600 ProgComm, [7600-44]S10
Kasseck, Christoph [7554-101]SPS1
Kastanos, Evdokia [7560-09]S2
Kasten, Ansas Matthias [7615-11]S3
Kaster, Jan [7608-08]S2
Kasukawa, Akihiko [7615-01]S1
Katagiri, Takashi [7559-06]S3
Katayama, Tsutao [7555-05]S1
Kathaperumal, Mohanalingam [7599-22]S6
Kato, Kiyoshi [7582-05]S2, [7582-55]SPS2
Katou, Atsushi [7619-36]SPS3
Katragadda, Manasi [7559-20]S
Katrasnik, Jaka [7556-17]S4, [7556-16]S4
Katsnelson, Alex [7578-48]S12
Katti, Kattesh [7564-38]S6
Katto, Masahito [7581-09]S2
Katz, Federico [7571-14]S4
Kaufel, Gudrun [7616-48]S11
Kauppinen, Ismo [7607-39]S9
Kautio, Kari [7607-39]S9
Kavalenka, Maryna [7553-14]S4
Kavaya, Michael J. [7578-02]S1
Kavehrad, Mohsen 7620 ProgComm, [7620-13]S4, [7620-14]S4
Kawachi, Tetsuya [7589-45]SPS2
Kawaguchi, Yoshizo [7584-07]S2
Kawai, Ryosuke [7602-58]S13
Kawakita, Yasumasa [7615-01]S1
Kawamoto, Kenji [7587-31]S5, [7618-16]S4
Kawana, Keisuke [7550-25]S5
Kawanaka, Junji [7578-18]S4
Kawanishi, Tetsuya [7621-22]S6
Kawano, Hiroyuki [7584-25]S9
Kawasaki, Akari [7605-07]S2
Kawasaki, Masashi 7603 ProgComm
Kawashima, Akira [7548B-44]S3
Kawashima, Hayato [7589-26]S7
Kawata, Satoshi 7569 ProgComm
Kawauchi, Satoko [7573-29]S7
Kay, Andrew J. [7599-38]S10
Kaya, İlhan [7554-84]S12
Kaye, Anthony [7603-31]S7
Kaylie, David M. [7548C-101]S5
Kazansky, Peter G. [7600-41]S10
Kazantseva, Elena [7580-77]SPS2
Kazaura, Kamugisha [7620-15]SPS3
Kazemi, Ali [7597-83]SPS3
Kazlas, Peter T. [7618-01]S1
Kearley, Mark Q. [7583-25]S5
Kecman, Fedja [7617-72]S10
Kedlaya, D. [7583-54]SPS2
Kee, Hooi Ling [7576-11]S3
Keebaugh, Doug [7592-36]SPS2
Keeley, Jared M. [7591-08]S2
Keil, Robert [7589-28]S7, [7589-43]S8, [7589-43]S12
Kelemen, Márk T. [7583-23]S5, [7583-27]S6
Kellenbenz, R. [7597-02]S1
Keller, Matthew D. [7555-69]SPS1
Kellogg, Rick A. [7604-24]S5
Kelly, O. D'allivry [7577-18]S4
Kelmelis, Eric J. [7599-20]S5
Kelsall, Robert W. [7606-24]S7, [7616-26]S6
Kemmer, Shanalyn A. 7591
ProgComm, [7591-24]S6, [7604-22]S5
Kempf, Carl J. [7595-10]S2, [7595-20]S4
Kenda, Andreas [7594-20]S6, [7594-31]S9
Kendall, Catherine A. [7548C-70]S1
Kennedy, Brendan F. [7554-44]S7
Kennedy, David J. [7568-73]S3
Kennedy, Ian M. [7574-20]S4, [7576-31]S8
Kennedy, Kenneth [7616-38]S9
Kennedy, Stephanie A. [7573-23]S6
Kennedy, Thomas A. [7600-33]S8
Kenyon, Anthony J. [7606-55]SPS3
Keo, Sam [7587-27]S4
Keränen, Kimmo [7607-39]S9
Keränen, Ville T. [7567-12]S3
Kerbage, Charles [7554-60]S9
Kern, Alexander [7607-10]S3
Kern, Pierre Y. [7604-36]S8
Kerr, Matthew D. [7605-25]S9
Kerttula, Juho [7580-42]S10
Kesari, Santosh [7569-20]S3
Kessel, David H. 7551 Chr, 7551 S1
SessChr, [7551-01]S1
Kessler, William J. [7581-21]S4
Kester, Robert [7555-09]S2
Kester, Robert [7558-06]S2, [7570-35]S7
Keszler, Douglas A. [7603-24]S6
Kettler, Thorsten [7616-54]S13
Khabele, Dineo [7555-03]S1
Khajavikhan, Mercedes [7579-15]S4
Khakimova, Dilorom [7571-40]SPS1
Khalavka, Yuriy [7575-05]S3
Khalifin, Viktor [7615-14]S4
Khalil, Diaa A. M. [7594-30]S9
Khan, Enamul H. [7586-09]S2
Khan, Kaiser [7569-93]SPS1
Khan, Mughees M. [7609-07]S2, [7609-10]S3
Khan, Nadir [7597-59]S13
Khan, Suffian [7603-03]S1
Khandekar, Rahul M. [7587-14]S3, [7587-17]S3
Khanna, Amit [7598-11]S3, [7598-12]S3, [7606-50]SPS3
Khanna, Suraj P. [7616-26]S6
Khatatourians, Artium [7589-11]S4
Khattab, Mohammed K. [7550-38]S8
Khavasi, Amin [7597-83]SPS3
Khayat, Mario 7557 ProgComm
Khaydarov, John [7582-01]S4, [7582-01]S6, [7582-01]S1
Khelif, Abdelkrim 7609 ProgComm, 7609 S5 SessChr, [7609-30]S7, [7609-31]S7
Khilo, Anatoly M. [7579-51]S3
Khitrov, Victor [7580-54]S12
Khitrova, Galina [7597-65]S14
Khizhnyak, Anatoliy [7578-57]S14, [7582-53]SPS2, [7588-06]S1
Khodaparast, Giti A. [7608-22]S5
Khodjavey, Gayrat [7571-40]SPS1
Khojasteh, Mehrnoush [7568-88]S2
Kholkhlova, Tatiana D. [7564-79]S11
Kholmanov, Iskandar [7603-40]S9
Khopin, Vladimir F. [7580-43]S10
Khorasani, Sina [7597-69]SPS3, [7597-72]SPS3, [7597-83]SPS3, [7607-44]SPS3, [7608-20]S4, [7609-13]S3, [7609-49]S11, [7609-51]S11
Khoshnegar, Milad [7608-20]S4
Khosla, Ajit [7593-39]SPS2, [7593-42]SPS2
Khouri, Sônia [7560-13]SPS1
Khurgin, Jacob B. [7600-06]S2, 7612 ProgComm, 7612 S3 SessChr, [7612-19]S5, 7614 ProgComm, [7614-01]S1, [7616-39]S9
Ki, Hyun Chul [7608-51]S11, [7610-36]SPS3, [7599-57]SPS3, [7603-65]SPS3
Ki Lok Ho, Clark [7566-04]S1
Kiang, Juliann G. [7561-32]S5
Kiang, Yean-Woei [7609-18]S4
Kibler, Karen [7561-32]S5
Kieffer, Jean-Claude [7569-94]SPS1, [7600-65]S15
Kiel, Alexander [7571-18]S5
Kiel, David H. [7580-21]S6
Kieleck, Christelle [7582-36]S8
Kienle, Alwin [7555-19]S4
Kiesel, Peter [7572-05]S1, [7593-32]S6, [7606-06]S3
Kiesslich, Ralf 7558 ProgComm
Kieu, Khanh [7569-83]SPS1
Kik, Pieter G. [7604-10]S2
Kikkawa, Toshihide 7602 ProgComm
Kikuchi, Hirotsugu [7618-29]S8
Kikuchi, Kenichi [7601-12]S3
Kikuchi, Makoto [7564-105]SPS1, [7566-05]S2, [7573-29]S7
Kikuri, Nobutaka [7580-16]S4, [7580-16]S6, [7580-16]S1
Kilin, Dmitri S. [7598-31]S8, [7610-04]S1
Killi, Alexander [7578-10]S3, [7578-12]S3
Kim, Beop-Min [7548E-129]S2
Kim, Beop-Min [7554-61]S9
Kim, Buem Joon [7617-14]S3
Kim, Byungki [7559-16]S, [7574-17]S3
Kim, Chang Seok [7554-47]S7, [7554-55]S8
Kim, Chang Soo [7554-72]S11
Kim, Chang-Seok [7554-82]S12, [7555-58]SPS1, [7605-26]SPS3
Kim, Chinkyoo [7602-01]S1
Kim, Chulhong [7564-43]S7, [7564-66]S9, [7564-77]S1, [7564-106]SPS1, [7564-111]SPS1, [7564-128]SPS1, [7567-20]S4
Kim, Dae Yu [7554-105]SPS1
Kim, Daekun [7569-54]S8, [7569-60]S9
Kim, DaeYu [7550-36]S7
Kim, Daisik 7600 ProgComm, 7600 S1 SessChr, [7606-53]SPS3
Kim, Do Young [7603-15]S3, [7603-34]S8
Kim, Do-Gyun [7572-19]SPS1
Kim, Dohoon [7599-33]S9
Kim, Do-Hyun [7559-26]S, [7559-33]S
Kim, Dojong [7587-15]S3
Kim, Dong Ho [7583-41]SPS2
Kim, Dong Ho [7602-66]S15, [7602-70]S11, [7602-70]SPS3
Kim, Dong Sung [7593-05]S1
Kim, Donghyun [7568-41]S3, [7574-13]S2, [7577-44]SPS1, [7577-47]SPS1, [7596-07]S2
Kim, Donguk [7568-10]S4, [7570-43]SPS1
Kim, Doo Gun [7599-57]SPS3, [7597-68]SPS3, [7603-65]SPS3, [7606-49]SPS3, [7608-51]S11, [7610-36]SPS3
Kim, Do-Won [7607-25]S6, [7607-30]S7
Kim, Dug Y. [7568-10]S4, [7568-64]S4, [7568-79]S1, [7570-43]SPS1, [7571-41]SPS1, [7574-07]S1, [7580-83]SPS2, [7575-40]SPS1
Kim, E. S. [7601-17]S4
Kim, Erik D. [7611-20]S5
Kim, Eunkyoung 7599 ProgComm, [7599-03]S1
Kim, Eun-Soo [7619-37]SPS3, [7619-38]SPS3
Kim, Geunyoung [7592-26]S5
Kim, Gwangyoung [7599-52]SPS3
Kim, Gyu-Man [7572-15]SPS1
Kim, Gyung-Bum [7584-36]SPS2
Kim, Gyungock [7606-33]S9
Kim, Han-Sung [7548F-146]S2
Kim, Hee Dong [7602-70]S11, [7602-70]SPS3
Kim, Hee-Joo [7574-20]S4
Kim, Ho-Cheol [7610-07]S2
Kim, Hong Seung [7606-49]SPS3
Kim, Hongkwon [7591-05]S2, [7608-47]S10
Kim, Hong-Seung [7597-68]SPS3
Kim, Hoseong [7572-19]SPS3
Kim, Huijun [7556-34]SPS1
Kim, Hwe-Jong [7599-57]SPS3, [7603-65]SPS3, [7608-51]S11
Kim, Hyeon Don [7554-82]S12
Kim, Hyo Jin J. [7603-65]SPS3, [7608-51]S11, [7610-36]SPS3
Kim, Hyochul [7609-06]S2, [7610-18]S4
Kim, Hyoki [7593-03]S1, [7609-40]S9
Kim, Hyoungsub [7603-36]S8
Kim, Hyun Jae [7603-11]S8
Kim, Hyun Jin [7599-57]SPS3
Kim, Hyungjun [7603-15]S3
Kim, Hyungjun [7603-34]S8
Kim, Hyung-Kun [7617-69]SPS3
Kim, Hyun-Joo [7598-20]S5
Kim, Hyunsung [7617-19]S4, [7602-55]S2
Kim, Il-Soo [7603-45]S10
Kim, J. H. [7599-40]S10
Kim, J. H. [7601-17]S4
Kim, Jae H. [7601-17]S4
Kim, Jae Gwan [7555-46]S10, [7555-47]S10, [7573-08]S2
Kim, Jae Jun [7587-15]S3
Kim, Jae-Chang [7618-30]S8
Kim, Jaehoon [7617-60]SPS3
Kim, Jae-Min [7603-34]S8
Kim, Jang-Joo 7599 ProgComm
Kim, Jason [7548C-177]S2
Kim, Jason [7553-07]S2
Kim, Jeehyun [7554-91]SPS1, [7555-21]S5, [7556-12]S3
Kim, Jeonghun [7599-03]S1
Kim, Ji Won [7578-50]S12
Kim, Jihoon [7548B-38]S2, [7555-29]S6
Kim, Jin K. [7608-59]S12
Kim, Jin Ki [7618-33]S9
Kim, Jinsik [7591-39]SPS2
Kim, Jin-Woo [7564-39]S6, [7564-51]S8, [7565-09]S3
Kim, Jong Su [7617-56]SPS3, [7617-57]SPS3, [7618-43]SPS3
Kim, Jong-Hun [7607-30]S7

Index of Authors, Chairs, and Committee Members

- Kim, Ju W. [7568-40]SPS1
 Kim, Jun Ki [7580-86]SPS2
 Kim, Jungkyu [7593-27]S5
 Kim, Junhoi [7609-40]S9
 Kim, Jun-Whee [7604-25]S5, [7604-50]SPS3
 Kim, Ju-Young [7598-41]S10
 Kim, Kap-Joong [7606-33]S9
 Kim, Ki Hean [7554-60]S9
 Kim, Ki-Bum 7608 ProgComm, 7608 S15 SessChr
 Kim, Ki-Han [7618-30]S8
 Kim, Kisoo [7599-23]S6
 Kim, Kwangjin [7572-10]S2
 Kim, Kye-Young [7599-49]SPS3
 Kim, Kyong-Hon [7605-27]SPS3
 Kim, Kyoung Chan [7583-41]SPS2, [7602-70]S11, [7602-70]SPS3
 Kim, Kyujung [7574-13]S2, [7577-44]SPS1, [7577-47]SPS1
 Kim, Kyung Chan [7602-66]S15
 Kim, Kyung-Hwan [7620-15]SPS3
 Kim, Kyung-Jo [7604-25]S5, [7604-50]SPS3
 Kim, Min W. [7597-64]S14
 Kim, Moon D. [7606-03]S1
Kim, Myung K. [7568-58]S1
 Kim, Myung-Ki [7598-41]S10, [7609-17]S4, [7610-16]S4
 Kim, Nakjoong 7599 ProgComm
Kim, Nam [7619-24]SPS3, [7619-27]SPS3
Kim, Nam Seong 7585 ProgComm
 Kim, Namje [7601-21]SPS3
 Kim, Pilhan [7569-88]SPS1
 Kim, Se-min [7605-27]SPS3
 Kim, Seon H. [7599-57]SPS3, [7603-65]SPS3, [7608-51]S11, [7610-36]SPS3
Kim, Seongsin M. [7617-56]SPS3
 Kim, Seongsoo [7602-44]S9
 Kim, Seung Hwan [7605-27]SPS3
 Kim, Seung-Cheol [7619-37]SPS3, [7619-38]SPS3
 Kim, Seungsoo [7564-61]S9, [7564-65]S9
 Kim, Shin Ae [7577-08]S3, [7577-44]SPS1
 Kim, Sihan [7591-13]S3
 Kim, Su Jin [7602-70]S11, [7602-70]SPS3
 Kim, Sung June [7577-08]S3, [7577-44]SPS1
 Kim, Sunghwan [7609-60]SPS3, [7609-61]SPS3
 Kim, Sung-Jin [7553-29]S
 Kim, Sungjun [7599-23]S6
 Kim, Suyoung [7599-56]SPS3, [7599-55]SPS3
 Kim, Tae Geun [7583-41]SPS2, [7602-66]S15, [7602-70]S11, [7602-70]SPS3
 Kim, Tae Hoon [7617-56]SPS3
 Kim, Tae Un [7603-65]SPS3, [7608-51]S11
 Kim, Tae-Dong [7599-63]SPS3
 Kim, Taiho [7571-15]S5, [7608-85]S18
 Kim, Wi Han [7572-24]SPS1
 Kim, Won Jin [7599-45]S12
 Kim, Wonnaem [7602-55]S12
 Kim, Yeungjung [7578-80]SPS2
 Kim, Yong S. [7568-72]S1
Kim, Young L. [7554-81]S12, [7573-32]S8
 Kim, Young Duk [7558-27]SPS1
 Kim, Young Ran [7568-79]S1
 Kimball, Brian R. [7599-39]S10, [7599-42]S11, [7618-19]S5
 Kimble, H. Jeff [7579-39]S10
- Kimerling, Lionel C.** [7604-05]S1
 Kimura, Takehiro [7548D-108]S1
 Kindel, Christian [7602-38]S8
 King, Jason K. [7571-36]S10
 King, Newton [7598-73]SPS3
 King, Phillip D. C. [7603-08]S2
 King, Roger [7615-06]S2
 Kingry, Luke C. [7559-14]S
 Kini, Rajeev N. [7608-22]S5
 Kinjo, Masataka [7576-13]S4
 Kinjo, Tatsuya [7609-34]S8, [7609-63]SPS3, [7609-64]SPS3
 Kino, Gordon [7558-22]S5, [7558-22]S1, [7558-23]S5, [7558-23]S1, [7567-04]S1
 Kinoshita, Nobuhiro [7619-14]S3
 Kinowski, Christophe [7604-34]S7
 Kinsky, Michael [7564-52]S8
 Kippenberg, Tobias J. [7579-35]S9
 Kipshidze, Gela [7616-66]S2
 Kira, Mackillo [7582-32]S7, [7600-10]S3, [7600-14]S4
 Kirch, Jeremy [7597-44]S10, [7607-17]S4, [7616-28]S7, [7616-28]S12
 Kirchhof, Johannes [7580-08]S2, [7580-107]SPS2, [7598-09]S2
 Kirfel, Gregor [7549-16]S
Kirillin, Mikhail [7577-25]S6
 Kirimura, Hiroya [7555-41]S9
 Kirkpatrick, Sean J. 7563 ProgComm, 7566 Chr, 7566 S1 SessChr
Kirste, Ronny [7602-27]S6, [7602-30]S7, [7603-04]S1
 Kiselev, Denis [7594-19]S6
 Kiseleva, Elena [7548B-41]S2
 Kishimoto, Maki [7589-45]SPS2
 Kishino, Katsumi 7602 ProgComm
 Kisker, David W. [7559-12]S
 Kissel, Heiko [7583-14]S3, [7583-27]S6, [7583-28]S6
 Kistner, Caroline [7600-44]S10, [7608-03]S1
 Kita, Takashi [7597-57]S12, [7610-24]S6
 Kitamura, Kazuya [7598-32]S8
 Kitamura, Kenji 7582 ProgComm
 Kitamura, Masatoshi [7603-35]S8
 Kitamura, Naoyuki [7598-64]SPS3
 Kitano, Tsukasa [7602-58]S13
 Kittel, Sonja M. [7585-01]S1
 Kitzerow, Heinz-Siegfried 7618 ProgComm
- Kiyohara, Kosuke** [7557-36]SPS1
 Kiyohara, Motosuke [7557-36]SPS1
 Kiyotoki, Shuu [7558-14]S3
 Kizhaev, Sergey S. [7608-61]S13
Klaessens, John [7548B-42]S3, [7548G-157]S3, [7556-29]S8, [7561-24]S4, [7562-30]S7
 Klaiber, Fritz [7598-29]S7
 Klang, Pavel [7616-22]S5, [7616-62]S14
 Klapshina, Larisa G. [7599-36]S9
 Klar, Peter J. [7597-20]S5
 Klee, Doris [7548C-99]S5
 Klehr, Andreas [7616-14]S3, [7616-36]S8, [7616-55]S13
 Klein, Benjamin 7597 S12 SessChr, [7597-10]S3
Klein, Karl-Friedrich 7559 ProgComm, 7559 S SessChr, [7559-17]S, [7559-33]S, [7559-34]S
Klein, Markus 7617 ProgComm, 7617 S8 SessChr
 Klein, Sabine [7573-20]S5
 Klein, Thomas [7554-41]S7, [7554-51]S8, [7554-56]S8
 Klem, John F. [7608-59]S12, [7608-72]S14, [7616-47]S11
Kleshnin, Mikhail [7568-21]S5, [7568-46]S2
- Kley, Ernst-Bernhard 7591 ProgComm, [7591-34]S8
 Klibanov, Michael V. [7561-37]S5
 Klimachev, Yuri M. [7581-02]S1
 Klin, Olga [7608-65]S14
Kliner, Dahv A. V. 7578 S6 SessChr, 7580 ProgComm, 7580 S4 SessChr, 7582 S1 SessChr
 Kling, Rainer [7589-38]S5, [7589-38]S9, [7590-05]S1
 Klinger, Antje [7568-82]S4
 Klingshirn, Claus F. [7597-40]S9
 Klipstein, Philip C. 7608 S17 SessChr, [7608-65]S14
 Klocke, Fritz [7590-10]S2
 Kloetzer, Sascha [7589-50]SPS2
 Klop, Martin [7548C-91]S4
 Klos, Thomas [7583-54]SPS2
 Klotzbach, Udo 7585 ProgComm
Klotzbücher, Thomas 7585 ProgComm, [7585-11]S3, [7585-21]S5
Klug, Ulrich [7589-38]S5, [7589-38]S9, [7590-05]S1
 Klumel, Genady [7583-11]S3
 Klyen, Blake R. [7554-25]S4
 Knall, Florian [7610-18]S4
Knappe, Ralf [7585-16]S4
 Kneissl, Michael [7602-39]S8, 7616 ProgComm, 7616 S4 SessChr
 Knels, Lilla [7554-85]SPS1
Kner, Peter A. [7570-05]S1
 Kniffin, Gabriel P. [7601-07]S2
 Knigge, Steffen [7583-22]S5
 Knight, Ian [7578-37]S9
 Knight, Jonathan C. [7568-75]S2
 Knight, Martin M. [7569-108]SPS1
 Knights, A. P. [7606-04]S1, 7606 ProgComm, 7606 S1 SessChr, 7606 S2 SessChr, [7606-16]S5, [7606-44]SPS3, [7606-55]SPS3, [7606-56]SPS3
Knize, Randall J. [7581-14]S4
 Knorr, Andreas 7597 S5 SessChr, [7597-63]S14
Knudsen, Bodo E. 7548B ProgComm, 7548B S3 SessChr, 7548B S5 SessChr, [7548B-52]S5, [7548B-55]S5, [7548B-56]S5
 Knutson, Jay [7569-68]S9
 Ko, Chang-Yong [7548F-146]S2
 Ko, Chun-Te [7548D-115]S3
 Ko, Hang Ju [7603-65]SPS3, [7608-51]S11, [7610-36]SPS3
Kobat, Demirhan [7569-92]SPS1
 Kobayashi, Ataru [7582-22]S5, [7586-19]S4, [7586-21]SPS2, [7603-60]SPS3
 Kobayashi, Hisataka 7576 ProgComm, 7576 S4 SessChr, 7576 S12 SessChr, [7576-03]S1, [7576-09]S3, [7576-54]SPS1, [7576-60]SPS1, [7576-74]S6
 Kobayashi, Junya 7599 ProgComm
Kobayashi, Katsuhiko 7550 ProgComm, 7550 S4 SessChr
 Kobayashi, Shunsuke 7618 ProgComm
 Kobayashi, Yoshio [7585-22]S5
 Kobelke, Jens [7598-15]S4
 Koberling, Felix [7568-87]S6, [7569-26]S4, [7569-32]S5, [7569-82]SPS1, [7569-106]SPS1, [7569-107]SPS1, 7571 S7 SessChr, 7571 S5 SessChr, [7571-08]S2, [7571-13]S4, [7571-39]SPS1
 Kobler, James [7548C-98]S5
Kobtsev, Sergey M. [7578-86]SPS2, [7580-74]SPS2, [7580-79]SPS2
 Kocaman, Serdar [7605-15]S6, [7609-11]S3
- Kocaoglu, Omer P. [7550-23]S4, [7550-26]S5, [7550-37]S7
 Kocaoglu, Omer P. [7550-42]S9
Koch, Edmund [7554-05]S1, [7554-83]S12, [7554-85]SPS1, [7554-95]SPS1, [7560-10]S3
 Koch, Joachim [7586-11]S3
 Koch, Jürgen [7584-20]S7, [7584-20]S11
 Koch, Martin [7597-20]S5, [7597-25]S6
 Koch, Peter [7548C-75]S1, [7554-48]S7, [7554-111]SPS1
 Koch, Steffen [7560-06]S2, [7566-06]S2
 Koch, Stephan W. [7578-35]S9, [7582-32]S7, 7597 ProgComm, 7597 S10 SessChr, [7597-19]S4, [7597-20]S5, [7597-24]S6, [7597-25]S6, [7597-65]S14, 7600 S5 SessChr, [7600-10]S3, [7600-14]S4, [7600-55]S13
Kochergin, Vladimir [7604-49]SPS3
 Kochetov, Igor V. [7581-02]S1
 Kodymová, Jarmila 7581 ProgComm
 Koechlin, Manuel P. [7599-58]SPS3, [7604-29]S6
 Koeffler, Phillip [7555-53]SPS1
 Koehler, Martin J. [7554-90]SPS1
 Koehler, Wolfgang [7581-08]S2, [7582-10]S3
 Koenderink, A. Femius [7600-37]S9, [7617-32]S6
 Koenig, Anne [7557-06]S2
 Koenig, Harald [7583-28]S6
 Koenig, Marcelle [7571-08]S2, [7571-13]S4
 Koenaard, Paul M. [7610-09]S3
 Koester, Reinhard [7564-62]S9
 Koesters, Arnd [7583-28]S6
 Koeth, Johannes [7583-26]S6
 Koga, Taito [7609-34]S8, [7609-63]SPS3
 Kogo, Reiri [7618-33]S9
 Koh, Dalkwon [7548E-129]S2
 Koh, Gim-Hong [7615-02]S1
Koh, Joohyun [7613-04]S1
Koh, Kevin [7555-08]S2, [7556-01]S1
 Kohda, Makoto [7600-46]S11
 Kohjiro, Satoshi [7601-12]S3
 Kohl, Andreas [7583-40]SPS2
 Kohlenberg, Elicia [7548D-115]S3
 Kohler, Oto [7559-05]S
 Kohler, Robert [7585-23]S5
 Köhler, Bernd [7583-14]S3
 Köhler, Florestan [7591-26]S6
 Köhler, Gunnar [7580-107]SPS2
 Köhler, Klaus [7578-32]S8, [7608-08]S2, [7617-21]S4, [7617-54]S11
 Kohn, David H. [7548F-142]S1
 Kohn, Rudolph N. [7596-09]S3
 Koike, Yasuhiro 7599 S3 SessChr, [7599-01]S1, [7599-02]S1, [7599-28]S7
 Koinzer, Stefan [7550-05]S1
 Kojima, Osamu [7597-57]S12, [7610-24]S6
 Kok, Pieter [7611-01]S1
 Kokenyesi, Sandor J. [7598-53]SPS3
 Kokki, Teemu [7580-41]S10
 Kokoska, Mimi S. [7565-09]S3
 Kokotov, Michael [7574-22]S4
 Kokotov, Sofia [7574-22]S4
 Koktysh, Dmitry S. [7574-19]S4
 Kolb, Johanna [7615-15]S4
 Kolbitsch, Christoph [7550-51]S10
 Koleske, Daniel D. [7617-17]S4
 Kolios, Michael C. [7564-36]S5, [7564-46]S7, [7564-58]S8
 Kolker, Dmitry B. [7582-13]S4

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Kolle, Mathias [7591-16]S4, [7609-05]S2
Kolleck, Christian [7578-03]S1
Kollias, Nikiforos 7548A Chr, 7548A S SessChr, [7548A-09]S, [7548A-17]S, [7548A-22]S, [7548A-24]S
Kolosov, Valeriy V. [7588-20]S4
Komaki, Shozo [7620-15]SPS3
Komashko, Aleksey M. [7581-15]S4, [7581-16]S4
Komissarov, Alexey [7583-09]S2
Konczewicz, Leszek [7608-64]S14
Kondo, Hayato [7610-12]S3
Kondo, Toshiyuki [7602-58]S13
Kondru, Clement [7567-05]S2
Konegger, Thomas [7554-57]S9
Kong, Chae-Ryon [7562-03]S1
Kong, Chang-Hyeng [7605-29]SPS3
Kong, Fanting [7564-33]S5
Kong, Linghua [7557-13]S3, [7560-27]SPS1
Kong, Siu-Kai [7565-14]S4
König, Karsten [7548A-05]S, [7548A-10]S, [7554-90]SPS1, [7555-16]S4, [7555-54]SPS1, [7564-92]SPS1, [7568-48]S1, 7569 Chr, 7569 S9 SessChr, [7569-36]S6, [7569-37]S6, [7569-43]S6, [7584-19]S7, [7584-19]S11, [7589-05]S2
Konno, Mikio [7585-22]S5
Kono, Junichiro [7600-03]S1
Konrad, Peter [7548G-159]S4, [7548G-160]S4
Kontinen, Janne [7578-27]S7
Koo, David [7554-16]S3
Kopeika, Norman S. [7588-07]S2
Koplow, Jeffrey P. [7580-10]S2, [7580-97]SPS2
Koponen, Joonas J. [7580-41]S10, [7580-97]SPS2
Kopp, Christophe H. [7606-42]SPS3
Koranda, Petr [7549-08]S1, [7559-05]S, [7578-76]SPS2
Korbelik, Mladen [7548A-16]S, 7565 ProgComm, 7565 S1 SessChr, [7565-01]S1
Korkusinski, Marek [7608-88]S19
Kornis, János [7619-13]S3
Korobov, Vladimir [7617-38]S7
Koroll, Hagen [7572-08]S2
Korotkova, Olga [7579-24]S6, 7588 Chr, 7588 S1 SessChr, 7588 S4 SessChr, 7588 S3 SessChr, 7588 S2 SessChr, [7588-15]S3, [7588-22]S4, [7588-23]S4, [7588-29]SPS2
Korovin, Alexander V. [7589-43]S8, [7589-43]S12
Korpjärvi, Ville-Markus [7578-36]S9
Korterk, Jeroen P. [7569-14]S2
Kortshagen, Uwe R. [7617-50]S10
Korytin, Alexey Ivanovich [7599-36]S9
Kosaka, Nobuyuki [7576-03]S1, [7576-09]S3, [7576-60]SPS1
Kosiankowski, Dirk [7621-14]S4
Kosolapov, Alexey F. [7580-43]S10
Kostecki, Jerzy [7584-29]S10
Köster, Niko S. [7600-10]S3
Kosterev, Anatoliy A. [7608-12]S3, [7608-14]S3
Kostner, Gerhard M. [7569-37]S6, [7568-48]S1
Kostuk, Raymond K. 7619 Chr
Kotob-Yahfoufi, Maya [7555-28]S6
Kotov, Vladimir [7597-35]S8, [7597-38]S8
Koudelka, Petr [7597-70]SPS3
Koudsi, Badia [7618-06]S2
Koujelev, Alexander Sergeevich [7587-06]S2
Koukourakis, Nektarios [7597-18]S4
Koulen, Peter [7572-13]S3
Koullick, Ed 7548B ProgComm, 7548B S4 SessChr, 7548B S2 SessChr, 7548B S7 SessChr, [7548B-47]S4
Kouta, Hikaru [7607-07]S2
Kouvetakis, John [7606-58]SPS3
Kovalik, Joseph M. 7587 S3 SessChr, [7587-02]S1, [7587-10]S2, [7587-11]S2, [7587-16]S3, [7587-34]S5
Kovalski, Joanna [7564-05]S1
Kovanis, Vassilios [7597-47]S10, [7616-06]S2, [7616-15]S3, 7597 ProgComm, 7597 S4 SessChr
Kovsh, Alexey R. [7607-31]S8
Kowalczyk, Andrzej A. [7550-16]S3, [7550-18]S4, [7550-70]SPS1, [7554-37]S6, [7554-39]S6, [7554-74]S11
Kowalski, Benjamin A. [7591-01]S1
Kowpak, Thomas [7555-27]S10
Kox, Marianne [7569-13]S2
Koyama, Fumio 7615 ProgComm
Koyama, Yoshinori [7576-60]SPS1
Koyama, Yoshisada [7587-12]S2
Kozak, Dmitry A. [7594-33]S9
Kozaki, Shogo [7619-26]SPS3
Kozlov, Vladimir G. [7582-33]S7, [7601-15]S3
Kozub, John A. [7550-33]S6
Kozuma, Ken [7548D-110]S2
Krabbe, Joshua D. [7609-39]S9
Kracht, Dietmar [7578-03]S1, [7580-88]SPS2
Kraemer, Benedikt [7569-32]S5, [7571-13]S4
Krafft, Christoph [7560-26]S1
Kraft, Jochen [7605-09]S3
Kraft, Marcel [7548C-76]S2, [7548C-178]S2
Kraft, Martin [7594-31]S9
Kraft, Timothy W. [7554-15]S3
Krainak, Michael [7578-01]S1, [7578-08]S2, [7582-19]S5, 7587 ProgComm, [7608-79]S17
Kraitl, Jens [7572-08]S2
Krakowski, Michel [7616-35]S8, [7616-50]S12, [7616-51]S12
Kramb, Kevan [7582-34]S7
Kramer, Lutz [7583-16]S4
Krämer, Benedikt [7569-26]S4
Krames, Michael R. 7617 ProgComm
Krause, Felix [7549-16]S, [7549-21]S
Krause, Volker K. [7580-107]SPS2, 7583 ProgComm, 7583 S8 SessChr, [7583-28]S6
Krauskopf, Bernd [7597-62]S13
Krauss, Thomas F. [7605-16]S6, [7606-14]S5, [7606-21]S7, [7606-40]S11, 7612 S4 SessChr, [7612-21]S6
Krebs, Frederik C. [7600-16]S4
Krebs, Olivier [7608-86]S18
Kreher, David [7599-35]S9
Kreider, Jaclynn [7548F-140]S1
Krejci, Martin [7583-44]SPS2
Krellmann, Mathias [7592-24]S5
Kremmel, Johannes [7607-21]S5
Kremser, Christian [7564-108]SPS1
Krenner, Hubert J. [7609-06]S2, [7610-18]S4
Krestnikov, Igor L. [7607-31]S8
Krieg, René [7589-21]S6
Krishna, C. Murali [7560-03]S1
Krishna, Sanjay 7590 ProgComm, [7608-68]S15
Krishnamachari, Vishnu [7569-18]S3
Krishnamoorthi, Harish [7548A-20]S, [7548F-149]S3, [7560-22]S6
Krishnamoorthy, Ashok V. [7607-01]S1, [7607-02]S1, [7607-11]S3
Kristiansen, Helge [7592-17]S3
Kröger, Maria [7550-01]S1, [7550-30]S6
Krogmeier, Jeffrey R. [7577-26]S6
Kroker, Lars [7593-10]S2
Krol, Denise M. [7584-17]S7, [7584-17]S11, 7589 ProgComm, 7589 S7 SessChr, [7589-32]S8, [7589-42]S8, [7589-42]S12
Kronast, Florian [7603-57]S5
Kronast, Wolfgang [7594-25]S7
Krost, Alois J. 7602 S2 SessChr, [7602-05]S1, [7602-48]S10
Krueger, Alexander [7550-01]S1, [7554-27]S4, [7589-12]S4
Krueger, Arnd K. 7569 ProgComm
Krueger, Ronald R. [7550-08]S2, [7550-38]S8, [7550-39]S8
Kruger, Odvania [7560-07]SPS1
Kruger, Robert A. 7564 ProgComm, 7564 S3 SessChr, [7564-04]S1, [7564-59]S9, [7564-71]S10, [7564-84]S12, [7564-116]SPS1, [7564-120]SPS1, [7564-121]SPS1
Krüger, Alexander [7548C-76]S2
Krüger, Jan [7593-10]S2
Kruizinga, Pieter [7576-51]S12
Krupke, William F. [7581-15]S4
Krutova, Irina M. [7575-34]S10
Krysa, Andrey B. [7616-38]S9
Krzewina, Leo [7568-58]S1
Krzysiek, Mariusz [7588-12]S3
Ksiazou, Viachaslau [7606-41]S11
Ku, Geng [7564-31]S5
Ku, Pei-Cheng [7597-64]S14, [7610-17]S4
Ku, Taeyun [7568-53]SPS1
Kubby, Joel A. [7594-33]S9, 7595 Chr, 7595 S4 SessChr, 7595 S3 SessChr, [7595-16]S3, 7606 Chr, 7606 S10 SessChr, 7606 S11 SessChr
Kubecek, Vaclav [7578-74]SPS2
Kubodera, Shoichi [7581-09]S2
Kuchin, Evgenij A. [7619-22]SPS3
Kuchta, Daniel [7615-23]S6
Kudielka, Klaus [7587-03]S1
Kudlick, Wieslaw A. [7571-14]S4
Kudrawiec, Robert [7610-09]S3
Kudryashov, Alexis V. 7579 Chr, 7579 S1 SessChr, [7579-03]S1, 7595 ProgComm, [7595-18]S4
Kudryashov, Igor [7578-48]S12
Kuebler, Sebastian [7572-05]S1
Kuebler, Stephen M. 7591 ProgComm
Kuech, Thomas F. [7607-17]S4, [7616-28]S7, [7616-28]S12
Kuehnelt, Michael [7582-06]S2
Kuetemeyer, Kai [7589-07]S3
Kuhlow, Berndt [7606-41]S11
Kuhn, Michael [7573-49]SPS1, [7579-12]S4
Kühn, Jonas [7570-09]S2
Kuis, Tim [7600-04]S1
Kukarin, Sergey [7580-74]SPS2, [7580-79]SPS2
Kukutsu, Naoya [7601-12]S3
Kullberg, Richard C. 7592 Chr, 7592 S4 SessChr, [7592-05]S1
Kulp, Thomas J. 7582 ProgComm
Kumagai, Hiroshi [7582-22]S5, 7586 ProgComm, [7586-19]S4, [7586-21]SPS2
Kumar, Ajith [7565-10]S3
Kumar, K. Kalyan [7560-03]S1
Kumar, Ravi [7610-35]SPS3
Kumar, Vijay [7602-13]S3
Kumavor, Patrick D. [7564-130]SPS1
Kumeda, Akio [7586-10]S3
Kumke, Michael [7576-41]S10
Kumpulainen, Tero [7590-06]S1
Kumstel, Judith [7591-20]S5
Kunagai, Hiroshi [7603-60]SPS3
Kunert, Bernardette [7578-35]S9, [7597-18]S4, [7597-25]S6, [7616-30]S7, [7616-30]S12
Kung, Andy H. [7600-31]S7
Kung, Cheng-Chih [7607-03]S1
Kung, Patrick [7617-56]SPS3
Kunik, Dario [7568-68]S3
Kunimori, Hiroo [7587-12]S2
Kunio, Mie [7562-32]S7
Kunze, Detlef [7592-24]S5
Kunzer, Michael [7617-21]S4, [7617-54]S11
Kuo, Anthony [7550-19]S4, [7554-20]S3
Kuo, Chie-Tong [7618-14]S9
Kuo, Der-Ming [7617-26]S5, [7617-27]S5
Kuo, Hao-Chung 7602 ProgComm, [7620-40]S9, [7602-72]SPS1, [7602-72]SPS3
Kuo, L. Jay [7564-08]S2
Kuo, Tsung-Rong [7548A-25]S
Kuo, Yen-Kuang [7597-74]SPS3, [7597-75]SPS3
Kuepac, Jan [7597-03]S1
Kupka, David [7568-54]S6
Küppers, Franko 7621 ProgComm, [7621-08]S3, [7621-09]S3, [7621-16]S5
Kura, Dzelal [7583-12]S3
Kura, Nobuhiru [7587-12]S2
Kurachi, Cristina [7550-76]SPS1, [7551-33]SPS1, [7555-32]S6, [7557-33]SPS1
Kurai, Satoshi [7558-14]S3
Kurata, Kazuhiko [7607-07]S2
Kurzweil, Geza [7606-31]S8
Kuribayashi, Ryosuke [7607-07]S2
Kurita, Taiichiro [7619-05]S1, [7619-34]SPS3
Kurokawa, Kazuhiro [7554-13]S3
Kuromori, Toshiki [7597-80]SPS3
Kurosaki, Ryojo [7584-07]S2
Kurt, Adnan [7598-46]S11
Kurtaliev, Eldar [7571-40]SPS1
Kurth, Martin L. [7577-45]SPS1
Kurt, Steffen [7594-32]S9
Kurti, R. Steven [7580-60]S14
Kurtz, Ronald M. [7562-43]SPS1
Kurzweg, Timothy P. [7573-16]S4
Kuschel, Lioba [7569-26]S4
Kutsumi, Hiromu [7562-26]S6
Kutyrev, Alexander S. [7594-24]S7
Kutz, J. Nathan [7580-31]S8, [7580-70]SPS2, [7580-71]SPS2, [7580-73]SPS2, [7582-39]S9, [7582-40]S9, [7600-56]S13
Kuusela, Tom [7607-39]S9
Kuwabara, Masakazu [7602-76]S11, [7602-76]SPS3
Kuwabata, Susumu [7618-16]S4
Kuzel, Petr [7600-11]S3
Kuzel, Timothy [7565-04]S2
Kuzin, Evgeny A. [7580-98]SPS2, [7582-24]S6
Kuzmin, Vladimir L. [7573-35]S8
Kuznetsov, Mark [7554-50]S8
Kuznicki, Thomas [7585-32]S12, [7585-32]S6
Kwasegroch, John [7590-29]S
Kwiatkowska, Ewa A. [7554-68]S10
Kwok, Owen C. H. [7616-51]S12
Kwon, Jin-Hyuk [7578-80]SPS2
Kwon, Kihwan [7548D-118]S4
Kwon, Oh-Jang [7598-20]S5
Kwon, O-Pil [7599-11]S3, [7599-19]S5

Index of Authors, Chairs, and Committee Members

- Kwon, Seong-Ji [7599-11]S3, [7599-19]S5
 Kwon, Sunghoon [7593-03]S1, [7609-40]S9
 Kwon, Tai Hun [7593-05]S1
 Kwon, Yong Ku [7605-27]SPS3
 Kwon, Young Jik [7548E-132]S3, [7554-72]S11
 Kwon, Young Kw K. [7618-43]SPS3
 Kwong, David N. [7607-38]S9, [7607-43]SPS3, [7609-44]S10
 Kwong, Dim-Lee [7609-11]S3
 Kwong, Nai-Hang [7600-47]S11, [7612-27]S7, [7614-12]S4
 Kwong, Raymond C. [7617-03]S1
 Kwong, Richard [7567-02]S1
 Kyriakides, Alexandros [7560-09]S2
 Kyrish, Matthew R. [7558-06]S2
- L**
- La Riviere, Patrick J. [7564-60]S9, [7564-64]S9
 LaBrake, Dwayne L. 7591 ProgComm
Lachaine, Remi [7589-08]S3
 LaComb, Ronald [7562-04]S1, [7569-47]S7
 Lacouture, Shelby [7592-19]S4, [7592-21]S4, [7593-18]S3
 Laczko, Gabor 7571 ProgComm
 Ladd, Thaddeus D. [7611-21]S5, [7611-22]S5
 Lademann, Jürgen [7551-05]S2, 7563 ProgComm, 7572 ProgComm
 Ladilina, Elena Yu. [7599-36]S9
 Ladouceur, François J. [7604-03]S1
 Lægsgaard, Jesper [7580-45]S11, [7580-68]SPS2, [7580-84]SPS2
 Lafontan, Xavier [7592-02]S1, [7592-09]S2
 Lafossas, Matthieu [7603-61]SPS3
 Lagoda, Gwen A. [7548B-46]S4, [7548G-192]S
 Lagoudakis, Konstantinos G. [7600-08]S2
 Lagoudakis, Pavlos G. [7610-02]S1
 LaHa, Michael J. [7590-29]S
 Lahn, Mattes [7569-107]SPS1
 Lahourcade, Lise [7602-15]S3, [7602-37]S8
 Lai, Benjamin [7551-16]S4
 Lai, Hsin-Yi [7564-126]SPS1
Lai, Puxiang [7564-82]S12
 Lai, Yin-Chieh [7582-11]S3, [7609-54]SPS3
 Laiho, Lily H. [7569-102]SPS1
 Laikhtman, Boris [7563-09]S2
 Laine, Romain [7570-16]S4, [7573-15]S4
 Laino, Valerio [7602-67]S15
Lakhtakia, Akhlesh 7591 ProgComm, 7591 S6 SessChr, [7591-28]S7
 Lakowicz, Joseph R. 7569 ProgComm, [7569-01]S, [7571-20]S6, 7577 Chr, 7577 S5 SessChr, 7577 S6 SessChr, [7577-20]S5, [7577-24]S5
 Lakshmana, Sudheendra [7574-20]S4, [7576-31]S8
 Lalanne, Philippe [7608-24]S5
 Lallier, Eric [7582-36]S8
 Laloë, Franck [7608-01]S
 Lalouat, Loïc [7608-29]S7, [7608-37]S8, [7609-21]S5
 Lam, Charlie V. [7595-09]S2
 Lam, Matthew [7555-01]S1
Lam, Richard B. [7564-04]S1, [7564-71]S10, [7564-84]S12
Lam, Stephen 7558 S4 SessChr, [7558-29]SPS1, [7560-21]S1
 Lam, Timothy T. [7580-27]S7
 Lam, Yeng Ming [7600-16]S4
Lam, Yin Mun E. [7580-100]SPS2
 Lamberti, Annalisa [7606-12]S4
Lambrecht, Armin 7608 ProgComm, 7608 S1 SessChr
Lamela, Horacio R. [7564-22]S4, [7597-23]S5, [7597-60]S13
 Lammert, Robert M. [7583-51]SPS2
 Lämmle, David [7594-12]S4
 Lamonier, Levenson [7569-59]S8, [7569-111]SPS1
 Lamontagne, Boris [7594-28]S8, [7606-13]S5
Lamouche, Guy [7548D-113]S2, [7548D-115]S3, [7549-04]S1, [7554-104]SPS1, [7567-17]S4
 Lampin, Jean-Francois [7608-31]S7, [7608-41]S9
 Lamprecht, Tobias [7607-19]S5, [7607-20]S5
 Lan, Lan [7561-22]S4
 Lan, Yun-Chiang [7577-03]S1, [7608-38]S8, [7608-39]S10
 Landman, Mattijs [7548G-157]S3
 Landré, Olivier [7602-36]S8
 Landry, Gary D. [7615-05]S2
Lane, Paul A. [7600-17]S4
 Lane, Pierre [7558-29]SPS1, [7561-18]S3
 Lane, Stephen [7572-16]SPS1
 Lang, Tino [7578-03]S1
Langbein, Wolfgang W. [7600-44]S10
 Lange, Christoph [7597-18]S4, [7600-10]S3
 Lange, Christoph [7621-13]S4, [7621-14]S4
 Lange, Mike [7598-37]S9
 Lange, Robert 7587 ProgComm, [7587-13]S2
 Langejürgen, Jens [7550-05]S1
 Langenbach, Eckhard [7583-12]S3
 Langer, Torsten [7578-64]S15
 Langford, Steve C. [7584-03]S1, [7586-09]S2
Langley, Derrick [7592-32]S6
 Langner, Andreas [7580-107]SPS2
 Lankeau, Eva M. [7548C-71]S5, [7548C-75]S1, [7550-03]S1, [7554-45]S7
 Lantratov, Vladimir M. [7610-20]S5
 Lanza, Gregory M. [7576-37]S9
 Lanzani, Guglielmo [7585-13]S3
 Lanzoni, Patrick [7594-26]S7, [7596-13]S3
 Lapchak, P. A. [7552-31]SPS1
 Laperle, Pierre [7580-69]SPS2, [7580-96]SPS2
 Lapointe, Jean [7594-28]S8, [7606-13]S5, [7608-88]S19
 Lapsker, Igor [7586-22]SPS2
 Large, Maryanne C. J. 7609 ProgComm
Larichev, Andrey [7550-52]S11
Larin, Kirill V. [7548D-119]S4, 7550 ProgComm, 7550 S3 SessChr, 7550 S10 SessChr, [7550-06]S2, [7550-46]S9, [7554-23]S4, [7554-75]S11, 7563 Chr, 7563 S5 SessChr, [7563-10]S2
 Larina, Irina [7554-23]S4
 Larkin, Sean [7550-17]S3
 Larque, Matthieu [7608-86]S18
 Larsen, Eivind [7548B-58]S6
 Larsen, Henning E. [7616-52]S12
 Larsen, Niels B. [7615-09]S3
Larson, Eric D. [7598-30]S7
Larson, Michael C. [7548C-90]S3
 Larson, Timothy A. [7576-24]S6
 Larsson, Anders G. [7615-04]S2
 Larsson, David [7615-09]S3
 Laruelle, François [7580-76]SPS2, [7616-34]S8
 Lashkari, Bahman [7564-144]SPS1
 Laskin, Alexander [7579-19]S5
Lasser, Theo [7550-15]S3, [7554-42]S7, [7554-77]S12, [7554-99]SPS1, [7558-18]S4, [7571-25]S7, [7571-35]S10
 Latal, Jan [7597-70]SPS3
 Latas, Sofia [7582-23]S6, [7582-41]S9
Latham, William [7578-17]S4
 Latrasse, Christine [7579-44]S11
 Latta, Daniel [7593-22]S4
 Latu-romain, Eddy [7603-61]SPS3
 Lau, Kei May 7617 ProgComm, 7617 S7 SessChr, [7617-47]S10
 Lau, Pickchung [7599-39]S10
 Laubscher, Andrea [7569-102]SPS1
 Lauer, Christian [7583-28]S6
 Laufer, Jan G. [7564-13]S3, [7564-45]S7
 Laumer, Bernhardt [7597-20]S5
 Laurand, Nicolas [7578-33]S8
 Laurell, Fredrik 7582 ProgComm
 Laurila, Marko [7580-41]S10
 Lautenschläger, Stefan [7603-04]S1
 Lauwers, Gregory Y. [7558-16]S4
 Lavigne, Arnaud [7572-12]S3
 Lavrov, Eduard [7603-18]S4
 Lawlor, Kate [7563-23]S5
Lawrence, William G. [7594-18]S5
 Lawrie, Jennifer L. [7574-19]S4
Lazarides, Anne A. [7604-46]S10
 Le, Henry [7565-07]S3
 Le, Tuan [7550-51]S10, [7578-62]S15, [7578-63]S15
 Le Coarer, Etienne P. [7604-36]S8, [7604-39]S8
 Le Gratiot, Luc [7608-86]S18
 Le Neal, Jean-François [7592-02]S1
 Le Si Dang, Daniel [7600-08]S2, [7603-61]SPS3
 Leach, Jacob H. [7602-23]S5
 Leach, Jonathan [7613-20]S6
 Leach, Kent [7566-04]S1
Leahy, Martin J. 7554 ProgComm, 7563 ProgComm, 7563 S2 SessChr, PanelModerator, [7563-02]S1, [7563-14]S3, [7563-18]S4, [7563-23]S5, [7563-32]SPS1
 Lear, Kevin L. SC053 Inst, [7559-12]S, [7559-14]S, [7559-20]S, [7598-36]S9, [7606-11]S4, 7615 ProgComm, 7615 S2 SessChr, [7615-10]S3, [7615-20]S5, [7615-24]S6
Leary, James F. [7553-06]S2, 7568 CoChr, [7568-73]S3, [7593-21]S4
 Leatherdale, Catherine A. [7617-72]S10
 Lebedenko, Elena N. [7575-34]S10
 LeBlanc, John [7577-26]S6
 Leblond, Gregory [7604-39]S8
 Lebovka, Nikolay [7613-05]S2
 Lécart, Sandrine [7569-33]S5
 Lechuga, Laura M. 7553 ProgComm, 7606 ProgComm
 Leckband, Deborah 7553 ProgComm
 Leclair, Sébastien [7567-09]S2, [7567-10]S3
 Leclerc, Troy [7588-08]S2
 Lecomte, Michel [7616-35]S8, [7616-50]S12, [7616-51]S12
 Ledderhof, Chris [7598-24]S6
 Ledenstov, Nikolai N. [7615-22]S6, [7597-27]S6
 Ledentsov, Nikolay N. 7597 ProgComm, [7597-53]S12, [7610-23]S6, [7616-54]S13
 Lederer, Falk L. [7604-12]S3
 Ledermann, Alexandra [7609-67]S1
 Ledoux-Rak, Isabelle N. [7598-25]S6, 7599 ProgComm, [7599-17]S4
 Ledwosinska, Elizabeth [7601-18]S4
 Lee, Abraham P. [7574-01]S
 Lee, Andrew [7578-72]SPS2
 Lee, Anthony [7548A-23]S, [7558-29]SPS1
 Lee, Beomsuk [7607-32]S8, [7607-38]S9, [7607-48]SPS3
 Lee, Byeong H. [7568-40]SPS1, [7556-39]SPS1, [7557-29]SPS1
 Lee, Byoung Chang [7580-105]SPS2
 Lee, Byoung-Cheol [7571-41]SPS1
Lee, Byoungho 7618 S1 SessChr, [7618-05]S2
 Lee, Byung Chul [7591-39]SPS2
 Lee, Byung Gyu [7602-66]S15, [7602-70]S11, [7602-70]SPS3
 Lee, Byung Ha [7568-76]S1
 Lee, Byung-Teak [7603-45]S10
 Lee, Cameron M. [7558-05]S2
Lee, Changho [7554-91]SPS1, [7556-12]S3
 Lee, Chao-Kuei [7600-68]SPS3, [7613-30]S8
Lee, Charles Y. C. 7599 ProgComm
Lee, Cheng-Chung [7591-38]SPS2
 Lee, Cheng-Kuang [7554-06]S1, [7554-11]S2, [7554-33]S5
 Lee, Chen-Wei [7613-30]S8
 Lee, Chia-Rong [7618-14]S9
 Lee, Chih-Hsien [7575-06]S3, [7575-22]S8
Lee, Chih-Kung [7556-25]S6, [7577-10]S3, [7618-40]SPS3
 Lee, Choon-Young [7557-31]SPS1, [7572-15]SPS1
 Lee, Chul Sung [7549-02]S1, [7549-07]S1
 Lee, Chul Sung [7549-24]S, [7549-25]S, [7549-26]S
 Lee, David A. [7569-108]SPS1
 Lee, Donghan [7606-03]S1
 Lee, Dong-Jin [7605-29]SPS3
 Lee, Dongjoo [7589-20]S6
Lee, El-Hang [7599-26]S7, 7605 Chr, 7605 S4 SessChr, 7605 S5 SessChr, 7605 S2 SessChr, [7605-17]S6, [7605-26]SPS3, [7605-27]SPS3, [7605-29]SPS3
 Lee, Eva Y. H. P. [7573-08]S2
 Lee, Geng-Yen [7602-61]S14
 Lee, H. [7572-24]SPS1, [7572-15]SPS1
 Lee, Hoo-Jeong [7603-36]S8
 Lee, Hosuk [7609-40]S9
 Lee, Howon [7609-40]S9
 Lee, Hsiang-Chieh [7554-33]S5
Lee, Hsiang-Chieh [7558-20]S4, [7570-19]S4
 Lee, Hua [7555-22]S5, [7555-39]S8
 Lee, Hual-Chuan [7582-38]S8
Lee, Hwang 7611 ProgComm, 7611 S2 SessChr, [7611-30]S7
 Lee, Hyeran [7576-12]S3, [7576-34]S9
 Lee, Hyung Seok [7554-47]S7
 Lee, Hyung-Jong [7554-55]S8
 Lee, Hyun-Hee [7599-33]S9, [7599-40]S10
 Lee, Hyun-Hee [7601-17]S4
 Lee, Hyun-Jae [7602-01]S1
 Lee, Ian [7578-07]S2
 Lee, I-Hui [7618-40]SPS3
 Lee, Jae Bum [7617-56]SPS3, [7617-57]SPS3, [7618-43]SPS3
 Lee, Jaesoong [7602-59]S13, [7602-63]S14, [7602-73]S11, [7602-73]SPS3, [7602-77]S11, [7602-77]SPS3
 Lee, Jai Hyuk [7605-28]SPS3

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Lee, Jangwoen [7555-46]S10, [7555-47]S10
Lee, Jeng-Woei [7565-08]S3
Lee, Jeongkug [7609-60]SPS3, [7609-61]SPS3
Lee, Ji Yong [7568-79]S1
Lee, Jin-Moo [7564-124]SPS1
Lee, Jiun-Haw [7618-40]SPS3
Lee, Jiunn-Yih [7618-40]SPS3
Lee, Jiyong [7575-40]SPS1
Lee, Jonathan Y. H. [7606-34]S9
Lee, Jong-Chan [7618-25]S7
Lee, Jongho [7599-52]SPS3
Lee, Jong-Lam [7599-23]S6, [7617-14]S3, [7617-66]SPS3
Lee, Joonhee [7617-60]SPS3
Lee, Ju-Han [7554-47]S7
Lee, Jung Il [7583-41]SPS2
Lee, Jung Jun [7617-57]SPS3
Lee, Jungsul [7548D-118]S4
Lee, Kangin [7578-80]SPS2
Lee, Kee-Keun 7592 ProgComm, [7592-23]S5, [7592-26]S5
Lee, Kenneth K. [7551-22]S6, [7554-35]S6, [7554-43]S7, [7589-14]S4
Lee, Kevin F. [7560-20]S3
Lee, Ki-Dong 7591 ProgComm
Lee, Kijoon [7562-44]SPS1, [7562-45]SPS1
Lee, Ko-Hsin [7604-18]S4
Lee, Kwang-Sup 7599 ProgComm, [7599 S2 SessChr, [7599 S11 SessChr, [7599-45]S12, [7599-49]SPS3, [7599-63]SPS3
Lee, Kye-Sung [7554-84]S12
Lee, Kye-Sung [7556-11]S3, [7558-26]S6, [7558-26]S2, [7569-67]S9
Lee, Michael [7555-22]S5
Lee, Michael W. [7609-37]S9
Lee, Ming-Ming [7548B-36]S1
Lee, Min-Hyuk [7607-25]S6
Lee, Patrick [7577-02]S1
Lee, S. [7554-93]SPS1
Lee, Sang Bae [7598-20]S5
Lee, Sang Nam [7617-57]SPS3, [7618-43]SPS3
Lee, Sang Shin [7579-32]S8
Lee, Sang Woo [7592-04]S1
Lee, Sang-Bong [7561-50]SPS1
Lee, Sang-Hyun [7592-04]S1
Lee, Sang-Won [7554-61]S9
Lee, Sang-Wook [7618-21]S6
Lee, Sang-Youp [7591-39]SPS2
Lee, Seogwoon [7602-01]S1
Lee, Seonkyung [7551-14]S3, [7581-03]S1, [7581-06]S1
Lee, Seung Hee 7618 ProgComm, [7600-63]S15
Lee, Seung Rag [7568-79]S1
Lee, Seungduk [7548E-129]S2
Lee, Seung-Gol [7605-29]SPS3
Lee, Seung-Jae [7593-05]S1
Lee, Seungrag [7574-07]S1, [7575-40]SPS1
Lee, Shu-Sheng [7608-54]S11
Lee, Sin-Doo 7618 S5 SessChr, [7618-21]S6
Lee, Soonil [7578-81]SPS2, [7592-28]S5
Lee, Stephanie [7548C-168]S1
Lee, Stephen R. [7617-17]S4
Lee, Sung [7594-08]S3
Lee, Sung Hyung [7599-45]S12
Lee, Sylvanus [7553-05]S2
Lee, Taejin [7571-06]S2
Lee, Tae-Kyeong [7606-49]SPS3, [7620-09]S3
Lee, Tae-Woo [7607-25]S6, [7607-47]SPS3
Lee, Tim K. [7568-02]S3
Lee, Ting-Yim [7555-35]S7
Lee, Tsung-Xian [7617-05]S2, [7617-10]S3
Lee, Wan Ho [7602-66]S15, [7602-70]S11, [7602-70]SPS3
Lee, Wei-Chi [7617-26]S5, [7617-27]S5
Lee, Woei M. [7613-29]S8
Lee, Wonho [7599-53]SPS3
Lee, Xuan-Hao [7617-65]SPS3
Lee, Yong Tak [7608-36]S8
Lee, Yong-Hee [7598-41]S10, [7601-10]S2, [7609-17]S4, 7610 ProgComm, [7610-16]S4, [7617-62]SPS3, [7618-44]SPS3
Lee, Yoo Seung [7579-32]S8
Lee, Young Jong [7569-21]S2
Lee, Yu-Hsun [7577-10]S3
Lee, Yuh Kwan Sylvanus [7553-15]S4
Lee, Yun-Shik 7582 ProgComm, [7582-32]S7
Lee Cheong Lem, Laurent [7603-17]S4
Leeder, Jamie [7569-66]S9, [7571-10]S2
Leem, Jung Woo [7608-36]S8
Leers, Michael [7583-16]S4
Lefebvre, Françoise [7567-06]S2
Lefort, James [7578-59]S14
Legare, David J. [7587-14]S3
Legeais, Jean-Marc [7550-29]S6, [7550-48]S10, [7589-02]S1
Legendre, Andrew [7595-11]S2
Leger, James R. 7579 ProgComm, [7579 S6 SessChr, [7579-15]S4
Leh, Barbara [7548E-131]S3, [7567-06]S2
Lehareinger, Yves [7554-78]S12
Lei, Chun 7615 ProgComm, 7615 S6 SessChr, [7615-03]S1, [7615-07]S2, [7615-23]S6
Lei, Danyuan [7586-05]S1
Lei, Jonathan [7578-60]S14
Lei, Tim [7551-24]S6
Leich, Martin [7580-08]S2, [7580-107]SPS2, [7598-09]S2
Leif, Robert C. [7556-38]SPS1, 7568 Chr, [7568-36]S5, [7568-91]S5
Leinonen, Pirjo [7578-27]S7
Leinonen, Tomi [7578-36]S9
Leipner, Hartmut [7586-17]S4
Leisher, Paul O. [7583-01]S1, [7583-04]S1, [7583-07]S2, [7583-13]S3, [7583-47]SPS2, [7583-48]SPS2
Leite, Elisa [7575-10]S4
Leitenstorfer, Alfred [7600-01]S, [7600-63]S15
Leitgeb, Rainer A. [7550-15]S3, [7550-51]S10, [7550-54]S11, 7554 ProgComm, 7554 S6 SessChr, [7554-42]S7, [7554-59]S9, [7554-78]S12, [7558-18]S4, [7554-37]S6
Leithem, Scott M. [7569-80]SPS1
Leitner, Raimund [7570-20]S4
LeJeune, Zorabel M. [7593-36]S7
Lek, Jun Yan [7600-16]S4
Lemaitre, Paul [7550-73]SPS1
Lemaitre, Aristide [7608-26]S6, [7608-86]S18
Lemieux, Hugo [7617-35]S7
Lemire-Renaud, Simon [7558-13]S3
Lemme, Erika [7589-07]S3
Lemor, Robert [7564-36]S5
Lempereur, Simon [7580-82]SPS2
Lemus, Avid [7621-15]S5
Lenarz, Thomas [7548C-100]S5
Lendl, Bernhard [7594-31]S9
Lenner, Miklós [7600-39]S9
Lentine, Anthony L. [7604-24]S5
Lenz, Andrea [7610-11]S3, [7610-13]S3
Lenz Cesar, Carlos [7569-58]S8, [7569-59]S8, [7569-110]SPS1, [7569-111]SPS1, [7575-04]S2, [7575-37]S11, [7610-08]S2
Lenzetti, Ivo [7550-77]SPS1
Lenzhofer, Martin [7594-20]S6
Leo, Karl [7617-39]S8, [7617-43]S8
Leon, Martin [7548D-117]S3, [7554-01]S1
Leonard, Francois [7610-28]S7
Leong, Haisheng [7577-14]S4, [7577-15]S4
Lepage, Dominic [7577-12]S4, [7586-06]S1
Lepine, Eric [7559-30]S
Leppla, Ralph 7621 ProgComm
Lermer, Matthias [7608-03]S1
Lermer, Teresa [7616-16]S4
Leroy, Frédéric [7548A-01]S
Lesaffre, Max [7564-88]SPS1
Lesage, Frederic [7573-45]SPS1
Lessard-Viger, Mathieu [7571-28]S7, [7577-22]S5, [7577-48]SPS1
Lester, Luke F. 7597 S8 SessChr, [7597-47]S10, 7610 ProgComm, 7616 S1 SessChr, [7616-06]S2, [7616-13]S3, [7616-15]S3
Letant, Sonia E. 7553 ProgComm
Letfullin, Renat R. [7548F-173]S, [7576-73]S8
Leu, Jonathan [7579-51]S3
Leuchs, Gerd [7621-08]S3
Leuenberger, Michael [7600-29]S7
Leung, Benjamin Y. [7554-34]S5
Leung, Michael K. [7554-35]S6, [7554-43]S7
Leung, Sarah J. [7577-28]S6
Leung, Terence S. [7564-107]SPS1, [7564-112]SPS1
Leunig, Andreas [7548C-174]S1
Leutenegger, Marcel [7571-34]S10, [7574-06]S1
Leuthold, Juerg [7597-56]S12, [7621-07]S2
Lev, Benjamin [7578-86]SPS2
Levchenko, Andrey E. [7580-43]S10
Levecq, Xavier [7568-90]S3, [7570-32]S7
Levendag, P. C. [7548C-181]S5
Levene, Adam [7561-07]S1
Levene, Michael J. [7555-36]S7, [7555-50]S10, [7569-63]S9, [7569-90]SPS1, [7589-24]S6
Levenson, Richard M. [7561-16]S3
Leveque-Fort, Sandrine [7569-33]S5, [7570-36]S7, [7571-38]S10, [7577-27]S6
Lever, Leon J. [7606-24]S7, [7616-26]S6
Levermore, Peter [7617-03]S1
Lévesque, Daniel [7554-104]SPS1
Levi, Marinella [7589-29]S7
Levi, Moran [7608-85]S18
Levi, Ofer SC461 Inst, SC309 Inst, [7548G-155]S2, [7553-25]SPS1, [7615-12]S3
Levi, Uriel 7612 S8 SessChr, [7612-31]S8
Levina, Larissa [7600-07]S2
Levis, Robert J. [7568-52]S3, [7570-27]S5, [7582-12]S3, [7582-21]S5
Levituss, Marcia [7576-45]S11
Levitz, David [7554-28]S4, [7566-12]S3
Levy, Carol [7589-11]S4
Levy, David [7598-03]S1
Levy, François [7603-61]SPS3
Levy, Hart [7548G-155]S2
Levy, Moshe [7583-50]SPS2
Levy, Uriel 7591 ProgComm
Lew, Matthew D. [7571-33]S10
Lewicki, Rafal [7608-12]S3, [7608-14]S3
Lewis, Aaron [7561-20]S3, [7568-43]S6, [7574-22]S4, [7589-11]S4, [7591-30]S7
Lewis, David [7568-43]S6, [7574-22]S4
Lewis-Clark, Eric [7560-23]S4, [7560-24]S6
Lexau, Jon [7607-02]S1
Leyden, Jan [7573-25]S6
Leyrat, Anne [7568-02]S3
Leznoff, D. B. [7593-42]SPS2
Li, A. [7578-34]S8
Li, Aizhen 7608 ProgComm, 7608 S19 SessChr
Li, Ben [7602-43]S9
Li, Bo [7583-42]SPS2
Li, Buhong [7565-13]S4
Li, Changhui [7564-18]S3, [7564-78]S11
Li, Chenxi [7563-20]SPS1, [7572-17]SPS1
Li, Chia-Yeh [7614-10]S3, [7614-13]S4
Li, Chuanqing [7569-46]S6
Li, Dachao [7572-25]SPS1
Li, Daijun [7578-23]S5, [7578-71]S16
Li, Daming [7583-01]S1, [7583-04]S1
Li, Dong [7568-33]S1, [7569-76]S9
Li, Feng [7591-23]S6
Li, Feng-Chieh [7561-38]S5, [7569-75]SPS1
Li, Guoliang [7607-02]S1, [7607-11]S3
Li, Guoqiang [7550-82]SPS1
Li, Hanqing [7579-51]S3
Li, Heng [7581-22]SPS2
Li, Hongbo [7579-18]S5
Li, Hui [7554-112]SPS1
Li, Hui [7565-23]SPS1
Li, Hui [7568-32]SPS1
Li, Jialin [7549-04]S1
Li, Jian Jian [7564-54]S8
Li, Jianjun [7561-04]S1
Li, Jianqing [7575-48]S10
Li, Jianzhao [7584-06]S2, [7589-31]S8, [7589-34]S8
Li, Jiao [7557-23]SPS1
Li, Jingjing [7574-23]S4, [7577-05]S2, [7591-25]S6
Li, Jiong-Juan [7618-36]S10
Li, Kang [7578-37]S9
Li, Ken [7598-37]S9
Li, Kun [7584-32]S11, [7590-07]S1
Li, Lei [7583-42]SPS2
Li, Li [7550-62]SPS1, [7564-70]S10
Li, Li [7564-125]SPS1
Li, Li [7598-71]SPS3
Li, Linghui [7603-43]S10, [7603-58]SPS3
Li, Linjie [7591-03]S1
Li, Mary J. [7594-24]S7
Li, Meng-Lin [7564-100]SPS1, [7564-102]SPS1, [7564-104]SPS1, [7564-126]SPS1
Li, Ming-Jun [7569-69]S9
Li, Ming-Shian [7618-34]S9
Li, Mingyuan [7597-26]S6
Li, Na [7576-24]S6
Li, Neinyi [7615-03]S1, [7615-07]S2, [7615-23]S6
Li, Pai-Chi 7564 ProgComm, 7564 S6 SessChr, [7564-08]S2, [7564-10]S2, [7564-16]S3, [7564-63]S9
Li, Qian [7555-51]S10
Li, Rui [7564-109]SPS1
Li, Rui [7601-20]S4
Li, Shuqin [7561-04]S1
Li, Simon [7597-55]S12
Li, Steven X. [7578-08]S2, [7578-09]S2, [7582-19]S5

Index of Authors, Chairs, and Committee Members

- Li, Ti [7602-44]S9
 Li, Ting [7548E-128]S2
 Li, Tsung-Hsian [7569-54]S8, [7569-73]SPS1
 Li, Wang-Yang [7618-36]S10
 Li, Wen Jung [7565-14]S4
 Li, Xiangyou [7584-34]S11
 Li, Xiankai [7562-28]S7
 Li, Xiao [7550-60]SPS1
Li, Xiao-Hang [7597-17]S4, [7602-52]S12, [7617-16]S3
 Li, Xiaocin [7600-29]S7
 Li, Xiaosong [7565-05]S2, [7565-07]S3, [7565-16]S4
 Li, Xiao-Yun [7606-43]SPS3
 Li, Xing [7602-23]S5, [7602-59]S13, [7602-63]S14, [7602-73]S11, [7602-73]SPS3, [7602-77]S11, [7602-77]SPS3, [7602-79]S4
 Li, Xingde 7554 ProgComm, [7554-12]S2, [7558-11]S3, [7569-69]S9, [7569-86]SPS1, [7574-03]S1, [7576-50]S12, [7577-23]S5
 Li, Xiuling [7608-34]S8
 Li, Xu [7554-26]S4
Li, Xun [7598-19]S5, [7604-43]S10
 Li, Yan [7565-12]S4
 Li, Yan [7608-21]S5
 Li, Yan [7616-06]S2, [7616-13]S3
 Li, Yang-Guo [7548E-139]S4, [7550-13]S3
 Li, Yingxin [7548B-59]S6, [7549-10]S2
 Li, Yulong [7575-23]S8
 Li, Yunhui [7606-10]S4, [7606-13]S5
 Li, Zhanming S. [7602-42]S9
 Li, Zhi [7598-33]S8
 Li, Zhifang [7554-112]SPS1
 Li, Zhiqiang [7597-55]S12
Li, Zhiyong [7574-23]S4, [7577-05]S2, [7591-25]S6
 Li, Zhi-Yuan [7564-111]SPS1
 Lian, Zheng G. [7604-30]S7
Liang, Baolai [7610-10]S3, [7610-26]S6, [7610-30]S7
 Liang, Di [7616-29]S7, [7616-29]S12
 Liang, Hong [7607-03]S1
 Liang, Jinyang [7596-09]S3
 Liang, Julian [7566-14]S3
Liang, Rongguang 7556 Chr, 7556 S1 SessChr, SC868 Inst
 Liang, Song [7604-20]S4
 Liang, Ting-Wei [7617-46]S9
 Liao, Anna [7594-27]S8
 Liao, Che-Hao [7602-08]S2, [7602-60]S14, [7617-30]S6
 Liao, Chien Sheng [7569-71]SPS1
Liao, Kuo-Chih [7555-53]SPS1
 Liao, Lun-De [7564-126]SPS1
 Liao, Shirong [7607-03]S1
 Liao, Yitao [7608-21]S5
 Liaw, Lih-Huei L. [7554-72]S11
Liaw, Sien-Kuei [7582-11]S3
 Liberale, F. [7548B-62]S7
 Libertino, Sebania [7598-34]S8, 7606 ProgComm, [7606-05]S2
Lichtenstein, Norbert [7583-21]S5, [7583-25]S5, [7583-44]SPS2, [7616-56]S13
 Lichtner, Mark [7583-37]S8
 Lie, Donald [7593-29]S6
Liebert, Adam PanelMember, [7563-16]S3
 Liebich, Sven [7597-18]S4, [7616-30]S7, [7616-30]S12
 Liebig, Thomas [7579-17]S4, [7579-22]S6
 Liebmann, Erica R. [7558-09]S2
 Liem, Andreas [7583-08]S2
 Lienau, Christoph [7600-34]S8
 Liermann, Erik [7583-16]S4
 Liero, Armin [7616-14]S3, [7616-55]S13
Lifante, Gines [7604-13]S3
 Ligat, B. [7616-34]S8
 Ligeret, Vincent [7616-35]S8
 Lighazan, Rodica [7549-03]S1, [7554-88]SPS1
 Light, Philip S. [7609-33]S8
 Light, Roger A. [7570-30]S6, [7577-17]S4
Ligler, Frances S. 7553 ProgComm, [7553-07]S2
 Likar, Bostjan [7556-17]S4, [7556-16]S4, [7556-40]SPS1
 Lilge, Lothar [7551-16]S4, [7575-32]S10
 Lim, Amanda [7548C-85]S3
 Lim, Daniel V. 7553 ProgComm
 Lim, Hubert H. [7548C-100]S5
 Lim, Hyungsik [7569-65]S9
 Lim, Junhyung [7603-36]S8
 Lim, Mark D. [7568-03]S2
 Lim, S. H. [7572-24]SPS1
 Lim, S. [7603-34]S8
 Lim, Sang-Hyun [7569-08]S1
 Lim, Soo Hee [7572-15]SPS1
 Lim, Sun Hee [7575-44]S8
 Lim, Wantae [7603-38]S9
Lim, Yi Heng [7554-58]S9, [7550-24]S5
 Lim, Youbong [7574-32]SPS1
 Lima, Adriana R. [7588-13]S3
 Lima, Juliana P. M. L. [7549-17]S
 Lima, Karmel O. [7598-48]S1
 Limpert, Jens [7578-58]S14, [7580-13]S3, [7580-30]S8, [7580-32]S8, [7580-34]S8, [7580-46]S11, [7580-49]S11, [7580-55]S13, [7580-57]S13, [7580-64]S15, [7580-85]SPS2, [7580-90]SPS2, [7580-91]SPS2
 Lin, Alice [7548G-19]S
 Lin, An [7568-11]S2
 Lin, Andrew [7610-30]S7
 Lin, Anthony T. [7610-10]S3
Lin, Bevin [7561-02]S1
 Lin, Carter [7611-23]S5
 Lin, Changgui [7598-01]S1
Lin, Chang-Yi [7616-06]S2, [7616-13]S3
Lin, Charles P. [7550-45]S9, 7568 ProgComm, [7569-46]S6, [7576-07]S2
 Lin, Cheng-An J. [7575-06]S3, [7575-22]S8, [7576-38]S9
 Lin, Cheng-Hsiang [7585-17]S4
 Lin, Cheng-Hung [7602-08]S2, [7602-60]S14, [7609-18]S4, [7617-30]S6
Lin, Che-Yun [7607-32]S8, [7607-38]S9, [7607-48]SPS3
 Lin, Chih-Lang [7591-36]SPS2
 Lin, Chun [7617-03]S1
 Lin, Dejiao [7580-06]S1
 Lin, Ding-Zheng [7608-54]S11
 Lin, Fang-Zheng [7604-19]S4
 Lin, Franck [7576-72]SPS1
 Lin, Hsing-Ying [7577-03]S1, [7608-38]S8, [7608-39]S10
Lin, Huiyun [7565-13]S4
 Lin, Hung-Cheng [7602-54]S12, [7602-61]S14
 Lin, Ja-Hon [7582-11]S3
 Lin, Jian [7569-61]S9, [7569-126]SPS1
 Lin, Jian Hung [7618-13]S3
Lin, Jingyu [7598-44]S10, [7602-34]S7, [7602-62]S14, [7608-52]S11
Lin, Jiunn-Yuan [7600-43]S10
 Lin, Jui-teng [7562-27]S6, [7574-09]S1
 Lin, Kuang-I [7600-24]S5
 Lin, Lian-Yu [7554-06]S1
 Lin, Ming-Chieh [7609-45]S10
 Lin, Ping-Hsun [7600-43]S10
 Lin, Ray-Ming [7602-10]S2, [7602-57]S13
 Lin, Robert H. [7594-27]S8
 Lin, S. [7618-14]S9
 Lin, Shangxin [7598-02]S1
 Lin, Shawn-Yu 7609 Chr
 Lin, Sung-Jan [7548A-25]S, [7552-08]S2, [7561-38]S5, [7569-52]S7, [7569-54]S8, [7569-73]SPS1
 Lin, Wang [7553-26]SPS1
 Lin, Wei-Chiang [7548E-136]S4, [7556-20]S5
 Lin, Wei-Chou [7561-38]S5
 Lin, Wei-Hung [7598-43]S10
 Lin, Weiping [7599-22]S6
 Lin, Wen-Yu [7617-53]S11
 Lin, X. [7560-25]S4
 Lin, Yi-Chun [7575-22]S8
 Lin, Yi-Hsin [7618-36]S10
 Lin, Yongbin [7577-14]S4
 Lin, Yo-Wei [7555-24]S5
 Lin, Yunkun [7609-26]S6
Lin, Yu-Cheng 7593 ProgComm
 Lin, Yu-Chieh [7556-25]S6, [7613-01]S1
 Lin, Yuehe 7593 ProgComm, [7593-25]S5
Lin, Yuting [7557-07]S2
 Lin, Ziliang [7611-27]S6
 Linask, Kersti K. [7554-21]S4
 Lincoln, Victor A. C. [7550-78]SPS1
 Lindahl, Jennifer [7578-59]S14
 Lindberg, Hans [7582-06]S2
Linden, Kurt J. SC448 Inst, SC747 Inst, 7583 ProgComm, 7583 S7 SessChr, 7583 S6 SessChr, 7617 ProgComm
 Linden, Stefan [7586-14]S3
 Linder, Norbert 7597 ProgComm, 7597 S3 SessChr, [7597-54]S12, 7617 CoChr, 7617 S2 SessChr
 Lindquist, Robert [7577-14]S4, [7577-15]S4
 Lindsay, S. M. [7561-32]S5
 Lindvold, L. R. [7559-37]S
 Linfield, Edmund H. [7616-26]S6
 Ling, Dongxiong [7579-10]S2
 Ling, Shih-Chun [7602-72]S11, [7602-72]SPS3
 Ling, Tao [7564-08]S2, [7564-89]SPS1, [7564-96]SPS1, [7564-97]SPS1
 Ling, Yunfeng [7559-16]S, [7574-17]S3
Ling, Yuting [7557-09]S3
 Lingamallu, Giribabu [7599-59]SPS3
 Lingle, Robert [7621-18]S5, [7621-20]S6
 Linskey, Mark E. [7548E-137]S4
 Linzon, Yoav [7600-57]S13
 Liong, Monty [7576-17]S5
 Liou, Bo-Ting [7602-68]S11, [7602-68]SPS3
 Liou, Jia-Hong [7609-56]SPS3
 Lippens, Didier [7609-21]S5
 Lippert, Thomas K. M. 7586 ProgComm, 7586 S3 SessChr, [7586-11]S3
 Lippitz, Markus [7600-20]S5
 Lipski, Frank [7602-24]S6
 Lipson, Jerold [7587-28]S4
 Lipson, Michal F. [7605-08]S3, [7612-23]S6
 Liptak, Richard W. [7617-50]S10
 Lira, Rafael [7575-24]S8
 Lis, Dan [7582-15]S4
 Lisboa, Marcio V. [7549-15]S2
 Liscidini, Marco [7553-21]S6, [7591-07]S2, [7608-30]S7
 Lison, Frank [7597-50]S11
 Litchiniter, Natalia M. [7574-15]S3
Litorja, Maritoni [7567-15]S4, [7596-03]S1, [7596-06]S2
 Litovsky, Silvio H. [7564-09]S2
 Litschauer, Marco [7554-57]S9
 Litton, Cole W. 7602 CoChr, 7602 S3 SessChr, 7603 Chr, 7603 S4 SessChr
 Litvinenko, Konstantin [7606-15]S5
 Litvinov, Dimitri [7597-65]S14
 Liu, Bangzhi [7610-29]S7
 Liu, Baoxu [7576-48]S11
 Liu, Bin [7602-12]S3
 Liu, Bing [7590-01]S1
 Liu, Bo [7564-54]S8, [7564-59]S9, [7564-120]SPS1, [7564-121]SPS1
 Liu, Bo [7583-34]S8
Liu, Boyang [7599-18]S5
 Liu, Cheng [7621-20]S6
 Liu, Cheng-Hui [7561-41]SPS1
 Liu, Chengyi 7617 S4 SessChr, [7617-09]S2, [7617-12]S3, [7617-15]S3, [7617-20]S4, [7617-25]S5, [7617-51]S10
 Liu, Chien-Min [7617-53]S11
 Liu, Fanguang [7565-16]S4
 Liu, Fei [7576-08]S2, [7576-52]SPS1
 Liu, Frankie [7607-02]S1
 Liu, Fuhan [7557-13]S3, [7560-27]SPS1
Liu, Gangjun [7548C-167]S2, [7548E-123]S1, [7554-07]S2, [7554-53]S8, [7554-102]SPS1, [7569-83]SPS1, [7569-130]SPS1
 Liu, Guangda [7565-12]S4
Liu, Guangyu [7597-58]S12, [7602-29]S6, [7602-52]S12, [7617-33]S6
 Liu, H. C. [7587-27]S4
 Liu, Hao-Li [7564-104]SPS1
 Liu, Henry C. [7569-87]SPS1
Liu, Hong 7563 ProgComm, [7563-04]S1, [7565-07]S3
 Liu, Hsin-Hao [7617-05]S2
 Liu, Hsueh-Hsiung [7602-54]S12, [7602-61]S14
 Liu, Hui Chun 7616 ProgComm, 7616 S5 SessChr, [7616-25]S6
 Liu, Huiyong [7602-79]S4
 Liu, J. [7618-14]S9
 Liu, Jianping [7602-44]S9
 Liu, Jihong [7609-52]S11
Liu, Jing [7604-38]S8
Liu, Jingjing [7554-81]S12, [7573-32]S8
 Liu, Jin-Hui [7609-57]SPS3
 Liu, Jonathan J. [7550-43]S9, [7550-56]S11
 Liu, Jonathan [7558-22]S5, [7558-22]S1, [7560-19]S1, [7567-04]S1, [7558-23]S5, [7558-23]S1
 Liu, Jui-Hsiang [7618-34]S9
 Liu, Jun [7599-18]S5
 Liu, Junhai [7578-77]SPS2
 Liu, Lei [7548E-139]S4
 Liu, Lei [7565-20]SPS1, [7565-22]SPS1
 Liu, Lina [7565-13]S4
 Liu, Linbo [7548C-77]S2, [7548C-79]S2, [7554-04]S1
 Liu, Mengyang [7564-103]SPS1
 Liu, Po-Chun [7602-74]S11, [7602-74]SPS3
 Liu, Po-Tsun [7603-39]S9
 Liu, Qian Huo [7577-15]S4
Liu, Quan [7561-04]S1, [7561-05]S1
 Liu, Rong [7572-26]SPS1
Liu, Rui [7555-44]S9
 Liu, S. C. [7578-34]S8
 Liu, Sean [7597-76]S8
 Liu, Shangjing [7617-54]S11

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Liu, Shin-Cheng [7600-68]SPS3
Liu, Thomas [7583-51]SPS2
Liu, Ting-Chun [7602-40]S9
Liu, Tzu-Ming [7569-51]S7
Liu, Victor [7553-25]SPS1
Liu, Weihua [7617-48]S10
Liu, Xiaomin [7580-68]SPS2
Liu, Xinbing 7585 ProgComm
Liu, Xinyu [7600-28]S6
Liu, Xiuli [7548G-165]SPS1
Liu, Xuan [7550-02]S1
Liu, Yang [7604-20]S4
Liu, YaZhao [7607-38]S9
Liu, Yisi [7608-47]S10
Liu, Yuan [7564-83]S12, [7564-117] SPS1
Liu, YuanZhi [7619-21]S4
Liu, Yun [7583-34]S8
Liu, Yu-San [7571-02]S1
Liu, Zhao [7587-17]S3, [7619-11]S3
Liu, Zhaojun [7581-10]S3
Liu, Zhaorui [7600-69]SPS3
Liu, Zhuang [7560-17]S5, [7574-05] S1, [7575-31]S10
Live, Ludovic Saiveng [7577-07]S3
Livingston, Edward [7596-01]S1, [7596-03]S1
Livshits, Daniil A. [7607-31]S8
Lizon, David C. [7588-10]S2
Llopis, Olivier [7579-43]S11
Llorens, J. M. [7610-09]S3
Lloyd, Harriet O. [7564-33]S5
Lloyd, Seth 7611 ProgComm
Lloyd, William [7555-02]S1
Lo, Eng H. [7569-91]SPS1
Lo, Kuang Yao [7618-14]S9
Lo, Ming-Hua [7602-69]S11, [7602-69] SPS3
Lo, Wen [7548A-25]S, [7550-58] SPS1, [7550-64]SPS1
Lo, Yi-Chien [7617-65]SPS3
Lo, Yuhua [7591-05]S2, [7605-12]S4, [7608-47]S10, [7608-87]S19
Lobad, Ahmad [7578-17]S4, [7580-93] SPS2
Lobanov, Sergei [7582-13]S4
Lobo Ribeiro, António B. [7580-23] S6
Loccioni, Claudio [7556-23]S6
Lochhead, Michael J. [7572-11]S3
Lochmann, Anatol [7610-15]S4
Lock, Tycho M. T. W. [7548B-60]S6
Lockett, Stephen [7568-27]S5
Lockett, Cosmin [7549-22]S5
Lodo, Stefano [7570-42]SPS1
Loeb, Gerald [7555-53]SPS1
Loeber, David A. S. [7582-04]S2
Loechel, Bernd [7609-09]S3
Loeschner, Udo [7589-39]S5, [7589-39]S9
Loewke, Kevin [7558-22]S5, [7558-22] S1
Loewke, Nathan O. [7558-23]S5, [7558-23]S1
Logunov, Stephan L. [7584-27]S10
Loh, William [7616-33]S8
Löhmansröben, Hans-Gerd [7572-12]S3, [7575-14]S5
Loiacono, Renzo [7606-14]S5
Loison, Claire [7569-57]S8, [7599-13] S3
Løke, Trond [7561-30]S4
Lomakin, Vitaliy [7606-19]S6
Loman, Anastasia [7571-17]S5
Lombardi, Wellington [7551-33]SPS1
Lombardo, Salvatore A. [7598-34]S8, [7606-05]S2
Lomeli, Eulises [7562-15]S4
Lompado, Arthur [7550-73]SPS1
Loncar, Marko 7591 Chr, 7591 S3
SessChr, 7609 S3 SessChr, [7609-04]S2, [7609-07]S2, [7609-10]S3
Long, Ruiqi [7572-04]S1
Long, Xingwu [7579-47]SPS2
Longdell, Jevon J. [7611-06]S1
Look, David C. 7603 Chr, 7603 S1
SessChr, 7603 S2 SessChr, [7603-01]S1
Loos, Anneke [7548C-99]S5
Loosen, Peter [7615-17]S4
Lopes, Cibele B. [7552-15]S3, [7549-15]S2
Lopes, Renaud [7548B-40]S2
Lopez, Carlos [7553-17]S5, [7553-19] S5
Lopez, John [7589-36]S5, [7589-36] S9
López Luke, Tzarara [7576-25]S6, [7617-61]SPS3
López-Escobar, María [7548A-08]S
Lopinski, Gregory [7606-10]S4, [7606-13]S5
LoPresti, Peter G. [7587-23]S4, [7587-32]S5
Lorbeer, Raoul [7613-25]S7, [7550-01]S1, [7550-38]S8, [7570-15]S4
Lorenz, Michael [7603-22]S5
Lorenz, Norbert [7585-03]S1
Lorke, Michael [7602-35]S8
Loth, Marsha A. [7599-25]S6
Lott, J. A. [7597-27]S6, [7597-53] S12, 7610 ProgComm, [7610-23] S6, 7615 ProgComm, 7615 S4 SessChr, [7615-22]S6
Lotti, Torello [7548A-07]S, [7569-104] SPS1
Lou, Pei-Jen [7569-55]S8
Loumena, Charlie [7589-36]S5, [7589-36]S9
Lourdudoss, Sebastian [7606-01]S1
Lousteau, Joris [7598-72]SPS3
Lovat, Laurence B. [7555-06]S2, [7573-04]S1, [7573-11]S3, [7573-14]S3, [7573-26]S7, [7573-48]SPS1
Love, Gordon D. [7613-23]S7
Lovisa, Blaise [7548B-57]S6
Lovsky, Yulia [7591-30]S7
Loyo-Maldonado, Valentin [7583-24] S5
Loza-Alvarez, Pablo [7569-99]SPS1, [7570-32]S7
Lozano, Karen [7609-26]S6
Lozovoy, Vadim V. [7569-125]S9
Lu, Chih-Feng [7617-30]S6
Lu, Chih-Wei [7555-24]S5, [7573-47] SPS1
Lu, Chunte A. [7580-93]SPS2
Lu, Fake [7569-61]S9, [7569-126] SPS1
Lu, Farn [7618-36]S10
Lu, Hui [7548G-161]S4
Lu, Huihong [7564-68]S10
Lu, I-Lin [7602-53]S12
Lu, Shing-Hwa [7548B-35]S1
Lu, Sijia [7569-45]S6, [7569-84]SPS1
Lu, Siyuan [7610-01]S1
Lu, Tien-Chang [7602-40]S9, [7602-72]S11, [7602-72]SPS3
Lu, Ting-Hua [7613-01]S1
Lu, Tsuei-Lian [7597-25]S6
Lu, Xianfeng [7597-19]S4
Lu, Xuejun [7608-66]S14, [7608-67] S15
Lu, Yang [7595-11]S2
Lu, Yen-Cheng [7617-30]S6
Lu, Yicheng 7603 S11 SessChr, [7603-48]S11
Lu, Yongfeng 7585 Chr, 7585 S5 SessChr, [7585-07]S2, [7585-08] S2, [7585-09]S2
Lu, Zhaolin [7604-44]S9
Lu, Zhenghong [7603-10]S3
Lubatschowski, Holger 7548C ProgComm, [7548C-76]S2, [7548C-100]S5, [7550-01]S1, [7550-30]S6, [7550-38]S8, [7554-27]S4, [7562-24]S6, [7570-15] S4, 7589 ProgComm, 7589 S1 SessChr, [7589-09]S3, [7589-12] S4, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7589-103]S, [7613-25]S7
Lucas, Jacques 7598 ProgComm
Lucas, Leanne [7577-02]S1
Lucas, Pierre 7559 ProgComm, 7559 S SessChr, [7559-29]S, [7559-30]S
Lucas-Hahn, Andrea [7589-07]S3
Lucas-Leclin, Gaelle [7580-106]SPS2
Luchita, Gheorghe [7599-61]SPS3
Luchowski, Rafal [7571-05]S1, [7571-21]S6, [7574-31]SPS1
Lucht, Robert P. [7564-90]SPS1
Luck, Larry [7554-92]SPS1
Luebbert, Christian [7606-10]S4
Luerss, Bernd [7581-08]S2
Luey, Benjamin [7618-47]S3
Lugarà, Pietro M. [7608-05]S1
Luger, Thomas A. [7548A-10]S, [7555-16]S4, [7555-54]SPS1
Lui, Harvey [7548A-16]S, [7548A-23]S
Luk, Ting-Shan [7609-29]S7
Lukat, Klaus [7592-24]S5
Lukes, Sarah J. [7594-04]S6, [7594-04]S2, [7594-12]S4
Lukin, Mikhail D. [7582-61]SPS2
Lukin, Vladimir P. [7588-04]S1
Lukiyanchuk, Boris [7577-21]S5
Lukomsky, Inna [7608-65]S14
Lulli, Giorgio [7606-14]S5
Lum, Daniel [7611-14]S3
Lumeau, Julien [7580-103]SPS2, [7598-28]S7
Luna, Abraham [7598-56]SPS3
Lund, Brian J. BO111 ProgComm
Lund, David J. BO111 ProgComm
Lunn, John A. [7565-06]S2
Lunt, Evan J. [7591-08]S2, [7606-09] S4
Luo, Jingdong [7579-32]S8, [7599-18] S5, [7607-48]SPS3
Luo, Qingming [7557-26]SPS1, 7563 ProgComm
Luo, Wenlin [7615-03]S1, [7615-07] S2, [7615-23]S6
Luo, Xianshu [7605-24]S9
Luo, Ying [7607-02]S1
Luo, Yonghua [7571-02]S1
Luo, Yunhan [7563-20]SPS1
Luong, Vu Hai Nam [7598-13]S3
Lüpke, Thomas [7559-11]S
Luquette, Brandon [7556-21]S5
Lurquin, Vanessa [7569-18]S3
Luschtinetz, Franziska [7576-41]S10
Lusiak, Przemyslaw [7551-26]S6, [7551-27]S7
Lüssem, Björn [7617-39]S8, [7617-43] S8
Lutgen, Stephan [7602-75]S11, [7602-75]SPS3, [7616-16]S4
Luther, Joseph [7600-36]S8
Luther-Davies, Barry [7609-37]S9
Luttge, Regina 7603 S12 SessChr, [7603-52]S12
Lutz, Vivien [7568-15]S2
Lutzenburger, Jeffrey [7594-04]S6, [7594-04]S2
Lux-Steiner, Martha C. [7603-47]S10
Luzhansky, Edward [7597-21]S5
L'vova, Tatiana [7597-16]S4
Ly, Sonny [7571-14]S4
Lyan, Philippe [7606-22]S7
Lynch, Candace [7602-14]S3
Lynch, Michael [7606-45]SPS3
Lyngsø, Jens K. [7580-38]S9
Lyo, Sungkwun K. [7616-46]S11
Lyon, Stephen A. [7616-46]S11
Lyszcza, Theodore M. [7618-19]S5
Lythgoe, Mark F. [7564-45]S7
Lytvyn, Peter M. [7598-53]SPS3
Lyulko, Oleksandra V. [7568-93]SPS1

M

Ma, Fang [7571-37]S10
Ma, Hongzhou [7566-02]S1
Ma, Jing [7579-53]S3
Ma, Kyungjae [7577-47]SPS1
Ma, Leo L. [7577-39]S8, [7562-28]S7, [7576-28]S7
Ma, Lingmei [7621-11]S3
Ma, Ruben [7606-10]S4, [7606-13]S5
Ma, Rui [7564-80]S11
Ma, Wenquan 7608 S11 SessChr
Ma, Ying-Zhong [7600-50]S12
Ma, Yiwen [7557-22]SPS1
Ma, Yunfei [7594-08]S3, [7594-09]S3
Ma, Zhenqiang [7606-29]S8, [7609-12]S3
Maack, Martin D. [7580-45]S11, [7580-84]SPS2
Maas, Amanda L. [7551-06]S2
Maasdorf, Andre [7583-22]S5
MacAulay, Calum [7558-29]SPS1, [7561-18]S3, [7568-88]S2
Macchadani, Houssaine [7602-45]S10
Maccone, Lorenzo [7611-33]S7
Macdonald, Rainer [7555-17]S4, [7569-82]SPS1
Machado, C. L. [7569-59]S8, [7569-111]SPS1
MacInnes, Andrew N. [7615-05]S2
Mack, John P. [7606-31]S8
Mackanos, Mark A. [7550-04]S1
Mackay, Sorcha [7548C-94]S4, [7548C-96]S5
Mackenzie, Jacob I. 7578 ProgComm, [7578-21]S5, [7578-50]S12
Mackenzie, P. J. [7554-93]SPS1
MacKinnon, Nick [7567-02]S1
Macleod, H. Angus SC321 Inst
Macnab, Andrew J. [7548B-32]S1, [7555-38]S8, [7572-07]S2
MacNeil, Sheila [7566-17]S4
Macomber, Steven H. [7583-54]SPS2
MacQuarrie, Evan R. [7603-31]S7
MacRobert, Alexander J. [7573-26]S7
Madabhushi, Rangaraj 7620 ProgComm
Madamopoulos, Nicholas 7620 ProgComm, [7620-07]S3
Madan, Sudhir K. [7548A-17]S
Madanick, Ryan [7573-24]S6
Madden, John D. W. [7589-14]S4
Madden, Steve J. [7609-37]S9
Madden, Timothy J. 7581 ProgComm
Madhukar, Anupam [7610-01]S1
Madsen, Christi K. [7579-54]S3, [7605-19]S7, [7605-23]S9
Madsen, Steen J. 7548E Chr, 7548E S3 SessChr, 7548E S1 SessChr, [7548E-132]S3, [7548E-133]S3, 7548G ProgComm
Maeda, Narihiko 7602 ProgComm
Maeda, Satoru [7602-58]S13
Maeda, Shingo [7582-22]S5, [7586-21]SPS2
Maehara, Akiko [7548D-117]S3, [7554-01]S1
Maejima, Kohei [7619-06]S2
Maerz, Anne [7593-01]S1
Magalhães, Ana Carolina [7567-08]S2
Magana, Arturo [7578-44]S11

Index of Authors, Chairs, and Committee Members

- Magen, Osnat [7608-65]S14
Mager, Loic [7599-12]S3, [7599-24]S6, [7604-28]S6
 Mägi, Eric C. [7609-37]S9
 Maglione, Mario [7603-28]S7
 Magnan, François [7571-28]S7
 Magnusson, Robert [7572-13]S3
Magnusson, Robert [7604-21]S5
 Magrini, Taciana D. [7551-34]SPS1
 Maguen, Ezra I. 7550 ProgComm, 7550 S2 SessChr
 Mah, Emisoon 7599 ProgComm
Mahadevan-Jansen, Anita TrackChr, [7548A-20]S, [7548F-149]S3, [7548F-183]S, 7548G Chr, [7548G-159]S4, [7548G-160]S4, [7550-47]S9, 7555 Chr, 7555 S7 SessChr, 7555 S8 SessChr, [7555-03]S1, [7555-31]S6, [7555-45]S9
Mahadevan-Jansen, Anita 7560 Chr, [7560-18]S4, [7560-22]S6, [7562-31]S7, [7562-50]S7
 Mahalingam, Krishnamurthy 7608 S19 SessChr, [7608-71]S13, [7610-22]S5
 Mahalov, Alex S. 7588 ProgComm
 Mahdi, Shaimaa [7606-41]S11
 Maheedhar, K. [7560-03]S1
 Maher, Mary Ann 7590 Chr, 7590 S3 SessChr
 Mahjouri-Samani, Masoud [7585-07]S2
 Mahler, Marianne [7555-17]S4
 Mahon, Rita [7587-01]S1
 Mahon, Sari [7554-07]S2, [7555-46]S10, [7555-47]S10
 Mahrt, Rainer F. [7605-01]S1, [7610-07]S2
 Mai, Zhiming [7551-45]SPS1, [7576-01]S1
 Maia Rocha, Karolinne [7550-39]S8
 Maier, Markus [7617-21]S4
 Maier, Stefan A. [7586-05]S1
 Maimon, Shimon [7608-74]S16
 Maineult, Wilfried [7608-31]S7
 Maioli, Paolo [7600-02]S1
Maisonneuve, Mathieu [7577-18]S4
Majer, Daniel [7616-40]S9
 Majid, Muhammad [7616-05]S1
 Majles Ara, Mohammad Hossein [7600-59]S14
 Majumdar, Arka [7609-08]S3, [7611-23]S5, [7611-27]S6, [7611-28]S6
Makaram, Singaperumal [7584-35]S12, [7584-35]S6, [7590-18]S3, [7590-19]S3
Makarov, Nikolay S. [7576-15]S4, [7599-30]S8, [7599-31]S8, [7599-43]S11
 Makarova, Maria O. [7609-08]S3
Makhlof, Houssine [7558-08]S2, [7558-19]S4
Makita, Shuichi [7550-14]S3, [7550-25]S5, [7554-13]S3, [7554-38]S6, [7554-58]S9
 Makkouf, Amani R. [7548E-133]S3
 Maksimov, Oleg [7583-09]S2
 Mäkinen, Anssi J. [7567-12]S3
 Malakov, Nail [7557-07]S2
 Malek, Reza S. TrackChr, 7548B Chr
 Malek-Madani, Reza [7588-22]S4
Malik, Bilal H. [7572-01]S1
 Malinowski, Andrew [7580-06]S1, [7582-17]S4
 Malkova, Natalia [7609-50]S11, [7610-05]S1, [7610-32]S8
 Mall, Marcus [7576-04]S1
 Mallas, George [7557-11]S3
 Mallidi, Srivalleesha [7564-65]S9, [7564-114]SPS1, [7564-118]SPS1
 Malloy, Kevin J. [7614-13]S4
 Malomed, Boris A. [7600-57]S13
 Malowicki, John Edward [7587-14]S3
 Malphrus, Jonathan [7548G-159]S4
 Malus, Joerg [7583-28]S6
 Malyutenko, Oleg Y. [7606-28]SPS3
Malyutenko, Volodymyr K. [7606-28]SPS3, [7614-14]SPS3, [7617-22]SPS3
 Manabe, Noriyoshi [7575-38]SPS1
Mandair, Gurjit S. [7548F-140]S1, [7548F-143]S1
 Mandal, Arjun [7603-59]SPS3
 Mandelis, A. [7564-145]SPS1, 7548F Chr, 7548F S3 SessChr, 7548F S1 SessChr, [7548F-148]S2, [7548F-150]S3, 7564 ProgComm, [7564-144]SPS1
 Mandella, Michael [7558-22]S5, [7558-22]S1, [7558-23]S5, [7558-23]S1, [7560-19]S1, [7567-04]S1
 Mandeville, Emiri T. [7569-91]SPS1
 Manevitch, Alexandra [7589-11]S4
 Manevitch, Zakhariya [7589-11]S4
 Mangeney, Juliette [7602-45]S10
 Mani, Sita [7590-14]S3
 Maniewski, Roman [7563-16]S3
 Manjunath, Varsha [7550-56]S11
 Manne, Upender [7559-28]S
 Manne, Venu G. R. [7554-75]S11
 Manneberg, Goran [7550-50]S10
Manns, Fabrice 7550 Chr, 7550 S SessChr, [7550-21]S4, [7550-42]S9, [7550-86]SPS1
 Manohara, Harish M. [7594-27]S8
 Manoharan, Krishna [7604-13]S3
 Mansfield, James R. [7561-16]S3
 Manson, Neil B. [7611-04]S1, [7611-07]S2
 Mantei, Dirk [7600-09]S2
Mantulin, William W. 7567 ProgComm, 7567 S4 SessChr, [7567-02]S1
 Manuel, Cyrus [7548C-86]S3
 Manuel, Cyrus [7548C-88]S3
 Manukar, Paritosh [7608-60]S13
 Manz, Christian [7578-32]S8
 Manzanera, Silvestre [7550-41]S8
 Manz-Gilbert, Yvonne [7583-44]SPS2
 Manzoni, Cristian [7595-15]S3
 Mao, Youxin [7555-12]S3
Maraghechi, Pouya [7600-69]SPS3
 Marandi, Maziar [7617-59]SPS3
 Marangoni, Stefano [7571-15]S5, [7608-85]S18
 Marcaide, Arrate [7559-07]S
 Marcauteanu, Corina [7549-03]S1, [7554-88]SPS1
 Marchand, Laurent [7594-39]S8, [7596-13]S3
 Marche, Georgi [7582-13]S4
 Marchionni, Paolo [7555-52]S10, [7556-32]S8
 Marciante, John R. 7598 ProgComm
 Marcinkevicius, Saulius [7602-28]S6
 Marcoccia, Roberto M. [7621-17]S5
 Marcos, Susana [7550-18]S4
 Marcu, Laura 7548D Chr, 7548D S1 SessChr, [7548D-105]S1, [7548D-106]S1, 7555 ProgComm, 7555 S4 SessChr, [7555-01]S1, [7555-18]S4, [7555-53]SPS1, [7566-04]S1
Marder, Seth R. 7599 ProgComm
 Mardilovich, Pavel [7584-17]S7, [7584-17]S11
 Mardy, Sek [7575-44]S8
 Mares, Jeremy W. [7603-44]S10
 Mari, Meropi [7569-109]SPS1
Mariampillai, Adrian [7554-35]S6, [7551-22]S6, [7554-43]S7, [7558-29]SPS1, [7580-102]SPS2
 Mariani, Giacomo [7610-30]S7
 Mariette, Henri [7610-34]S8
 Marinchio, Hugues [7608-41]S9
Mário Correia da Silva Vilar, Rui [7589-13]S4
 Marion, Samuel L. [7558-09]S2
 Maritato, Luigi [7603-30]S7
 Marjanovic, Marina [7554-69]S11, [7576-35]S9
 Märki, Iwan [7571-25]S7, [7571-35]S10
Markov, Vladimir B. [7578-57]S14, [7582-53]SPS2, [7588-06]S1
 Marks, Tobin J. [7599-18]S5
 Markwald, Roger R. [7566-20]S4
 Marotel, Pascal [7603-61]SPS3
 Marquer, Catherine [7569-33]S5
 Marques, Aparecida Maria C. [7549-18]S, [7549-20]S, [7552-14]S3, [7552-24]SPS1
 Marques, Paulo V. S. [7591-17]S5, [7584-22]S8, [7584-22]S12
 Marquina, Nelson [7549-12]S2
 Marris-Morini, Delphine [7606-22]S7, [7606-26]S7
 Mars, Jerome I. [7573-42]SPS1
Marschall, Sebastian [7554-52]S8
 Marshall, Graham D. [7580-24]S6, [7589-16]S5
 Marshall, Lee H. [7604-22]S5
 Martensen, Björn [7554-45]S7
Marti, Dominik [7577-38]S8
Martin, Airtion A. 7560 ProgComm, [7560-02]S1, [7560-04]S4, [7560-07]SPS1, [7560-13]SPS1, [7561-39]SPS1, [7568-14]SPS1
 Martin, Alan W. [7618-47]S3
 Martin, Bruno [7597-30]S7, [7604-36]S8
 Martin, Edward W. M. [7556-28]S7
 Martin, Jean-Louis [7548A-01]S
 Martin, Michael G. [7583-54]SPS2
 Martin, Thomas [7607-37]S9
 Martinez, Aldo [7550-20]S4
 Martinez, Jennifer S. [7576-20]S5
 Martinez, Marino J. [7591-24]S6
 Martinez, Sergio [7555-25]S5
Martinez, Ty [7595-07]S2, [7595-08]S2
 Martinez de la Fuente, Jesus 7575 S5 SessChr, [7575-09]S4, [7575-18]S7, [7575-28]S9
 Martinez Mateu, Laura [7548C-76]S2
 Martinez-Cantón, Adriana Erica [7562-37]S8
Martinez-Corral, Manuel SC979 Inst
Martinho, Herculano d. S. [7560-02]S1, [7560-04]S4
 Martini, Joerg [7572-05]S1
 Martini, Mary [7565-04]S2
 Martin-Minguez, Alfredo [7597-54]S12, [7597-46]S10, [7616-50]S12
Martin-Palma, Raúl J. [7591-28]S7
 Martins, J. Vanderlei [7588-13]S3
 Martins, Mario Augusto d. S. [7560-02]S1
 Martins, Rodrigo [7603-33]S8
 Martin-Sanchez, J. [7610-09]S3
Martinsen, Robert J. 7583 ProgComm, 7583 S1 SessChr, [7583-01]S1, [7583-04]S1, [7583-07]S2, [7583-13]S3, [7583-32]S8, [7583-47]SPS2
 Martucci, Alessandro [7582-46]S10, [7582-54]SPS2
Martyshkin, Dmitri V. [7578-54]S13
 Maruyama, Hiroki [7580-38]S9
 Maruyama, Hirotaka [7598-32]S8
 Marwah, Rajat [7578-03]S1
 Marx, Ulrich [7566-16]S4, [7568-23]S2
 Maselli, Valeria A. [7585-14]S3
 Masenelli, Bruno [7603-16]S3
 Mashanovich, Goran Z. [7606-14]S5, [7606-15]S5, [7606-20]S6, [7606-44]SPS3, [7608-18]S4
 Mashcovitch, Eugene A. [7554-97]SPS1
 Mashimo, Hiroshi 7558 ProgComm, [7558-20]S4
 Masi, Maria G. [7550-11]SPS1
 Masihzadeh, Omid [7568-54]S6
 Maslennikova, Anna V. [7557-18]S4
 Maslov, Konstantin [7550-62]SPS1, [7564-05]S1, [7564-06]S1, [7564-12]S2, [7564-31]S5, [7564-34]S5, [7564-43]S7, [7564-70]S10, [7564-77]S1, [7564-91]SPS1, [7564-124]SPS1, [7564-125]SPS1
 Mason, Sarah [7566-07]S2
 Massa, Severin [7578-69]S16
 Massaro, Alessandro [7602-47]S10
 Massi, Daniela [7548A-06]S, [7569-104]SPS1
 Masson, Jean-Francois [7577-07]S3
Masson, Jonathan [7594-13]S4
Massov, Ole [7548C-100]S5, [7554-27]S4, [7589-12]S4
Masters, Daniel B. [7562-31]S7, [7562-50]S7
 Masuda, Taizo [7581-05]S1
Matcher, Stephen J. 7548F ProgComm, [7566-17]S4
 Matejcek, Pavel [7571-03]S1
 Mateos, Xavier [7578-14]S3
 Mathevet, Fabrice [7599-35]S9
 Mathews, James [7592-27]S5
Mathews, Jay [7606-58]SPS3
 Mathews, Marion S. [7548E-137]S4
 Mathur, Neil [7603-57]S5
Matic, Agnella I. 7548G ProgComm, [7548G-190]S, [7548G-191]S
 Matioli, Elison [7609-15]S4, [7617-31]S6
 Matovu, Charles [7573-33]S8
Matsko, Andrey B. 7579 ProgComm, 7579 S9 SessChr
 Matsuda, Keiji [7557-30]SPS1
 Matsui, Hiroaki [7603-06]S2
 Matsui, Hiroshi [7593-35]S7
 Matsuki, Kazuto [7580-16]S4, [7580-16]S6, [7580-16]S1
 Matsumoto, Mitsuji [7620-15]SPS3
 Matsumoto, Takafumi [7586-10]S3
 Matsumoto, Tsutomu [7618-11]S2
 Matsumura, Kouji [7566-05]S2
 Matsuo, Hiroki [7548D-108]S1, [7551-40]SPS1
 Matsuoka, Noboru [7550-69]SPS1
 Matsuoka, Yuichiro [7562-26]S6
Matsushima, Kyoji [7619-39]SPS3
Matsushima, Tomoaki 7585 ProgComm
Matsuura, Yuji 7559 ProgComm, [7559-03]S, [7559-05]S, [7559-06]S
 Matteini, Paolo [7550-74]SPS1, [7550-77]SPS1, [7574-30]SPS1, [7577-42]SPS1, [7577-43]SPS1
 Matthes, André [7616-60]S14
Matthews, Dennis L. [7555-44]S9, [7561-02]S1, [7561-08]S1, [7561-34]S5
 Mattila, Marco [7621-09]S3
 Mattoussi, Hedi 7575 ProgComm, 7575 S3 SessChr, [7575-14]S5, [7575-26]S9
 Mattsson, Kent E. [7580-75]SPS2
 Matulionis, Arvydas [7602-16]S4
 Matveev, Boris A. [7597-16]S4, [7607-39]S9, [7609-16]S4
 Matveeva, Eva G. [7571-21]S6
 Matvienko, A. [7564-145]SPS1
 Matyjaszewski, Krzysztof [7599-03]S1
Maula, Jarmo [7591-27]S7

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Maung, Linn H. [7549-02]S1
Maurer, Christian [7570-12]S3
Mauriello, Alessandro [7548D-104]S1
Mauro, Antonio [7558-29]SPS1
Maury, Olivier [7599-41]S11
Mawst, Luke J. 7597 S14 SessChr, [7597-44]S10, [7607-17]S4, 7616 ProgComm, 7616 S12 SessChr, [7616-23]S5, [7616-28]S7, [7616-28]S12
Maxfield, Frederick R. [7548B-36]S1
Maximov, Jewgenij [7598-55]SPS3
Maximov, Mikhail V. [7616-54]S13
May, Stanley [7597-05]S1
Mayer, Kuno [7585-27]S12, [7585-27]S6
Mayer, Theresa S. [7610-29]S7
Maytin, Edward V. [7551-04]S2
Maywar, Drew N. [7598-42]S10
Mazilu, Michael [7555-43]S9, [7568-39]S
Mazuir, Clarisse [7591-06]S2
Mazumder, Jyotirmoy [7584-09]S3
Mazur, Eric D. [7584-01]S1, 7589 ProgComm, [7589-23]S6
Mazzillo, Massimo C. [7598-34]S8
Mbellou, Sofia [7548B-66]SPS1
Mc Elligott, Susan D. [7563-22]SPS1
McAlpine, Jessica [7561-18]S3
McAneny, James J. [7590-15]S3
McBride, Roy [7580-06]S1
McCall, Brian [7558-24]S6, [7558-24]S2, [7590-09]S2
McCally, Russell L. BO111 ProgComm
McCammon, Susan [7569-49]S7
McClelland, David E. [7579-46]S11, [7580-27]S7
McClintock, Ryan P. 7608 ProgComm
McClure, Jesse [7548C-90]S3
McComb, Timothy S. [7578-51]S12, [7580-02]S1, [7580-14]S3, [7580-50]S11, [7580-61]S14
McConville, Chris F. 7603 S4 SessChr, [7603-08]S2
McCormack, Devin [7564-38]S6
McCosker, Ravi J. [7604-15]S3
McCracken, Blane [7611-14]S3
McCredie, Geoffrey [7603-17]S4
McCurdy, Alan [7621-20]S6
McCutcheon, Murray [7609-07]S2, [7609-10]S3
McDermott, William E. 7581 ProgComm
McDevitt, John T. [7553-08]S2
McDonald, John F. [7607-35]S8
McDonald, Melisenda [7559-16]S, [7574-17]S3
McDonald, Michael A. [7576-16]S4
McDonald, Stephen M. 7569 ProgComm
McDougall, Stewart D. [7583-24]S5
McDerrery, John-David P. [7548F-143]S1
McElhinney, Mark [7583-20]S5
McElroy, Austin B. [7554-92]SPS1
McEwen, Gerald D. [7568-81]SPS1
McGee, Benjamin [7556-21]S5
McGinty, James A. [7570-16]S4, [7573-15]S4
McGoron, Anthony J. [7565-11]S3
McGovern, Brian [7548G-162]S5
McGraith, Brian 7574 ProgComm
McGuinness, Christopher [7609-45]S10
McGuire, James P. [7618-03]S1
McHale, Noel [7570-31]S6
McInerney, John G. [7597-45]S10
McIntyre, Tim [7570-12]S3
McKenzie, Gordon P. [7548C-72]S1, [7548C-73]S1, [7548C-74]S1, [7554-90]SPS1
McKenzie, Matt [7593-36]S7
McKillop, John S. SC976 Inst
McLaughlin, James R. [7564-40]S6
McLaughlin, Robert A. SC981 Inst, [7554-44]S7, [7554-73]S11, [7555-14]S3
McLean, David I. [7548A-23]S
McLeod, Robert R. [7591-01]S1
McLin, Leon BO111 ProgComm
McMahon, Peter [7611-22]S5
McMillan, James F. [7605-15]S6
McMillen, Colin D. [7598-40]S10
McMurtrie, Roger [7611-04]S1
McNabb, Ryan P. [7554-20]S3, [7558-21]S5, [7558-21]S1
McNamara, Paul M. [7563-22]SPS1, [7563-32]SPS1
McNeil, Calum J. [7593-31]S6
McNerney, Gregory P. [7571-32]S9
McNerny, Daniel [7553-02]S1
McPhail, E. Frederick [7548B-44]S3
McPhedran, Ross [7606-40]S11
McShane, Michael J. 7572 ProgComm, 7572 S1 SessChr, [7572-04]S1
McWilliams, Annette [7560-21]S1
Meair, Jonathan [7582-29]S7
Measor, Philip [7591-08]S2, [7606-09]S4
Mebben, Sandra [7578-03]S1
Medeiros, Maria Jaislanny [7568-06]S2
Medhat, Mostafa [7594-30]S9
Medina, Gloria [7575-33]S10
Medintz, Igor L. 7574 ProgComm, 7575 S6 SessChr, [7575-14]S5, [7575-26]S9
Medrano, Carolina [7599-11]S3
Medvedkov, Oleg M. [7580-39]S9
Meemon, Panomsak [7554-84]S12
Meemon, Panomsak [7556-11]S3
Meerheim, Rico [7617-43]S8
Meerholz, Klaus [7617-42]S8
Meghea, Aurelia [7599-21]S6
Meglinski, Igor V. 7563 ProgComm
Meglinski, Igor 7563 S1 SessChr
Meglinski, Igor [7563-15]S3
Meglinski, Igor [7573-35]S8
Mehl, Patrick M. [7564-83]S12, [7564-117]SPS1
Mehl, Ron [7583-32]S8
Mehner, Jan [7559-11]S
Mehra, Ram Mohan [7603-56]S12
Mehran, Khashayar [7597-83]SPS3, [7607-44]SPS3
Mehrmohammadi, Mohammad [7564-114]SPS1, [7574-04]S1
Mehrwald, Markus [7562-25]S6
Mehta, Kalpesh B. [7577-30]S7
Mehta, Ketan [7564-67]S10
Mehta, Monal R. [7569-80]SPS1
Mei, Bing [7575-26]S9
Meier, Norbert [7607-19]S5, [7607-20]S5
Meier, Torsten 7600 ProgComm, 7600 S3 SessChr, [7600-27]S6, [7600-55]S13
Meine, Hans [7570-41]SPS1
Meinschien, Jens [7583-55]SPS2, [7583-56]SPS2
Meissner, Helmuth E. [7582-38]S8
Meissner, Kenith E. 7572 ProgComm, [7575-17]S6
Meissner, Peter [7621-24]S6
Meissner, Sven [7554-85]SPS1
Meister, Stefan [7579-45]S11, [7606-41]S11
Meixner, Alfred J. [7568-12]S6, [7568-38]S1, [7571-11]S2
Mejias-Brizuela, Nildia Y. [7619-28]SPS3
Melak, Anthony [7578-06]S2
Melchiorretto, Pasquale [7568-20]S5
Melgaard, Seth [7614-02]S1, [7614-06]S2, [7614-08]S3
Melinger, Aaron [7592-19]S4
Melinger, Joseph S. [7600-17]S4
Melinon, Patrice [7603-16]S3
Melkumov, Mikhail A. [7580-39]S9
Meller, Jarek [7571-06]S2
Melloni, Andrea 7604 ProgComm
Melnik, Roderick V. N. [7610-31]S7
Melnikov, Andrey G. [7563-24]SPS1
Melnikov, Vasily A. [7606-45]SPS3
Melo, Mary Anne S. [7549-17]S
Meloni, Marisa [7550-59]SPS1
Memis, Omer G. [7601-08]S2
Menaar, Bouzid [7568-77]SPS1, [7574-18]S3, [7574-28]S4
Menaar, Farid [7568-77]SPS1, [7574-18]S3, [7574-28]S4
Menabuoni, Luca [7550-77]SPS1
Menard, Laurent [7548E-131]S3, [7567-06]S2
Mendes, Marco [7584-28]S10, [7585-28]S12, [7585-28]S6
Mendes, Sergio B. [7559-36]S
Mendez, Alexis SC981 Inst
Mendez, Antonio J. [7587-21]S3
Mendez, Enrique [7583-15]S3
Méndez Gamboa, José Angel [7568-78]S
Mendicute, Claudio [7575-11]S5
Mendonca, Marc [7564-54]S8, [7564-116]SPS1
Meneghesso, Gaudenzio [7617-23]S4
Meneghetti, Mario R. [7610-21]S5
Meneghini, Matteo [7617-23]S4
Menendez, Jose [7606-58]SPS3
Menezes, Priscila F. [7560-07]SPS1
Meng, Chengbo [7565-21]SPS1
Menhard, Christian [7585-32]S12, [7585-32]S6
Menini, Philippe [7590-21]SPS2
Menq, Chia-Hsiang [7568-50]S3
Mentzer, Mark A. [7598-76]SPS3
Menzel, Christoph [7604-12]S3
Menzel, Ralf [7582-07]S2, [7583-37]S8
Meraiyebu, Ajibola B. [7552-28]SPS1
Merchant, Soroush [7565-01]S1
Mery, S. [7592-15]S3
Mereuta, Alexandru [7615-19]S5
Mermelstein, Marc D. [7580-51]S12
Mermillod-Blondin, Alexandre [7570-29]S6
Mermut, Ozzy [7553-11]S3, [7558-12]S3, [7567-09]S2, [7567-10]S3, [7568-44]S5
Merrer, Pierre-Henri [7579-43]S11
Mertsching, Heike [7560-06]S2, [7566-06]S2, [7566-16]S4, [7568-23]S2
Mescheder, Ulrich [7594-25]S7
Mescia, Luciano [7598-45]S11
Mesnilgrete, Fabien [7590-21]SPS2
Messadeq, Younes [7609-36]S8
Messerschmidt, Bernhard [7556-06]S2
Metaxas, Dimitris N. 7557 ProgComm
Metgé, Germain [7599-35]S9
Mettikolla, Prasad [7571-05]S1
Metze, Konradin [7568-56]S2, [7568-57]S2
Metzner, Sebastian [7602-24]S6, [7602-31]S7, [7602-64]S15
Meunier, Anthony [7580-17]S1, [7580-17]S4, [7580-17]S6
Meunier, Michel [7575-32]S10, [7577-18]S4, 7584 Chr, 7584 S5 SessChr, [7584-02]S1, [7584-14]S6, [7584-14]S10, 7589 S9 SessChr, [7589-08]S3
Mével, Eric [7589-17]S5
Meyer, Bruno K. [7597-20]S5, [7603-04]S1
Meyer, Heiko [7570-15]S4, [7613-25]S7
Meyer, Jerry R. 7608 ProgComm, 7608 S3 SessChr, 7616 ProgComm, 7616 S9 SessChr, [7616-23]S5, [7616-45]S11
Meyer, Michael G. [7570-17]S4
Meyer, Rolf [7587-13]S2
Meysers, Ronald E. [7587-05]S1
Meysers, Stephen T. [7603-24]S6
Meza, Octavio [7617-61]SPS3
Mi, Zetian [7591-23]S6, [7602-09]S2
Mialon, Genevieve [7575-02]S2
Miao, Haixing [7579-42]S10
Miao, Hui [7570-45]SPS1
Miao, Qin [7570-17]S4
Miard, Audrey [7608-26]S6
Michaëli, Walter [7598-29]S7
Michaelis, Dirk [7617-42]S8
Michaelis de Vasconcellos, Steffen J. [7600-09]S2
Michalet, Xavier [7571-15]S5, [7608-85]S18
Michalik, Pavel [7549-08]S1
Michalzik, Rainer [7607-10]S3
Michel, Jurgen SC817 Inst
Michel, Nicolas [7616-50]S12, [7616-51]S12
Michel, Sebastien [7569-98]SPS1
Michel, Sébastien [7599-17]S4
Michelet, Jean-François [7548A-01]S
Michell, Gareth J. [7616-65]SPS3
Michler, Markus [7607-21]S5
Michler, Peter [7602-31]S7
Mics, Zoltan [7600-11]S3
Middendorf, Lyle R. 7576 ProgComm
Midgett, Aaron G. [7600-36]S8
Midorikawa, Katsumi [7584-25]S9, [7584-40]SPS2, [7584-45]SPS2, [7585-12]S3
Migacz, Justin [7554-79]S12
Migdall, Alan [7609-50]S11, [7611-16]S4
Migliore, Leonard R. [7578-68]S16
Miglo, Alexander [7615-14]S4
Mihailov, Stephen J. [7589-15]S5
Mikami, Osamu [7607-28]S7
Mikami, Takuya [7582-55]SPS2
Mikawa, Takashi 7607 ProgComm
Mikhailova, Maya P. [7608-61]S13
Mikheyev, Pavel A. [7581-07]S1
Mikhrin, Sergey S. [7607-31]S8
Miki, Mayu [7618-38]S10
Mikula, Vilem [7594-24]S7
Milad, Magdy [7555-29]S6
Milanese, Daniel [7598-72]SPS3
Milanowski, Randall [7593-41]SPS2
Milewski, Krzysztof [7548D-112]S2
Milione, Giovanni [7613-04]S1, [7613-17]S5, [7613-28]S8
Millaud, Jacques E. [7608-85]S18
Miller, Andrew R. [7556-07]S2
Miller, Benjamin L. 7553 Chr, 7553 S3 SessChr, [7553-03]S1, [7553-18]S5
Miller, Clayton [7550-66]SPS1
Miller, David [7593-42]SPS2
Miller, David A. B. [7607-33]S8
Miller, Dianne [7561-18]S3
Miller, Donald T. 7550 ProgComm, 7550 S11 SessChr, 7550 S5 SessChr, [7550-23]S4, [7550-26]S5, [7550-37]S7
Miller, Ian [7548E-136]S4
Miller, Jason [7548C-101]S5
Miller, Kathy D. [7564-59]S9
Miller, Kent L. 7614 S1 SessChr
Miller, Mary A. [7617-17]S4
Miller, Michael [7615-15]S4, [7615-17]S4

Index of Authors, Chairs, and Committee Members

- Miller, Suzanne [7585-03]S1
 Miller, Thomas J. [7617-72]S10
Milne, Peter J. 7550 ProgComm
 Milner, Thomas E. [7548B-52]S5,
 [7554-92]SPS1, [7562-28]S7
 Milosevic, Milan M. [7606-44]SPS3
Milster, Tom D. [7570-38]S7
 Mimoun, Malki [7616-34]S8
 Min, Changjun [7604-47]S9
 Min, Gihyeon [7568-40]SPS1
 Min, Wei [7569-06]S1, [7569-45]S6,
 [7569-84]SPS1
Minamikawa, Takeo [7569-21]S3,
 [7569-70]SPS1
 Mineev, Ekaterin [7590-11]S2
 Ming, Chengguo [7598-02]S1, [7598-
 61]SPS3
 Minkov, Lyubomir L. [7621-23]S6
 Mino-Kenudson, Mari [7558-16]S4
 Minoura, Norihiko [7576-55]SPS1
 Mintairov, Sergey [7610-20]S5
 Minzioni, Paolo [7589-10]S3
 Mir, Sadiq M. [7570-34]S7
Miragliotta, Joseph A. 7571
 ProgComm
 Mirchin, Nina [7586-22]SPS2
 Miri, Mehdi [7597-83]SPS3
Mirov, Ilya S. [7578-53]S13
Mirov, Sergey B. [7578-52]S13,
 [7578-54]S13, [7578-55]S13
 Mirza, Iftexhar O. [7609-20]S5
 Misawa, Hiroaki [7591-18]S5, [7591-
 19]S5
 Mishima, Tetsuya [7608-72]S14,
 [7616-47]S11
 Mishina, Tomoyuki [7619-05]S1,
 [7619-34]SPS3
 Misiewicz, Jan [7610-09]S3
 Miskowicz, Peter [7592-20]S4
 Misra, Veena [7577-06]S2
 Missert, Nancy A. [7617-17]S4
 Missine, Jeroen [7607-15]S4
 Mita, Seiji [7602-27]S6
 Mitchell, Jay [7592-04]S1
 Mitchell, M. [7585-07]S2
 Mitin, Vladimir V. [7608-73]S16
 Mitra, Sourav [7590-18]S3
 Mitra, Sushanta [7593-17]S3, [7593-
 23]S4
Mitra, Thomas [7579-20]S5, [7583-
 55]SPS2, [7583-56]SPS2
 Mittag, Anja [7568-16]S5
 Mitus, Antoni C. 7599 ProgComm
Miura, Masahiro [7550-14]S3, [7550-
 25]S5
 Mixon, Dustin [7562-21]S5
 Miyagi, Kazuya [7609-64]SPS3
 Miyagi, Mitsunobu [7549-08]S1,
 [7559-03]S, [7559-05]S, [7559-09]S
 Miyaji, Godai 7584 ProgComm
 Miyajima, Kenji [7585-22]S5
 Miyake, Hideto 7602 ProgComm,
 7602 S14 SessChr, [7602-65]S15
 Miyamoto, Shinichi [7587-31]S5
 Miyanaga, Noriaki [7578-18]S4, [7584-
 16]S6, [7584-16]S10
 Miyanishi, Tomoya [7589-46]SPS2,
 [7609-58]SPS3
 Miyata, Kentaro [7582-05]S2
 Miyawaki, Atsushi [7584-25]S9
 Miyazawa, Akiyoshi [7548D-110]S2
Miyazawa, Arata [7550-25]S5
 Miyoshi, Shunichiro [7548D-108]S1,
 [7551-40]SPS1
Mizeikis, Vygtantas [7591-18]S5,
 [7591-19]S5
Mizoshiri, Mizue [7589-33]S8, [7589-
 48]SPS2
 Mizrahi, Amit [7606-19]S6
 Mizuno, Shintaro [7598-08]S2, [7598-
 57]SPS3
Mizuno, Yoshifumi [7555-05]S1
 Mizutani, Kouki [7597-80]SPS3
 Mjones, Jan [7548B-43]S3
 Mnaymneh, Khaled [7608-88]S19
 Mo, Chunlan [7617-48]S10
 Mo, Larry [7564-75]S11
 Mo, Ting-Shan [7618-14]S9
 Moayed, Alireza A. [7550-12]S3
 Moazeni, Ali [7584-44]SPS2
 Mochida, Joji [7566-05]S2
 Mochizuki, Akihiro 7618 ProgComm
 Mochizuki, Hiroyuki [7585-10]S3
 Modell, Mark D. [7573-25]S6
Modgil, Dimple [7564-60]S9
 Moench, Holger [7615-15]S4, [7615-
 17]S4
 Moerk, Jesper [7615-19]S5
Moerner, W. E. [7571-33]S10
 Moffatt, Douglas J. [7569-07]S1
 Moforth, Cynthia [7549-09]S1
 Moges, Helina [7552-11]S2
 Mohamed, Ashik [7550-86]SPS1
 Mohammad, Othman [7555-46]S10
 Mohammad, Wajihuddin [7592-29]S5
Mohammadi, Saeed [7609-30]S7,
 [7609-31]S7
Mohammed, Edris M. [7607-08]S2
Mohan, Nishant [7570-21]S4
 Mohan, Rupavatharam Krishna [7611-
 17]S4
 Mohanasundaram, S. V. [7592-15]S3
 Mohnhey, Suzanne E. [7610-29]S7
 Mohr, Jürgen [7590-12]S2
 Mohrdiek, Stefan [7616-56]S13
 Mohseni, Hooman [7601-08]S2
 Moiseev, Alexander A. [7554-97]SPS1
 Moiseev, Konstantin D. 7608
 ProgComm, 7608 S5 SessChr,
 [7608-61]S13
 Moision, Bruce [7587-22]S3
 Mojarradi, Mohammad [7594-27]S8
Mokhov, Sergiy [7580-33]S8, [7598-
 28]S7
 Mokhun, Oleksy [7580-65]S15
 Mokina, Irina [7598-37]S9
 Mokkalpati, Sudha [7586-04]S1
 Mokwa, Wilfried [7594-202]S, [7594-
 202]S, [7594-202]S, [7594-202]S
 Molaei, Mehdi [7600-59]S14, [7617-
 59]SPS3
 Molavi, Behnam [7555-38]S8
 Moldoveanu, Mirela [7599-21]S6
 Molina, S. I. [7610-09]S3
 Molinari, Michael [7603-46]S10
 Molinary, Michael [7575-11]S5
 Moll, Kevin [7572-11]S3
 Moll, Nikolai [7605-01]S1
 Molnar, Richard J. [7618-19]S5
Moloney, Jerome V. [7578-35]S9,
 [7579-18]S5, [7597-25]S6
Momeni, Babak 7609 S4 SessChr,
 [7609-19]S5, [7609-48]S11
 Monat, Christelle [7606-40]S11,
 [7609-37]S9
Monchalain, Jean-Pierre [7564-81]
 S12
 Moncorgé, Richard [7589-19]S5
 Mondia, Jessica [7553-05]S2
 Monem Haghdooost, Zahra [7607-44]
 SPS3
 Monich, Victor A. [7552-13]S3
 Monneret, Serge [7570-14]S3
 Monnet, François [7548E-131]S3
 Mönnich, Holger [7548F-144]S2
 Monroe, Margo [7553-17]S5
 Monroy, Eva [7602-15]S3, [7602-
 37]S8, [7602-45]S10, 7608 S6
 SessChr, [7608-50]S11, [7610-34]
 S8
 Monson, Todd C. [7576-51]S12
 Montaigne, Nelly [7598-14]S4
 Montcuquet, Anne-Sophie [7573-42]
 SPS1
 Montiel i Ponsoda, Joan J. [7580-10]
 S2, [7580-97]SPS2
 Montilla, Leonardo G. [7564-122]
 SPS1, [7564-123]SPS1
 Moody, Daniela I. [7588-10]S2
 Moody, Galan A. [7600-49]S12
 Moody, Michael [7585-26]S12, [7585-
 26]S6
Moody, Stephen E. [7568-55]S5
 Mookherjee, Shayan 7579
 ProgComm, 7579 S4 SessChr,
 7579 S3 SessChr, [7612-26]S7
 Moon, Joong-ho [7561-01]S1
 Moon, Kyung-Mi [7617-69]SPS3
 Moon, Mi Ran [7603-36]S8
 Moon, SangJun [7551-17]S4
 Moon, Sucbei [7570-43]SPS1
 Moon, Yong-Tae 7602 ProgComm
 Moon, Yon-Tae [7620-09]S3
 Moore, Christopher I. [7587-01]S1
 Moore, James [7572-20]SPS1
 Moore, John [7618-46]S10
 Moradi, Hassan [7587-23]S4, [7587-
 32]S5
 Morais, Sara F. A. [7610-21]S5
 Morales, Alma R. [7576-46]S11
 Morales, Magali [7602-19]S4
 Morand, Alain [7597-30]S7, [7604-36]
 S8, [7604-39]S8
 Morandé Sales, Elisa [7567-07]S2
 Morandotti, Roberto [7600-57]S13,
 [7600-65]S15
 Morarescu, Rodica [7586-18]S4
 Mordon, Serge [7548B-40]S2
 More, Karren L. [7586-13]S3, [7586-
 24]SPS2
 Moreau, Alain [7604-06]S1
Morehead, James J. [7578-59]S14
Moreno, Ivan [7617-63]SPS3
 Moreno, Laura E. [7548C-171]S5,
 [7548G-190]S
Moreno Zarate, Pedro P. [7582-50]
 SPS2, [7597-49]S11, [7600-52]S12
 Moresco, Michele [7602-46]S10
 Moret, Mathieu [7602-06]S2
 Moretti, Tony [7587-26]S4
 Morgan, James E. [7550-44]S9
Morgan, Stephen P. 7556
 ProgComm, 7566 ProgComm
 Morgan, Timothy G. [7564-04]S1
 Mori, Akira 7585 ProgComm
 Mori, Tetsuya [7607-27]S7
 Morin, Franck [7550-29]S6, [7580-28]
 S7, [7589-02]S1
 Morin, Michel [7579-44]S11
 Morioka, Hiroshi [7582-22]S5, [7586-
 21]SPS2
 Morita, Yoshinori [7562-26]S6
 Moritz, Michael J. [7597-31]S7
 Moritz, Tobias [7555-44]S9
 Mork, Jesper [7615-18]S5, [7612-35]
 S9, 7616 ProgComm
 Morkoc, Hadis [7602-33]S7, [7602-63]
 S14, 7602 Chr, 7602 S1 SessChr,
 7602 S11 SessChr, [7602-21]S5,
 [7602-23]S5, [7602-59]S13, [7602-
 73]S11, [7602-73]SPS3, [7602-77]
 S11, [7602-77]SPS3, [7602-79]S4
 Morley, Simon [7548C-94]S4, [7548C-
 96]S5
 Morneau, Dominic [7558-13]S3
 Moro, Slaven [7572-09]S3
 Moros, Maria [7575-18]S7
 Morosawa, Atsushi [7554-66]S10,
 [7554-98]SPS1
Morris, Michael D. 7548F
 ProgComm, 7548F S2 SessChr,
 [7548F-140]S1, [7548F-142]S1,
 [7548F-143]S1, [7548F-147]S2,
 7600 ProgComm, [7560-15]S6
 Morris, Stephen J. [7556-22]S6
 Morrissey, Colm [7548F-183]S
 Morshed, Bashir I. [7593-26]S5
Mortensen, Niels A. [7606-40]S11
 Mosbacher, H. L. [7562-23]S5
 Moschenko, A. P. [7610-15]S4
 Moseley, Harvey S. [7594-24]S7
 Mosely, Jeffrey [7564-48]S7
 Moser, Christophe [7579-14]S1,
 [7581-13]S3, [7598-26]S6
 Moser, Rüdiger [7578-32]S8
 Moser, Gaylord [7548G-193]S
 Moses, Jeffrey [7548D-117]S3, [7554-
 01]S1
 Moshegov, Niklay [7583-09]S2
Moskalev, Igor S. [7578-54]S13,
 [7578-55]S13
 Mosley, Karen [7600-17]S4
 Moss, Benjamin R. [7579-51]S3
 Moss, David J. [7609-37]S9
 Moss, Gaylord E. 7619 ProgComm
 Moss, Ian H. WS933 Inst
Moss, Steven C. [7583-06]S1
 Mosse, Charles A. [7548C-180]
 S4, [7573-11]S3, [7573-26]S7,
 [7573-48]SPS1, [7548C-94]S4,
 [7548C-96]S5
 Mosse, Sandy [7551-44]SPS1
 Mossler, Gervaise [7569-57]S8, [7599-
 13]S3
 Mostofi, David [7578-06]S2
 Mota, Alessandro D. [7578-72]SPS2
 Motafakker-Fard, Ali [7589-25]S6
 Motaghiannizam, Reza S. [7554-16]
 S3
Motamedi, M. Edward SympComm
 Motamedi, Saam [7576-32]S8
 Motoc, Adrian [7554-88]SPS1
 Motohisa, Junichi [7608-25]S6
Motojima, Mutsuki [7597-85]SPS3
 Mott, Eric [7548E-130]S3
 Mottay, Eric [7569-98]SPS1, 7589
 ProgComm, 7589 S8 SessChr,
 [7589-02]S1, [7589-06]S2, [7589-
 17]S5, [7589-19]S5, [7589-36]S5,
 [7589-36]S9
 Moudakir, Tarik [7603-46]S10
 Moulin, Thibaut [7604-39]S8
 Mouras, Rabah [7569-109]SPS1
 Mousavi Mehr, Seyyed Hesam [7609-
 51]S11
 Moustakas, Theodore D. [7608-21]S5
 Mow-Lowry, Conor M. [7580-27]S7
Moy, Austin J. [7573-08]S2
 Mozer, Henry [7608-42]S9
Mo'ina, Janez [7598-65]SPS3
 Mroczka, Janusz [7588-12]S3
 Mroz, Pawel [7565-02]S1
 Mu, Xiaodong [7582-38]S8
 Mudanyali, Onur [7568-86]S3
 Muellenbroich, Marie Caroline [7569-
 114]SPS1
 Mueller, Claus-Bernhard [7571-31]S9
 Mueller, Edward J. [7548B-45]S3
 Muir, Gordon [7548B-62]S7, [7548B-
 63]S7, [7548B-64]S7
 Mujagic, Elvis [7616-62]S14
Mujat, Mircea [7548E-122]S1, [7550-
 35]S7, [7555-26]S6, [7561-27]S4,
 [7576-36]S9
 Mukai, David [7554-07]S2, [7555-46]
 S10
 Mukai, Takashi 7602 ProgComm
 Mukai, Yukihiro [7594-14]SPS2
 Mukamel, Shaul [7600-51]S12
 Mukherjee, Jayanta [7597-45]S10
Mukherjee, Sushmita [7548B-36]S1
 Mukherjee, Tamal 7590 ProgComm
 Mulderson, Tim [7548C-68]S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Mulholland, Greg [7602-59]S13, [7602-63]S14, [7602-77]S11, [7602-77]SPS3
- Müller, A. [7611-26]S6
- Müller, Bernhard [7594-25]S7
- Müller, Christian [7599-34]S9
- Müller, Heike H. [7550-03]S1
- Müller, Jens [7555-16]S4
- Müller, Jens [7602-75]S11, [7602-75]SPS3, [7616-16]S4
- Müller, Jürgen [7583-21]S5, [7583-44]SPS2
- Müller, Markus [7616-48]S11
- Müller, Veronika [7571-34]S10
- Mulsow, Matthew [7592-19]S4, [7593-18]S3
- Mulvaney, Paul 7575 ProgComm
- Muminov, Azamat Z. [7590-24]SPS2
- Munce, Nigel R. [7551-22]S6, [7554-43]S7, [7589-14]S4
- Munhoz, Fabiana [7569-96]S3, [7569-98]SPS1
- Muñoz Zurita, Almudena [7575-35]S11
- Muñoz Javier, Ana Luz [7582-50]SPS2
- Munro, Elizabeth A.** [7548G-15]S2, [7615-12]S3
- Murakami, Kenzi 7558 ProgComm
- Murakami, Makoto [7590-01]S1
- Murakami, Takashi [7576-05]S1
- Murali, Supraja [7554-84]S12
- Murali, Supraja [7569-67]S9
- Muralt, Martin [7584-26]S10
- Murari, Krishna** [7610-35]SPS3
- Murata, Masaki [7586-19]S4, [7603-60]SPS3
- Murata, Osamu** [7619-10]S3
- Murazawa, Naoki [7591-19]S5
- Murdoch, Graham B. [7603-10]S3
- Murgu, Septimiu D. [7548C-175]S2
- Muroi, Tetsuhiko [7619-14]S3
- Murphy, Brian A. [7551-14]S3
- Murphy, James L. [7587-01]S1
- Murphy, John A. 7601 ProgComm
- Murphy, Michael L. [7580-15]S4, [7580-15]S6, [7580-15]S1
- Murray, Joel M. [7582-44]S10
- Murray, Lee [7617-71]SPS3
- Murray, Ray [7616-05]S1
- Murray, Todd W. [7564-40]S6, [7564-82]S12
- Murthy, Avinash [7564-118]SPS1, [7576-28]S7, [7577-39]S8
- Murthy, Niren [7576-10]S3
- Murthy, Shashi 7593 S6 SessChr, [7593-24]S5
- Murty, Ramana [7615-02]S1
- Murua Escobar, Hugo [7589-09]S3
- Murugkar, Sangeeta [7569-93]SPS1
- Musikhin, Sergey [7569-95]S7
- Mussivand, Tofy [7593-26]S5
- Muthiah, Chinnaamy [7576-11]S3
- Muthu, Priya [7571-05]S1
- Muthukatti, R. [7561-40]SPS1
- Mutig, A. [7597-27]S6, [7615-22]S6, [7597-53]S12, [7610-23]S6
- Mutyal, Nikhil N. [7561-28]S4, [7563-05]S1, [7573-34]S8
- Muys, Peter [7597-35]S8
- Myara, Mikhael [7580-106]SPS2
- Myatt, Chris [7572-11]S3, 7553 ProgComm
- Mycek, Mary-Ann** [7548F-142]S1, 7555 ProgComm, 7555 S6 SessChr, [7555-02]S1
- Mycek, Mary-Ann [7570-06]S1
- Myers, Abbey G. [7578-87]SPS2
- Myers, Jeffrey A. [7578-87]SPS2
- Myers, John D. [7578-87]SPS2
- Myers, Michael J. [7578-87]SPS2
- Myers, Richard A. [7550-72]SPS1
- Myers, Tanya L. [7608-13]S3
- Myllylä, Risto A.** 7572 ProgComm, [7593-43]SPS2
- Mynderse, Lance A. [7548B-44]S3
- Myneni, Vimeetha [7570-02]S1
- Myoung, NoSung [7578-52]S13
-
- N**
- Na, Chang Su [7554-91]SPS1
- Na, Jihoon [7556-39]SPS1
- Na, Jong Ho [7603-35]S8
- Nabaei, Mohammad [7584-44]SPS2
- Naber, Andreas [7571-04]S1, [7571-42]SPS1
- Nabiev, Igor R. 7575 S10 SessChr, [7575-11]S5
- Nabiev, Rashit [7615-02]S1
- Nacke, Christoph [7599-43]S11
- Nadeau, Jay L.** 7575 ProgComm, 7575 S4 SessChr, [7575-27]S9
- Naderi, Nader A. [7597-47]S10, [7616-15]S3
- Nadiarykh, Oleg [7562-04]S1, [7569-47]S7
- Nadkarni, Seemantini K.** 7548D S3 SessChr, [7548D-112]S2, [7548D-121]S4
- Nadtochenko, Victor [7577-25]S6
- Nadtochiy, A. M. [7597-53]S12
- Nadtochiy, Alexey A. [7615-22]S6
- Naeser, Margaret** [7552-20]S4
- Nag, Joyeeta [7586-05]S1, [7597-37]S8, [7603-31]S7
- Nagamachi, Ryuusuke [7594-21]S6
- Nagano, Tetsuo [7568-49]SPS1, [7576-09]S3, [7576-54]SPS1, [7576-60]SPS1
- Naganuma, Kaori [7583-31]S7
- Nagao, Tadaaki** [7600-61]S14
- Nagar, Saurabh [7603-20]S4
- Nagasaka, Yuji [7593-04]S1, [7594-21]S6
- Nagasaki, Yukio [7576-22]S6
- Nagata, Kengo [7602-76]S11, [7602-76]SPS3
- Nagle, Julien [7616-35]S8
- Nagy, Peter [7598-53]SPS3
- Nair, Rohit [7607-16]S4
- Nair, Tejas [7548E-134]S3
- Najafi, Khalil [7592-04]S1
- Naji, Maji** [7569-93]SPS1
- Najiminaini, Mohamadreza [7562-09]S2, [7568-34]S6, [7577-35]S8
- Nakabayashi, Takakazu [7576-13]S4
- Nakagawa, Shigeru [7607-22]S6
- Nakahara, Sumio [7619-39]SPS3
- Nakai, Kei [7550-57]S11
- Nakamachi, Eiji** [7555-05]S1, [7556-34]SPS1
- Nakamichi, Tokuma [7599-47]S12
- Nakamura, Daisuke** [7550-69]SPS1, [7586-10]S3
- Nakamura, Shuji [7616-19]S4, [PW1000P1-01]SOPL2, [PW1000P1-01]S, [7602-43]S9
- Nakamura, Tomonari [7581-05]S1
- Nakamura, Toshihiro [7579-50]SPS2
- Nakanishi, Takayuki [7598-07]S2
- Nakano, Kenji [7597-51]S11, [7597-61]S13
- Nakano, Yoshiaki [7605-04]S2
- Nakata, Yoshiki [7584-16]S6, [7584-16]S10
- Nakkach, Mohamed [7577-33]S7
- Nalcioglu, Orhan [7557-07]S2
- Nalcioglu, Orhan [7557-09]S3
- Nalcioglu, Orhan [7557-34]SPS1, [7557-35]SPS1
- Nalcioglu, Orhan [7567-16]S4
- Naldi, Marina [7574-12]S2
- Nam, Kim** [7618-09]S2
- Nam, Minwoe** [7592-26]S5
- Nam, Ok-Hyun 7602 ProgComm
- Nam, Sanghun [7599-53]SPS3
- Namati, Eman** [7548C-78]S2, [7548C-79]S2
- Nambu, Mika [7564-98]SPS1
- Namihara, Yoshinori [7609-64]SPS3, [7609-34]S8, [7609-63]SPS3
- Nampoori, Vadakedathu P. N.** [7610-35]SPS3
- Nanishi, Yasushi 7602 Chr, 7602 S5 SessChr
- Nanjo, Takuya [7562-13]S4, [7562-47]SPS1
- Nankivil, Derek D.** [7550-86]SPS1
- Naoum, Rafah [7609-53]SPS3
- Napartovich, Anatoly P.** [7580-72]SPS2, [7581-02]S1
- Naphas, Renee D. [7563-19]S4
- Naqavi, Ali [7607-44]SPS3
- Naranjo Tackman, Ramon [7550-08]S2
- Narasimhan, Sankar [7564-36]S5
- Narayana Samy, Aravind [7592-24]S5
- Narazaki, Aiko [7584-07]S2
- Narcy, Gregoire [7616-31]S7, [7616-31]S12
- Nase, Gabriele [7569-101]SPS1
- Nash, Kelly L. [7576-23]S6
- Nastac, Dumitru I. [7574-14]S2
- Nasu, Hatsuko [7561-43]SPS1
- Nasu, Hiroyuki [7598-08]S2, [7598-57]SPS3
- Nataf, Gilles [7602-15]S3
- Natarajan, Shyam [7555-22]S5
- Nath, Veerendra [7550-86]SPS1
- Nathan, Vaidya 7608 ProgComm, 7608 S18 SessChr
- Näther, Dirk U. [7580-26]S7
- Naulleau, Patrick P. 7591 ProgComm
- Naumann, Dieter 7560 ProgComm
- Nava, Armando [7592-13]S3
- Navab, Nassir 7557 ProgComm
- Navarro Y Garcia, Fabrice** [7576-49]S12
- Nawashiro, Hiroshi [7573-29]S7
- Naylor, Mark F. 7565 ProgComm, 7565 S2 SessChr, [7565-05]S2
- Nazari, Marziyeh [7597-71]SPS3
- Nazemi, Jonathan [7548D-104]S1
- Neagu, Liviu P. [7580-23]S6
- Nebel, Achim [7585-16]S4
- Nedosekin, Dmitry [7564-51]S8
- Nee, See-Mie F. [7556-02]S1, [7573-40]SPS1
- Nee, Tsu-Wei** [7556-02]S1, [7573-40]SPS1
- Needleman, Daniel J. [7618-20]S6
- Neel, Delphine [7613-31]SPS3
- Neev, Joseph 7589 Chr, 7589 S4 SessChr
- Negishi, Kazuya [7576-75]S2
- Negres, Raluca A. [7581-12]S3
- Negrutiu, Meda-Lavinia** [7549-03]S1, [7554-88]SPS1
- Nehra, Ajay [7548B-39]S2
- Neil, Mark [7548G-162]S5, [7593-02]S1
- Nejeczleb, Karel [7578-78]SPS2, [7578-82]SPS2, [7578-84]SPS2
- Nel, Andre [7576-17]S5
- Nelson, Alan C. [7570-17]S4
- Nelson, Darin A. [7555-23]S5
- Nelson, Erik C. [7591-29]S7
- Nelson, Keith A. [7600-54]S13
- Nelson, Michael [7593-37]S7
- Nelson, Robert L. 7599 Chr, 7599 S5 SessChr, 7599 S1 SessChr, 7604 ProgComm, 7604 S10 SessChr, [7604-45]S10
- Nemec, Hynek [7600-11]S3
- Nemec, Michal** [7549-08]S1, [7559-05]S, [7578-82]SPS2
- Nemet, Gregory [7582-01]S4, [7582-01]S6, [7582-01]S1
- Nemeyer, Adam [7548B-49]S4
- Nemov, Sergey A. [7582-50]SPS2
- Nemova, Galina [7614-05]S2
- Nemukhin, Alexander V. [7576-14]S4
- Neshataeva, Ekaterina [7603-55]S12
- Nesi, Gabriella [7548B-33]S1
- Nesin, Vasyil V. [7548G-156]S3
- Nestler, Matthias [7591-33]S8
- Netesova, Nadezhda P. [7597-84]SPS3
- Neu, Walter [7596-18]S3
- Neuberth, Nicole [7571-04]S1
- Neuenschwander, Beat 7584 S11 SessChr, [7584-26]S10
- Neumann, Jörg [7578-03]S1, [7580-88]SPS2
- Neumann, Norbert** [7594-32]S9
- Neumann, Thomas [7570-17]S4
- Neumeyer, Dirk [7569-16]S2
- Nevedomsky, Vladimir N. [7608-61]S13
- Neves-Petersen, Maria Teresa 7571 ProgComm
- Nevou, Laurent [7602-45]S10
- Newell, Timothy [7578-17]S4
- Newport, David [7554-24]S4
- Neyts, Kristiaan [7613-10]S3
- Ng, Beng-Koon [7554-87]SPS1
- Ng, Chi Chung [7590-25]SPS2
- Ng, Eldon** [7557-37]SPS1, [7568-34]S6
- Ng, Siang Ping [7583-36]S8
- Ngai, Peter [7617-41]S8
- Ngezahayo, Anacleit [7589-09]S3
- Ngo, Trong-Hieu [7607-47]SPS3
- Nguyen, Binh-Minh** [7608-60]S13, [7608-94]S16
- Nguyen, Cac T. [7554-31]S5, [7573-37]S9
- Nguyen, Chi Thanh [7599-17]S4
- Nguyen, Dan T. [7582-26]S6, [7582-29]S7
- Nguyen, Dan [7599-39]S10
- Nguyen, Daniel [7549-07]S1
- Nguyen, Dien [7556-21]S5
- Nguyen, Dinh C. [7588-10]S2
- Nguyen, Duy H. [7606-03]S1
- Nguyen, Elaine [7548E-123]S1
- Nguyen, Freddy T. [7576-35]S9
- Nguyen, Hoang** [7609-23]S5
- Nguyen, Lam Duy [7598-13]S3, [7598-25]S6
- Nguyen, Nga [7607-47]SPS3
- Nguyen, Quan [7550-73]SPS1
- Nguyen, Thanh L. [7575-45]S9
- Nguyen, Thanh T. [7580-27]S7
- Nguyen, Thanh Nam [7598-22]S5
- Nguyen, Thu [7548A-11]S
- Nguyen Thanh, Hoa [7561-07]S1
- Nhembe, Farai [7548C-94]S4, [7548C-96]S5
- Ni, Chen [7618-09]S2
- Ni, Karl [7606-39]S10
- Ni, Xianfeng [7602-23]S5, [7602-33]S7, [7602-59]S13, [7602-63]S14, [7602-73]S11, [7602-73]SPS3, [7602-77]S11, [7602-77]SPS3, [7602-79]S4
- Nichols, Sarah R. [7569-23]S3
- Nicklaus, Kolja [7578-64]S15
- Nicolau, Dan V.** TrackChr, 7568 Chr, [7568-29]S3, 7574 Chr, 7574 S1 SessChr, 7574 S SessChr, [7574-12]S2, [7574-14]S2
- Nie, Shuming 7575 ProgComm
- Nielsen, Claus H. [7615-09]S3
- Nielsen, Tim 7557 ProgComm

Index of Authors, Chairs, and Committee Members

- Niemann, Heiner [7589-07]S3
 Nienhuis, Gerard 7613 ProgComm, 7613 S5 SessChr, [7613-14]S4
 Nien-Shy, Chyong [7589-03]S1
 Niino, Hiroyuki 7584 Chr, 7584 S9 SessChr, 7584 S1 SessChr, [7584-07]S2
 Nikishin, Sergey A. [7602-62]S14
 Niklaus, Muhamed [7593-11]S2
 Nikol, Hans 7617 ProgComm, 7617 S5 SessChr, [7617-34]S7
 Nikolaev, Ivan [7617-32]S6
 Nikolajsen, Thomas [7580-75]SPS2
 Nikolenko, Volodymyr [7548G-154]S2
 Nikolskij, Andrej [7619-22]SPS3
Nikulin, Vladimir V. [7587-14]S3, [7587-17]S3, [7619-11]S3
 Nilsson, Gert E. PanelMember, [7563-02]S1, [7563-14]S3, [7563-32]SPS1, 7572 ProgComm
 Nilsson, Johan SC748 Inst, [7580-56]S13, [7580-58]S13, [7598-47]S11
 Nimmi, K. P. [7619-20]S4
 Nimo, Antwi [7594-25]S7
 Ning, Cun-Zheng 7597 ProgComm
 Ninkov, Zoran [7596-17]S4
 Nishi, Hidetaka [7606-27]S8
 Nishi, Okihiko [7550-100]S
 Nishida, Takehiro [7583-02]S1
 Nishii, Junji [7589-33]S8, [7589-48]SPS2
 Nishii, Junji [7598-64]SPS3
 Nishikawa, Jun [7558-14]S3
 Nishikino, Masaharu [7589-45]SPS2
Nishimura, Hiroki [7597-22]S5
Nishimura, Nozomi [7569-92]SPS1
 Nishioka, Masao [7610-12]S3
 Nishioka, Norman S. 7558 ProgComm, [7558-02]S1, [7558-16]S4, [7558-17]S4
 Nishiyama, Hiroaki [7589-33]S8, [7589-48]SPS2
 Nitta, Junsaku [7600-46]S11
 Niu, Hanben [7569-74]SPS1
 Niu, Ping Juan [7606-43]SPS3
 Nixon, William E. [7601-03]S1, [7601-04]S1
 Nizamov, Shavkat [7571-40]SPS1
 Nizomov, Negmat N. [7571-40]SPS1
 Nkenke, Emeka [7555-42]S9
 Noad, Julian P. [7598-24]S6
 Nobile, Michele [7616-22]S5, [7616-62]S14
 Noble, Robert J. [7609-45]S10
 Nobre dos Santos, Marines [7549-23]S, [7549-17]S
 Noda, Susumu 7609 ProgComm
 Nodop, Dirk [7578-58]S14, [7580-13]S3, [7580-64]S15, [7580-90]SPS2
 Noe, John W. [7613-33]SPS3
 Noel, Patrice [7603-61]SPS3
 Noell, Wilfried 7594 ProgComm, 7594 S9 SessChr, [7594-13]S4, [7594-19]S6, [7594-26]S7
 Noh, Min-Soo [7602-41]S9
 Noh, Young K. [7606-03]S1
 Noh, Young-Ouk [7554-55]S8
 Noharet, Bertrand [7602-78]SPS3, [7602-78]S11
 Noiseux, Isabelle [7553-11]S3, [7567-09]S2, [7567-10]S3, [7568-44]S5
 Nolan, Daniel A. [7582-56]SPS2, [7613-04]S1
Nolte, David D. [7555-23]S, [7573-09]S2, [7574-16]S3, [7574-32]SPS1
 Nolte, Ingo [7589-09]S3, [7613-25]S7
 Nolte, Stefan SC743 Inst, [7580-55]S13, 7584 S8 SessChr, 7589 Chr, 7589 S12 SessChr, [7589-16]S5, [7589-28]S7, [7589-30]S8, [7589-43]S8, [7589-43]S12
 Nomoto, Hiroyuki [7550-04]S1, [7550-31]S6, [7550-32]S6
 Nontapot, Kanokwan [7608-22]S5
 Noojin, Gary [7562-29]S7
Noordegraaf, Danny [7580-45]S11, [7580-48]S11, [7580-84]SPS2
 Noordmands, Herke Jan [7561-24]S4, [7548G-157]S3, [7549-13]S2, [7548B-60]S6, [7556-30]S8
 Nootz, Gero [7600-07]S2
 Nordlund, Kai [7586-07]S2, [7586-23]SPS2
 Nordquist, Christopher D. [7590-08]S2
 Nordquist, Robert E. [7565-05]S2, [7565-06]S2, [7565-07]S3
 Nordstrom, Robert J. 7567 Chr, 7567 S3 SessChr, 7567 S2 SessChr, [7567-01]S1
 Norgia, Michele [7572-09]S2
Norin, Lars O. [7580-07]S2
 Norman, Stephen [7580-92]SPS2
 Norris, Theodore B. [7553-02]S1
 North, Rachel V. [7550-55]S11
 Northrup, John [7616-17]S4
 Norton, Andrew P. [7595-04]S1
 Norton, David P. [7603-38]S9
Norwood, Robert A. 7599 ProgComm, [7599-04]S1, [7599-05]S2, [7599-22]S6, [7599-39]S10, [7599-42]S11, [7619-41]S4
 Nothdurft, Ralph [7576-11]S3
 Notomi, Masaya 7609 ProgComm, [7609-02]S1
 Nötzel, Richard [7610-37]S5
 Nouvel, Philippe [7608-41]S9
 Nouvong, Aksone [7555-40]S8
 Novak, Dalma 7620 ProgComm
 Novak, Jakub [7578-84]SPS2
 Novak, Joseph M. [7606-51]SPS3, [7607-35]S8
 Novelli, Marco [7555-06]S2, [7573-48]SPS1
 Novikov, Innokenty I. [7616-54]S13
 Novotny, Lukas [7553-14]S1
 Nowaczyk, Kazimierz [7569-01]S
 Nowatzky, Andreas G. 7568 ProgComm
 Nowy, Stefan [7617-40]S8
 Nozaki, Shinya [7609-34]S8, [7609-63]SPS3, [7609-64]SPS3
 Nozik, Arthur J. [7600-36]S8
Nseyo, Unyime O. 7548B ProgComm, 7548B S7 SessChr, [7548B-61]S7, [7548B-66]SPS1
 Ntemou, Asimina [7548B-61]S7
 Ntumba, K. [7575-27]S9
Ntziachristos, Vasilis 7557 ProgComm, [7557-03]S1, 7564 S9 SessChr, [7564-19]S3, [7564-20]S3, [7564-27]S4, [7564-62]S9, [7564-80]S11, [7564-110]SPS1
Nuernberger, Patrick [7560-20]S3
 Numata, Kenji [7582-19]S5
 Nunna, K. [7610-10]S3
 Nunzi, Jean-Michel 7599 ProgComm
 Nunzi conti, Gualtiero [7559-08]S, 7604 CoChr, 7604 S1 SessChr, [7604-34]S7
 Nussbaum, Christian [7584-26]S10
 Nüsse, Nils C. [7609-09]S3
 Nuster, Robert [7564-25]S4, [7564-30]S5, [7564-108]SPS1
 Nuzzo, Valeria [7589-02]S1
 Nyagilo, James [7576-30]S8
Nyeo, Su-Long [7550-63]SPS1
 Nyga, Sebastian [7578-25]S4, [7578-25]S6, [7578-25]S1
 Nygard, Einar [7557-07]S2
 Nyman, Jeffrey S. [7548F-149]S3, [7548F-183]S
 Nyushkov, Boris N. [7580-104]SPS2

O

 O, Beom-Hoan [7605-29]SPS3
 Oak, Sahil [7594-17]S5
 Oakes, David B. [7581-03]S1
 Obara, Go [7584-15]S6, [7584-15]S10, [7589-46]SPS2
Obara, Minoru [7551-30]S7, [7562-33]S7, [7564-47]S7, [7584-15]S6, [7584-15]S10, [7589-46]SPS2, [7603-62]SPS3, [7609-58]SPS3
 Obata, Daisuke [7562-26]S6
 Obata, Kotaro [7584-20]S7, [7584-20]S11
Ober, Raimund J. 7570 ProgComm, 7570 S4 SessChr, [7570-03]S1, [7575-19]S7
 O'Brien, Chris [7590-15]S3
O'Brien, Christine [7564-48]S7
 O'Brien, Peter J. [7555-38]S8
 O'Callaghan, James R. [7604-18]S4
 Ochalski, Tomasz J. [7610-26]S6
 Ochiai, Takahide [7616-61]S14
 Ochoa, Juan R. [7578-40]S10
 Ochs, Markus [7575-35]S11
 O'Connell, Marie-Louise [7563-32]SPS1
 Oda, Motoki [7561-43]SPS1
 Odaira, Yasuo [7597-22]S5
 O'Daniel, Jason K. [7616-32]S8
 Ode, Takahiro [7557-36]SPS1
Oden, Patrick I. 7596 ProgComm, 7596 S4 SessChr
 Odhner, Johanan [7582-21]S5
 O'Doherty, Jim [7563-32]SPS1
 O'Donnell, Frederick J. [7616-33]S8
O'Donnell, Matthew 7564 ProgComm, 7564 S2 SessChr, [7564-41]S6, [7564-134]S
 O'Donoghue, Shane [7608-02]S1
 Odriozala, Helena [7616-51]S12, [7597-46]S10, [7597-54]S12, [7616-50]S12
 O'Driscoll, Ian P. [7616-04]S1
 Oelckers, Stefan [7548C-75]S1
 Ofan, Avishai [7605-21]S8
 O'Faolain, Liam [7606-14]S5, [7606-40]S11
 Offerhaus, Herman L. [7569-14]S2
 Offerre, Bert J. 7607 ProgComm, [7607-20]S5, 7607 S5 SessChr, [7607-18]S5, [7607-19]S5
 Ogata, Manabu [7550-69]SPS1
 Ogawa, Kanade [7589-18]S5
 Ogawa, Mikako [7576-03]S1, [7576-09]S3, [7576-60]SPS1
 Ogilvie, Jennifer P. [7569-23]S3
 Ogiso, Yuji [7602-76]S11, [7602-76]SPS3
 Ogul, Tracy [7581-15]S4, [7581-16]S4
 Ogura, Hiroyuki [7561-43]SPS1
 Ogura, Ichiro [7607-07]S2
 Oh, Christian [7548A-27]SPS1, [7548E-135]S4, [7548G-152]S1, [7548G-153]S1, [7548G-166]SPS1
 Oh, Geum-Yoon [7597-68]SPS3, [7603-65]SPS3, [7606-49]SPS3, [7608-51]S11
Oh, Haekwan [7592-23]S5, [7592-26]S5
 Oh, Jae E. [7606-03]S1
 Oh, Jeong Rok [7617-62]SPS3
 Oh, Ju Hyun [7605-27]SPS3
 Oh, Jungwhan [7555-21]S5
 Oh, Kyoung-Hwan [7601-12]S3
 Oh, Min Hyun [7580-105]SPS2
 Oh, Min-Cheol [7554-55]S8, [7604-25]S5, [7604-50]SPS3
Oh, Sanghoon [7548E-136]S4, [7556-20]S5, [7559-19]S
 Oh, SeungHun [7605-26]SPS3
 Oh, Wang Yuhl [7554-04]S1, [7554-60]S9, [7548C-77]S2, [7554-64]S10
Oh, Youngjin [7577-47]SPS1
 O'Hara, Julia A. [7551-14]S3, [7551-25]S6, [7551-44]SPS1, [7568-74]S2
 Ohba, Toshiyuki [7589-45]SPS2
 Oheim, Martin [7575-16]S6
 Ohhara, Takao [7597-79]SPS3
 Ohira, Ryuichiroh [7618-38]S10
 Ohira, Tatsuya [7582-22]S5
 Ohishi, Yasutake 7598 ProgComm, [7598-08]S2, [7598-57]SPS3, [7598-58]SPS3, [7598-59]SPS3
Ohkawa, Masashi [7597-22]S5, [7597-51]S11, [7597-61]S13, [7597-85]SPS3
Ohki, Makoto [7619-26]SPS3
 Ohlhausen, James A. [7592-08]S2
 Ohm, Christian [7618-28]S7
 Ohmae, Etsuko [7561-43]SPS1
 Ohmi, Masato [7554-94]SPS1, [7562-36]S8
Ohmori, Tsutomu [7564-105]SPS1
 Ohnishi, Makoto [7562-36]S8
 Ohno, Hideo [7603-07]S2
 Ohno, Tomoki [7583-31]S7
 Ohta, Hiroaki [7616-19]S4
 Ohta, Nobuhiro [7576-13]S4
 Ohtani, Keita [7603-07]S2
 Ohtsu, Motoichi [7586-12]S3
 Ohuchi, Yasuhiro [7619-32]SPS3
 Oi, Ryutarou [7619-05]S1, [7619-34]SFS3
 Oka, Michio 7578 ProgComm
Okada, Tatsuo [7550-69]SPS1, [7586-10]S3, 7603 ProgComm, 7603 S12 SessChr, [7603-53]S12
 Okada, Tomoko [7576-55]SPS1
 Okada-Shudo, Yoshiko [7599-10]S3
 Okamoto, Takeshi [7558-14]S3
 Okazaki, Kota [7586-10]S3
 O'Kelly, James [7555-53]SPS1
 Okhotnikov, Oleg G. [7580-42]S10, [7580-81]SPS2
 Oki, Yuji [7599-47]S12
 Okita, Yoshinari [7559-06]S
 Okorogu, Albert O. 7619 ProgComm
 Okसानen, Jani [7614-15]S4
 Oku, Hiromasa [7594-05]S6, [7594-05]S2
 Oladipupo, Sunday [7564-05]S1
Olafsson, Ragnar [7564-122]SPS1, [7564-123]SPS1
 Oláh, Csaba [7552-21]S4
 Oláh, Mihály [7552-21]S4
Olarte, Omar [7570-32]S7
Olausson, Christina B. [7580-38]S9, [7580-48]S11
Oldenburg, Amy [7554-69]S11, [7554-71]S11
 Oleinick, Nancy L. [7548E-130]S3, 7551 ProgComm, [7551-02]S1
Olesberg, Jonathon T. [7617-71]SPS3
 Olivares Pérez, Arturo [7619-28]SPS3, [7619-29]SPS3
 Olive, Christian [7548A-01]S
Olive, D. Michael 7576 S6 SessChr, [7576-71]S2
 Oliveira, Luciane F. [7582-47]S10
 Oliveira, Priscila C. [7552-24]SPS1
 Oliveira, Vitor B. [7589-13]S4
Oliveira, Jeffrey W. [7562-29]S7
Olivier, Nicolas [7550-48]S10, [7570-29]S6, [7603-61]SPS3, [7615-18]S5
Olivier, Scot S. [7550-36]S7, 7595 Chr, 7595 S2 SessChr
 Ollila, Jyrki [7607-39]S9
 Olson, Don [7583-54]SPS2
 Olson, Eben [7555-36]S7
 Olsson, Roy H. [7592-08]S2

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Omelchenko, Alexander I.** [7566-11]S3
Omenetto, Fiorenzo [7553-05]S2, [7553-15]S4, [7591-14]S4
Omi, Soichiro [7599-27]S7
Omigawa, Yu [7621-22]S6
Omran, Haitham [7594-30]S9
O'Neal, Chad B. [7592-12]S3
O'Neil, Patrick K. [7555-23]S
O'Neill, William [7584-32]S11, [7590-07]S1
Ong, Chi Wi [7599-50]SPS3
Onishchukov, Georgy [7621-08]S3
Ono, Kenichi [7583-02]S1
Ono, Luis K. [7604-10]S2
Onofri, Fabrice R. A. [7588-12]S3
Ooi, Boon-Siew [7616-01]S1
Oomi, Soichiro [7599-47]S12
Oppenheim, Yaakov [7583-11]S3
O'Quinn, Elizabeth C. [7548F-149]S3
Oraevsky, Alexander A. 7564 Chr, 7564 S SessChr, 7564 S1 SessChr, 7564 S7 SessChr, 7564 S SessChr, [7564-22]S4, [7564-24]S4, [7564-56]S8, [7564-67]S10, [7564-73]S11, [7564-74]S11, [7564-129]SPS1
Orcutt, Jason S. [7579-51]S3
Orenstein, Meir [7612-29]S8
Orgiani, Pasquale 7603 S6 SessChr, 7603 S7 SessChr, [7603-30]S7
Orlic, Susanna 7599 ProgComm, [7599-34]S9
Orlova, Anna G. [7557-18]S4, [7568-21]S5
Oron, Dan [7589-06]S2
Orr, Brian J. [7582-18]S5
Orr, Linda [7548C-70]S1
Orsal, Gaele [7603-46]S10
Ortega, Arthur [7548A-27]SPS1, [7548E-135]S4, [7548G-152]S1, [7548G-153]S1, [7548G-166]SPS1
Ortega, Tiago A. [7578-72]SPS2
Ortega-Quijano, Noé [7548A-08]S, [7548F-145]S2, [7562-10]S3
Ortiz, Gerardo G. [7587-30]S5
Ortiz-Gutiérrez, Mauricio [7568-78]S
Ortmann, Uwe [7569-26]S4, [7569-32]S5
Ortsiefer, Markus [7615-25]S6
Orzkowsky-Schroeder, Regina B. [7568-82]S4
Osellame, Roberto 7585 ProgComm, [7585-13]S3, [7589-10]S3, [7589-29]S7
Osgood, Richard M. 7605 ProgComm, 7605 S9 SessChr, [7605-21]S8
Osgood, Richard M. [7618-19]S5
Osher, Jonas [7548C-94]S4
Oshima, Yusuke [7560-05]S2
Oshita, Shugo [7576-13]S4
Osiko, Vjatcheslav V. [7578-75]SPS2, [7578-76]SPS2
Osiniski, Marek 7575 Chr, 7575 S9 SessChr, 7575 S SessChr, [7575-33]S10, 7597 Chr, 7597 S1 SessChr
Osmond, Johann [7606-26]S7
Osouf, Jocelyne [7567-10]S3
Ostapenko, Irina A. [7610-15]S4
Ostendorf, Andreas 7585 ProgComm
Ostrovnikov, Vasily [7578-31]S8
Ostrovkikhova, Oksana [7599-25]S6
Ostrowski, Alexis D. [7575-41]SPS1
O'Sullivan, Ciara K. [7593-22]S4
O'Sullivan, Creidhe M. M. 7601 Chr
O'Sullivan, Thomas D. [7548G-155]S2, [7615-12]S3
Odady, Deitze [7559-07]S, [7583-15]S3
Otoboni, José A. [7556-35]SPS1
Otsuka, Kenju [7613-02]S1
Ott, Guenter [7562-41]S9
Otto, Cees [7569-14]S2
Otto, Pamela [7564-67]S10
Otto, Thomas [7594-38]SPS2
Otugen, Volkan [7579-28]S7
Ou, Chung-Jen [7550-79]SPS1, [7556-37]SPS1, [7562-48]SPS1, [7566-13]S3, [7597-81]SPS3, [7597-82]SPS3, [7617-64]SPS3
Ou, Fang [7599-18]S5
Ou, Haiyan [7617-36]S7
Ouakli, Nicolas [7573-45]SPS1
Oubei, Hassan M. [7582-04]S2
Ougazzaden, Abdallah [7597-11]S3, [7603-46]S10
Oukrif, Dahmane [7555-06]S2
Ousten, Yves [7583-40]SPS2
Ouzounov, Dimitre G. [7581-22]SPS2
Ovtchinnikov, Alexander [7583-09]S2
Owari, Hiroshi [7607-27]S7
Ozaki, Masanori 7618 S3 SessChr, [7618-16]S4
Ozaki, Tsuneyuki [7569-94]SPS1, [7600-65]S15
Özbay, Ekmel 7609 ProgComm
Ozcan, Aydogan [7568-86]S3, 7598 ProgComm
Ozcan, Meric [7619-19]S4
Ozden, Nuri [7573-25]S6
Özel, Deniz [7573-31]S7
Ozen, Metin 7590 ProgComm
Özgur, Ümit [7602-77]S11, [7602-77]SPS3, [7602-59]S13, [7602-23]S5, [7602-63]S14, [7602-73]S11, [7602-73]SPS3, [7602-79]S4
Ozkumur, Emre [7553-17]S5, [7553-19]S5
Ozturk, Alper [7584-27]S10
- ## P
- Pache, Christoph [7550-15]S3, [7554-42]S7, [7554-77]S12, [7554-99]SPS1
Pacheco, Katherine B. [7618-22]S6
Pacheco, Marcos Tadeu T. [7552-15]S3
Pacifici, Domenico 7609 ProgComm
Packirisamy, Muthukumaran [7555-49]S10
Padgen, Michael R. [7593-15]S3
Padgett, Miles J. 7613 ProgComm, [7613-20]S6
Padilha, Lazaro A. [7600-07]S2
Padiou, Christian [7548D-115]S3
Padiyar, Dinesh [7599-22]S6
Paek, Andrew [7566-02]S1
Pagano, Roberto [7598-34]S8, [7606-05]S2
Page, Robin H. [7593-31]S6
Pagnod-Rossiaux, Philippe [7580-76]SPS2, [7616-34]S8
Pahapill, Juri [7599-43]S11
Paiella, Roberto [7608-21]S5
Paik, Chang H. [7576-03]S1
Paik, David S. [7576-03]S1
Pain, Thierry [7598-22]S5
Painchaud, Yves [7579-44]S11
Painter, Oskar J. [7609-28]S7
Pakarinen, Jukka [7586-07]S2
Pakhomov, Andrei G. [7548G-156]S3
Pal, Sudeshna [7553-03]S1
Palanisamy, Nithiyantham [7550-67]SPS1
Palanker, Daniel V. 7550 ProgComm, 7550 S7 SessChr, [7550-04]S1, [7550-31]S6, [7550-32]S6, [7562-34]S8
Palchan, Mila [7591-30]S7
Palima, Darwin [7613-03]S1
Palit, Sabarni [7607-17]S4, [7616-28]S7, [7616-28]S12
Páll, Valéria [7552-21]S4
Palla, Andrew D. [7581-01]S1, [7581-20]S4
Pallikkuth, Sandeep [7571-01]S1
Palm, Joerg [7585-32]S12, [7585-32]S6
Palmisano, Tommaso [7598-45]S11
Palosz, Witold [7578-38]S10
Palsdottir, Bera [7580-87]SPS2
Pálsson, Magnus [7578-61]S15
Paltau, Guenther [7564-23]S4, [7564-25]S4, 7564 ProgComm, 7564 S4 SessChr, [7564-21]S4, [7564-30]S5, [7564-108]SPS1
Pan, Ci-Ling 7618 ProgComm
Pan, Dipanjan [7576-37]S9
Pan, Huapu [7598-33]S8
Pan, Janet L. [7600-13]S3
Pan, Lei [7564-32]S5
Pan, Liuzhan [7579-49]SPS2
Pan, Min-Cheng [7573-50]SPS1
Pan, Min-Chun [7573-50]SPS1
Pan, Wei J. [7604-30]S7
Pan, Yinsheng [7554-09]S2
Panayotov, Krassimir 7615 ProgComm
Pande, Paritosh [7554-32]S5, [7561-23]S4
Pandey, Kiran [7561-19]S3
Pandikunta, Mahesh [7602-62]S14
Paniccia, Mario J. 7606 ProgComm, 7606 S12 SessChr, 7616 ProgComm, 7616 S7 SessChr
Panigrahi, Prasanta K. [7563-08]S1
Panizza, Pascal [7604-06]S1
Panova, Ina G. [7550-68]SPS1
Pansu, Robert B. [7589-06]S2
Pantha, Bed N. [7602-34]S7
Pantola, Chayanika [7561-19]S3
Papas, Eric B. [7550-88]SPS1
Papaullon, Ian 7593 ProgComm
Papillon, Aline [7548A-22]S
Pappert, Steve A. 7579 ProgComm, 7579 S11 SessChr
Parak, Wolfgang J. 7575 Chr, 7575 S2 SessChr, 7575 S1 SessChr, [7575-06]S3, [7575-16]S6, [7575-35]S11, [7575-36]S11
Parameswaran, Ash M. [7593-12]S2
Paranjape, Amit [7554-92]SPS1
Paras, Constantine [7555-31]S6, [7555-45]S9
Pardesi, Omar [7568-74]S2
Paré, Claude [7580-96]SPS2
Paredes, Stephan [7607-21]S5
Parekh, Sapun [7569-21]S2
Parekh, Shyam [7620-16]S2
Parel, Jean-Marie A. 7550 ProgComm, 7550 S2 SessChr, [7550-21]S4, [7550-42]S9, [7550-86]SPS1
Parent, Jérôme [7570-09]S2
Parillaud, Olivier [7616-35]S8, [7616-51]S12
Parillaud, Oscar [7616-50]S12
Paris, Daniela [7578-81]SPS2
Parisotto, Thais M. [7549-23]S
Park, B. Hyle [7548E-135]S4, [7548G-153]S1, [7548G-152]S1, [7554-60]S9
Park, C. W. [7572-24]SPS1, [7572-15]SPS1
Park, Chul-Seung [7571-41]SPS1
Park, Chulyoung [7599-52]SPS3
Park, Gyoungwon [7615-05]S2
Park, Hee K. [7585-06]S2
Park, Hye M. [7568-72]S1, [7568-76]S1
Park, Hyle [7548A-27]SPS1, [7548G-166]SPS1
Park, Hyo-Hoon 7607 ProgComm, 7607 S4 SessChr, [7607-25]S6, [7607-30]S7, [7607-47]SPS3
Park, Hyundai [7606-31]S8
Park, Jae Seok [7554-82]S12
Park, Jae-Hyeung [7618-05]S2, [7618-09]S2, [7619-24]SPS3, [7619-27]SPS3
Park, Jaggyu [7606-03]S1
Park, Je Hong [7618-43]SPS3
Park, Jennifer [7576-18]S5
Park, Jeong Woo [7606-47]SPS3
Park, Ji Ae [7599-63]SPS3
Park, Ji-Ho [7576-18]S5
Park, Jongwoon [7599-52]SPS3
Park, Joo Hyung [7597-44]S10
Park, Joong-Mok [7602-70]S11, [7602-70]SPS3
Park, Joo-Sup [7619-38]SPS3
Park, Jung Ho [7591-39]SPS2
Park, Kinam [7553-06]S2
Park, Kwan Seob [7557-29]SPS1
Park, Kwang Won [7617-56]SPS3, [7617-57]SPS3, [7618-43]SPS3
Park, Kyung [7603-36]S8
Park, Kyung Hyun [7601-21]SPS3
Park, Myoung Jin [7606-53]SPS3
Park, Namkyoo [7601-10]S2, [7606-53]SPS3
Park, Sahnggi [7606-33]S9
Park, Samuel D. [7576-61]SPS1
Park, Se-Geun [7605-29]SPS3
Park, Sungboon [7606-27]S8
Park, Sunwook [7548F-146]S2
Park, Wook [7609-40]S9
Park, Yong-Hwa 7594 ProgComm, 7594 S3 SessChr
Park, Yong-Jo [7617-69]SPS3
Park, YongKeun [7568-65]S6, [7568-66]S4
Park, Young-Soon [7599-33]S9
Parkhomenko, Yana A. [7608-61]S13
Parkhomenko, Yuri N. [7579-08]S2
Parkin, Stuart S. P. 7603 ProgComm
Parra, Sonia [7569-63]S9
Parson, Ted B. [7592-08]S2
Parsons, Earl R. [7621-08]S3, [7621-09]S3
Paschalis, Eleftherios P. 7548F ProgComm
Paschke, Katrin [7582-07]S2, [7582-59]SPS2, [7583-30]S7, [7583-43]SPS2
Paschotta, Ruediger SC931 Inst, SC818 Inst, SC860 Inst
Pasenow, Bernhardt [7597-20]S5
Pask, Helen M. [7578-72]SPS2
Paskova, Tanya [7602-26]S6, [7602-59]S13, [7602-63]S14, [7602-77]S11, [7602-77]SPS3
Passaseo, Adriana [7602-47]S10
Passmore, Brandon S. [7616-46]S11
Passow, Thorsten [7617-21]S4, [7617-54]S11
Pastila, Riikka K. [7569-46]S6
Pataouret, Alain [7580-82]SPS2
Patch, Sarah [7564-42]S6
Pate, Ryan [7609-12]S3
Patel, Darayas N. [7598-73]SPS3
Patel, Jasbir N. [7593-13]S2
Patel, Natvarlal M. [7592-34]SPS2
Patel, Rajesh S. [7585-19]S4
Patel, Rajni V. [7568-13]S5
Patel, Yogesh G. [7570-25]S5
Pathak, Rajiv [7583-35]S8
Pati, Gour S. 7612 S2 SessChr, [7612-13]S3
Patil, Chetan A. [7548A-20]S, [7548F-149]S3, [7548F-183]S, [7550-47]S9
Patil, Dinesh [7607-02]S1
Patil, Sunil R. [7610-31]S7
Patkar, Meena [7568-83]S2
Patonay, Gabor 7576 ProgComm, 7576 S3 SessChr, [7576-06]S2
Patra, Krishna C. [7604-16]S3

Index of Authors, Chairs, and Committee Members

- Patriache, Gilles [7616-41]S9
 Patrikeeva, Natalya [7569-49]S7
 Patskovsky, Sergiy V. [7577-18]S4
 Patterson, David [7582-61]SPS2
 Patterson, Jason [7583-48]SPS2
Patterson, Michael S. [7551-31]S7
 Patterson, Michelle P. [7564-46]S7
 Patterson, Steve [7583-01]S1, [7583-04]S1, [7583-07]S2, [7583-13]S3, [7583-32]S8, [7583-47]SPS2, [7583-48]SPS2
 Patterson, Steven [7555-46]S10
 Patting, Matthias [7568-87]S6, [7569-26]S4, [7569-106]SPS1
 Pau, Hans W. [7548C-71]S5, [7548C-75]S1
 Pau Vizcaino, Jose Luis 7603 S3
 SessChr, [7603-05]S2
 Paudel, Hari P. [7597-05]S1
 Paul, Oliver [7600-22]S5
 Paul, Thomas [7604-12]S3
Paulus, Yannis [7550-31]S6, [7550-32]S6
 Pauzauskie, Peter J. [7596-08]S2
 Pavarelli, Nicola [7610-26]S6
 Pavaskar, Prathamesh [7608-43]S9
 Pavelescu, Emil-Mihai [7597-46]S10, [7616-03]S1
 Pavlov, Alexey N. [7563-25]SPS1
 Pavlov, Valeri [7576-21]S6
 Pavlova, Elmira N. [7563-33]SPS1
 Pavlova, Ina P. [7569-39]S6
 Pavlova, Petya E. [7563-33]SPS1
Pavone, Francesco S. [7548G-164]SPS1, [7550-74]SPS1, [7548A-06]S, [7548A-07]S, [7548B-33]S1, [7569-40]S6, [7569-104]SPS1
 Pawlik, Susanne [7583-21]S5, [7616-56]S13
 Pawlowski, Edgar [7578-39]S10
 Pawlowski, Enno [7582-03]S2
 Pawluczyk, Olga [7555-07]S2
 Pawluczyk, Romuald [7555-07]S2
Paxton, Alan H. 7579 Chr, 7579 S5
 SessChr, 7579 S1 SessChr, [7579-09]S2
 Payne, Don M. [7595-08]S2
 Payne, Jason [7562-21]S5
 Peştereli, Elif [7573-31]S7
 Pearson, Lee [7578-50]S12
Pearton, Stephen J. 7603 S8
 SessChr, 7603 S9 SessChr, [7603-38]S9
 Pecchia, Alessandro [7597-12]S3
 Peccoud, Jean [7568-55]S5
 Peckerar, Martin C. [7605-13]S5
 Pedersen, Christian [7554-52]S8
 Pedersen, Christian L. [7580-15]S4, [7580-15]S6, [7580-15]S1
 Pedrazzani, Janet R. [7608-74]S16
 Pe'er, Jacob [7589-11]S4
Pegoraro, Adrian F. [7569-07]S1
 Pei, Shao Ning [7596-08]S2
 Pekarski, Pavel [7615-15]S4
 Pelaz, Beatriz [7575-18]S7
 Peled, Aaron [7586-22]SPS2
 Pelegrini, Marcus V. [7598-69]SPS3
 Pelivanov, Ivan M. [7564-79]S11
 Pellegrino, Joseph G. 7608
 ProgComm, 7608 S1 SessChr, 7608 S12 SessChr
 Pellerin, Eric [7548D-115]S3
 Pelletier, François [7579-44]S11
 Pelli, Stefano [7559-08]S, [7604-34]S7
 Peltz, Leora [7598-37]S9
 Pena, Ana-Maria [7548A-01]S
 Penazzi, Gabriele [7597-12]S3, [7597-66]S14
Pence, Isaac J. [7555-31]S6
 Pendyala, Srinivas [7551-24]S6
 Peng, Henry 7584 ProgComm
 Peng, Leilei [7571-26]S7
 Peng, Paul [7589-23]S6
 Peng, Steven [7548B-49]S4
 Penn, John S. [7550-47]S9
 Penna, Michele [7603-02]S1
 Penty, Richard V. [7607-23]S6, 7616
 ProgComm, [7616-51]S12
 Peralta, Xomalin G. [7562-18]S5, [7562-19]S5
 Perea Folgueras, Angel [7584-04]S1
 Pereira, Luisa [7603-33]S8, [7603-37]S9
 Pereira, Stephen P. [7551-20]S5, [7551-44]SPS1
 Pereira Caetano, Dilson [7612-18]S5
 Perelman, Lev T. 7573 ProgComm, 7573 S3 SessChr, [7573-25]S6
 Peremans, Andre [7582-15]S4
Perera, A. G. Unil [7608-75]S16
 Peretto, Lorenzo [7550-11]SPS1
 Pereyra, Inés [7598-69]SPS3
 Pérez, José [7571-04]S1, [7571-42]SPS1
 Pérez-Cortés, Mario [7568-78]S
 Perez-Gutierrez, Francisco G. [7562-38]S8
 Peri, David [7562-40]S9
Periasamy, Ammasi TrackChr, 7569 Chr, 7569 S SessChr, 7569 S SessChr, [7569-27]S4, 7574
 ProgComm
 Perinet, Josiane [7580-76]SPS2
 Perney, Nicolas M. B. [7604-31]S7
 Pernus, Franjo [7556-17]S4, [7556-16]S4, [7556-40]SPS1
 Perova, Tatiana S. [7606-45]SPS3
Perram, Glen P. [7581-18]S4, [7612-10]S2
 Perrien, Daniel S. [7548F-149]S3
 Perrin, Leslie [7552-19]S4
Perry, Joseph W. [7609-24]S6
 Persson, Sirpa [7602-78]SPS3, [7602-78]S11
 Pertsch, Thomas [7589-28]S7, [7604-12]S3
 Pery, Emilie [7557-28]SPS1
 Pesatori, Alessandro [7572-09]S2
 Peschel, Thomas [7580-86]SPS2, [7585-24]S12, [7585-24]S6
 Peschel, Ulf [7589-43]S8, [7589-43]S12
 Peshlov, Boyan [7559-22]S, [7572-18]SPS1
 Pessa, Markus [7578-36]S9
 Pestov, Dmitry [7569-125]S9
 Petegnief, Valerie [7569-99]SPS1
 Peter, Sébastien [7568-12]S6, [7571-11]S2
Peterka, Darcy [7548G-154]S2
 Petermann, Ingemar [7602-78]SPS3, [7602-78]S11
Peters, David W. [7591-24]S6, [7604-22]S5, [7604-24]S5, [7609-46]S11
 Peters, Frank H. [7598-60]SPS3, [7604-18]S4, [7615-25]S6
 Peters, Rachel M. [7569-39]S6
 Petersen, Alan B. 7578 ProgComm, 7578 S9 SessChr, 7578 S11
 SessChr
 Petersen, Bjoern [7589-07]S3
 Petersen, Christopher [7548D-114]S3, [7554-02]S1
 Petersen, Eliot B. [7582-26]S6, [7582-29]S7
 Petersen, Paul M. [7582-02]S4, [7582-02]S6, [7582-02]S1, [7616-52]S12
 Petersen, Svea [7573-20]S5, [7576-27]S7
Peterson, Kristen A. [7554-103]SPS1
 Peterson, Lindsay M. [7548D-116]S3, [7554-21]S4
 Peterson, Rita D. 7582 ProgComm
Petkovsek, Rok [7598-65]SPS3
 Petraglia, Frank [7554-27]S4
 Petrenko, Roman [7571-06]S2
 Petrich, Jacob W. [7576-39]S10
 Petrich, Wolfgang [7560 Chr, [7560-12]S3, [7608-06]S2
 Petroff, Pierre M. [7609-06]S2, [7610-18]S4
 Petrov, Dmitri [7613-10]S3, [7613-11]S3
 Petrov, Valentin [7578-14]S3, [7578-77]SPS2, [7578-81]SPS2, [7582-13]S4, [7582-15]S4
 Petrov, Yuriy [7564-52]S8, [7564-53]S8
 Petrova, Irina Y. H. [7564-52]S8, [7564-53]S8
 Petrovich, Marco N. [7580-35]S9
 Petruzzelli, Vincenzo [7598-45]S11
 Pettersson, Jonas [7603-14]S3
 Petway, Larry B. [7608-80]S17
 Peychl, Jan [7569-32]S5
Peyghambarian, Nasser [7579-18]S5, [7582-26]S6, [7582-29]S7, [7599-04]S1, [7599-22]S6, [7599-39]S10, [7599-42]S11, [7619-41]S4
 Peyrin, Françoise [7557-28]SPS1
Peyrot, Donald A. [7550-29]S6, [7589-02]S1
Pfefer, Joshua [7556-18]S5, 7556
 CoChr, 7556 S4 SessChr
 Pfeiffer, Frank [7583-13]S3
 Pfeiffer, Hans-Ulrich [7616-56]S13
 Pfeiffer, Nick [7562-08]S2, [7562-11]S3
 Pfeiffer, Thomas [7607-41]S1, [7607-41]S10
 Pfeiffer, Walter 7600 ProgComm
 Pfeufer, Volker [7578-31]S8
 Pfister, Nick [7602-43]S9
Pflaum, Christoph [7578-88]SPS2
 Pflöging, Wilhelm 7584 S12 SessChr, 7585 Chr, 7585 S6 SessChr, [7585-23]S5
 Pflügl, Christian J. 7616 S14 SessChr, [7616-27]S6
 Phan, Anh-Hoang [7619-24]SPS3
 Phay, John E. [7555-45]S9
 Philip, Geo M. [7613-06]S2
 Philipp, Carsten [7548A-31]SPS1
 Phillip, Brad [7592-05]S1
 Phillips, Brian S. [7591-08]S2, [7606-09]S4
 Phillips, Daniel B. [7556-21]S5
 Phillips, James [7566-07]S2
 Phillips, Jamie D. [7608-70]S15
Phillips, Kevin G. [7562-07]S2, [7573-27]S7
 Phillips, Mark C. [7608-13]S3
 Phillips, Matthew [7603-17]S4
Phillips, Ronald L. SC188 Inst, 7588
 ProgComm, [7588-08]S2, [7588-19]S4
 Phillpot, Simon R. [7603-29]S7
Phinney, Leslie M. 7592 S2 SessChr, [7592-30]S6
 Phipps, Aaron [7556-21]S5
 Phipps, Jennifer E. [7548D-106]S1, [7555-18]S4
 Phua, Poh Boon [7583-36]S8
 Piana, Angelo [7598-34]S8
 Piao, Mei-Lan [7619-27]SPS3
 Piao, Xianqing [7599-15]S4
 Picard, Francis [7592-03]S1
 Picard, Wayne J. [7548E-127]S2
Picot, Paul A. [7564-04]S1
Pierce, Jeffrey W. [7582-16]S4
 Pierce, Mark C. [7548C-68]S1, [7556-05]S2
 Pierre, Colin [7548B-40]S2
 Pierre, J. [7609-66]SPS3
Pierron, Olivier N. 7592 ProgComm
 Pierrotet, Diego F. [7608-80]S17
 Pierzchalski, Arkadiusz [7568-16]S5
 Piestun, Rafael 7584 ProgComm, [7613-27]S8
 Pietilä, Pasi [7578-27]S7
 Pietka, Barbara [7600-08]S2
 Pietro, Luciana [7569-59]S8, [7569-111]SPS1
 Pietrzak, Agnieszka [7583-22]S5
 Pietzonka, Ines [7582-06]S2
 Pifferi, Antonio [7556-15]S4
 Pikov, Victor [7562-17]S5
 Pileckas, Julius [7578-30]S7
 Pilkuhn, Manfred H. [7598-43]S10
 Pili, Suman [7550-36]S7
Pilon, Laurent [7555-40]S8, [7555-59]SPS1, [7588-16]S3
Pina, Ladislav [7584-29]S10
 Pinazo, Jose M. [7589-29]S7
 Pinguet, Thierry [7607-11]S3
Pinheiro, Antonio Luiz B. [7549-20]S
 Pinheiro, Marcelo M. [7568-14]SPS1
Pini, Roberto [7548A-06]S, 7550
 ProgComm, 7550 S10 SessChr, 7550 S6 SessChr, [7550-74]SPS1, [7550-77]SPS1, [7574-30]SPS1, [7577-42]SPS1, [7577-43]SPS1
 Pinos, Andrea [7602-28]S6
 Piper, James [7568-36]S5
 Piprek, Joachim 7597 ProgComm, 7597 S6 SessChr, 7602 CoChr, 7602 S10 SessChr, [7602-42]S9
 Piqué, Alberto SympChair, 7584
 ProgComm
 Piqueras, Juan [7603-05]S2
Pircher, Michael [7550-27]S5, [7550-54]S11, [7554-57]S9, [7554-59]S9, [7554-62]S9
Pitris, Constantinos [7560-09]S2, [7554-67]S10
 Pitter, Mark C. [7570-30]S6, [7577-17]S4
Pitwon, Richard C. A. [7607-18]S5
 Pivetti, Christopher [7561-08]S1
 Pivnenko, Mike [7618-46]S10
 Pivtsov, Victor S. [7580-104]SPS2
Piyawattanametha, Wibool 7558
 ProgComm, 7558 S6 SessChr, [7558-22]S5, [7558-22]S1, [7558-23]S5, [7558-23]S1, 7594 Chr, 7594 S2 SessChr
 Plamann, Karsten [7550-29]S6, [7550-48]S10, [7589-02]S1
 Plana, Robert [7592-09]S2
 Planas, Anna M. [7569-99]SPS1
 Planat-Chrétien, Anne [7557-06]S2
 Plant, Anne L. [7576-16]S4
 Plant, Jason J. [7616-33]S8
Platt, Andrew D. [7599-25]S6
 Platzer, Christoph [7562-25]S6
 Platzer-Björkman, Charlotte [7603-12]S3, [7603-14]S3
 Plawsky, Joel L. [7592-18]S4
 Plekhanov, Vladimir I. [7557-18]S4
Pleshko, Nancy [7548F-142]S1
 Pleskow, Douglas [7573-25]S6
 Pletschen, Wilfried [7617-54]S11
 Plewicky, Mateusz [7570-27]S5
Plick, William N. [7611-32]S7
 Pluchon, David [7604-06]S1
 Plumley, John B. [7575-33]S10
 Poberaj, Gorazd [7604-29]S6
 Poblenz, Christiane [7602-43]S9
 Pochet, Michael C. [7597-47]S10, [7616-15]S3
 Pocock, Ginger M. [7562-14]S4

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Podoleanu, Adrian G.** [7549-03]S1, [7549-22]S, 7554 ProgComm, [7554-18]S3, [7554-63]S10, [7554-88]SPS1, [7556-10]S3, [7580-23]S6
Podvyaznyy, Alexey [7583-38]S8
Poe, Carolina [7564-63]S9
Poghosyan, Armen R. [7582-01]S4, [7582-01]S6, [7582-01]S1
Pogue, Brian W. 7551 ProgComm, 7551 S6 SessChr, [7551-14]S3, [7551-25]S6, [7551-44]SPS1, [7551-45]SPS1, 7557 ProgComm, 7557 S4 SessChr, [7557-15]S4, 7567 ProgComm, 7567 S2 SessChr, [7568-74]S2, 7573 ProgComm, [7573-22]S6
Point, Jean-Charles 7620 ProgComm
Poirier-Richard, Hugo [7571-28]S7
Poisel, Hans [7559-34]S
Poisson, Marie Antoinette [7602-19]S4
Poitras, Daniel [7606-13]S5
Pokorny, Jan [7559-05]S
Polacchini, C. [7609-36]S8
Poland, Simon P. [7569-114]SPS1
Poletti, Francesco [7580-35]S9
Poli, Nicola [7603-40]S9
Pollnau, Markus [7559-02]S, [7604-07]S2, [7605-20]S7
Polman, Albert [7586-04]S1
Polulet, Patrick [7557-20]SPS1
Polyakov, Sergey [7609-50]S11, [7611-16]S4
Polyanskii, Peter V. [7613-15]S4
Ponce, Fernando [7602-44]S9
Ponce, Luciano [7564-52]S8
Pond, James [7577-24]S5
Ponevchinsky, Vladislav V. [7613-05]S2
Pons, Patrick [7592-09]S2
Pons, Thomas 7575 S8 SessChr
Pons, Thomas [7575-26]S9
Ponticorvo, Adrien [7596-05]S2
Ponzoni, Andrea [7603-40]S9
Poole, Kelvin F. [7591-22]S6
Poole, Philip J. [7608-88]S19
Poon, Andrew W. [7605-24]S9, 7606 ProgComm, 7606 S8 SessChr
Popescu, Dan P. [7555-12]S3
Popescu, Roxana [7599-21]S6
Popesku, Simona A. [7586-22]SPS2
Popov, Kaloyan A. [7573-16]S4
Popov, Sergei [7554-30]S5
Popovic, Milos A. [7579-51]S3, [7579-52]S3
Popp, Jürgen 7560 ProgComm, [7560-26]S1, [7560-28]S2, [7577-01]S1, [7593-01]S1
Porat, Noga [7553-10]S3
Porcar-Guezenc, Rafael [7570-32]S7
Porciatti, Vittorio [7550-42]S9
Poreddy, Amruta [7551-26]S6, [7551-27]S7
Porneala, Christian [7584-28]S10, [7585-28]S12, [7585-28]S6
Porte, Henrik [7600-67]SPS3
Porzi, Claudio [7621-11]S3
Posilovic, Kristijan [7616-54]S13
Postell, David [7581-04]S1, [7581-07]S1
Poti, Luca [7621-11]S3
Potier, Marie-Claude [7569-33]S5
Potma, Eric O. 7569 SPS1 SessChr, [7569-130]SPS1, [7569-19]S3
Potsaid, Benjamin M. [7550-43]S9, [7550-56]S11
Potter, Barrett G. 7598 ProgComm
Pottiez, Olivier [7582-24]S6
Potuzak, Marcel [7584-27]S10
Pougeoise, Emilie [7603-61]SPS3
Poulet, Patrick [7557-21]SPS1
Poulin, Guillaume [7589-08]S3
Poulin, Michel [7579-44]S11
Poulter, Michael [7568-13]S5
Pourrezaei, Kambiz [7576-61]SPS1
Poutous, Menelaos K. [7580-14]S3, [7580-61]S14
Povazay, Boris [7554-17]S3, [7554-22]S4, [7554-30]S5
Povinelli, Michelle L. [7579-53]S3, [7612-34]S9
Povolotskiy, Michael [7597-10]S3
Povoski, Stephen P. [7556-28]S7
Povozay, Boris [7550-55]S11
Powers, Peter E. 7578 S6 SessChr, 7580 S4 SessChr, [7580-108]SPS2, 7582 Chr, 7582 S6 SessChr, 7582 S1 SessChr, [7582-25]S6, [7582-34]S7
Pownall, Robert [7598-36]S9
Pozzovivo, Gianmauro [7602-45]S10
Prabhat, Prashant [7575-19]S7
Pradel, Annie [7604-04]S1
Pradhan, Asima [7561-19]S3, [7563-08]S1
Pradhan, Prabhakar [7568-62]S1, [7573-02]S1, [7573-21]S5
Pradhan, Prachi [7615-14]S4
Prado, Raquel [7559-07]S
Praes, Carlos E. d. O. [7560-07]SPS1
Prael, Scott A. [7555-37]S8
Prael, Scott 7567 ProgComm, [7567-12]S3, [7570-11]S3, [7573-03]S1, [7573-12]S3
Prakash, K. Ajay Giri [7594-34]S9
Prakashrao, Aruna [7561-11]S1
Pramanik, Manojit [7564-43]S7, [7564-69]S10, [7564-128]SPS1, [7576-37]S9
Pramitha, Vayalamkuzhi [7619-20]S4
Prasad, Amit Kumar [7599-59]SPS3
Prasad, B. Raghavendra [7588-09]S2
Prasad, Narasimha S. 7578 ProgComm, 7578 S1 SessChr, [7578-38]S10, [7578-47]S11
Prasad, Paras N. TrackChr, SC463 Inst, 7574 ProgComm, [7599-45]S12
Prasad, Ratna [7550-33]S6
Prasciolu, Mauro [7582-54]SPS2
Prashant, Shuvan [7606-18]S6
Pratavieira, Sebastiao [7557-33]SPS1
Prates, Renato A. [7552-17]S3
Prather, Dennis W. 7591 ProgComm, [7596-12]S3, [7599-20]S5, [7606-30]S8, 7609 ProgComm, [7609-20]S5, [7609-22]S5
Prawer, Steven D. [7604-03]S1
Prehatney, Robert [7552-14]S3
Preisser, Stefan [7564-26]S4, [7564-76]S11, [7564-131]SPS1
Prem, Prabhakaran [7599-45]S12
Prentice, Paul A. [7564-87]SPS1
Prentiss, Mara Goff [7582-61]SPS2
Prescod, Andru J. [7620-07]S3
Press, David L. [7611-22]S5
Pressecq, Francis [7592-02]S1
Presser, Nathan [7583-06]S1
Prestin, Sven [7548C-178]S2
Preston, Kyle [7605-08]S3
Preza, Chrysanthe 7570 ProgComm, 7570 S3 SessChr, [7570-02]S1
Prezkuta, Zach [7578-07]S2
Price, Jonathan H. V. [7580-35]S9
Price, Kirk [7583-01]S1, [7583-07]S2, [7583-13]S3, [7583-32]S8, [7583-47]SPS2
Prieto, Pedro [7550-40]S8, [7550-41]S8
Prieto, Victor [7572-21]SPS1
Prikoszovits, Thomas [7578-63]S15
Prineas, John P. [7582-32]S7, [7617-71]SPS3
Probst, Joachim [7548C-75]S1
Proccaccianti, Claudio [7568-20]S5
Prochazka, Karel [7571-03]S1
Prokesch, Hannah [7550-54]S11
Protzenko, Dmitriy E. [7548C-85]S3
Prough, Donald [7564-52]S8, [7564-53]S8
Proulx, Antoine [7580-69]SPS2, [7580-96]SPS2
Provencal, Francis [7592-03]S1
Provost, Lionel [7598-14]S4
Prudenzano, Francesco [7598-45]SPS1
Pryamikov, Andrey D. [7580-43]S10
Pryde, Geoff J. [7611-12]S3
Pryor, Brian [7552-11]S2
Pryor, Craig E. [7608-76]S16
Przybylski, Marius 7585 ProgComm, [7585-23]S5
Psaltis, Demetri [7593-07]S1, [7593-11]S2, [7594-22]S6, [7599-48]S12
Psilodimitrakopoulos, Sotiris [7569-99]SPS1
Ptaszek, Marcin [7576-11]S3
Ptaszynski, Lars [7550-05]S1
Pu, Jixiong 7588 ProgComm, [7588-27]SPS2
Pu, Y. [7561-42]SPS1, [7561-09]S1
Pu, Yiyi [7619-21]S4
Pucci, Annemarie [7560-12]S3, [7608-06]S2
Pudlas, Marieke [7560-06]S2, [7566-06]S2
Puertas, Sara [7575-09]S4
Pujol, Maria Cinta [7578-14]S3
Puleo, Gian Luigi [7574-11]S2
Pulisfer, Drew Patrick [7591-28]S7
Puls, Joachim [7597-42]S9
Pulsikamp, Jeff 7592 ProgComm
Pun, Edwin Y. [7598-02]S1
Puppini-Rontani, Regina M. [7549-23]S
Purement, Alex A. [7586-03]S1, [7586-13]S3, [7586-24]SPS2
Purushothaman, Immanuel [7592-25]S5
Puschmann, Stefan [7568-15]S2
Puustinen, Janne [7578-36]S9
-
- Q**
- Qi, Bingsong [7578-23]S5
Qi, Xin [7557-32]SPS1
Qian, Xifeng [7601-04]S1
Qian, Zhiyu [7576-08]S2
Qiang, Sheng [7612-14]S3
Qiang, Zexuan [7609-12]S3
Qiaofen, Zhou [7591-21]S5
Qin, Guanshi [7598-58]SPS3
Qin, Ruogu [7567-19]S4, [7567-20]S4
Qin, Zhuanping [7566-14]S3
Qiu, Bocang [7583-24]S5
Qiu, Jinze [7548B-52]S5, [7562-28]S7
Qiu, Le [7573-25]S6
Qiu, Suimin [7569-49]S7, [7576-32]S8
Qong, Qiliang [7563-21]SPS1
Qo, Jianan Y. 7555 ProgComm, [7568-33]S1, [7569-67]S9, [7569-76]S9
Qu, Junle [7569-74]SPS1
Qu, Min [7564-114]SPS1, [7574-04]S1
Quake, Stephen R. [7568-02]S3
Quan, Guotao [7557-26]SPS1
Quan, Kara J. [7548D-109]S1, [7554-03]S1
Quang, Timothy [7567-02]S1
Quarles, Gregory J. TrackChr
Queren, Désirée [7616-16]S4
Quintana, Iban [7583-15]S3, [7584-33]S11
Quintana, Silvana [7551-33]SPS1
Quintero, Luis [7568-67]S4, [7568-69]S5
Quirk, Bryden C. [7554-44]S7, [7555-14]S3
-
- R**
- Ra, Hyejun** [7558-22]S5, [7558-22]S1, [7558-23]S5, [7558-23]S1
Raab, Christoph [7597-50]S11
Raab, Michael [7616-60]S14
Raabe, Isabel [7569-32]S5
Rabeling, David S. [7579-46]S11
Rabinovich, William S. [7587-01]S1
Rabinovitch, Peter S. [7555-06]S2
Rachinskii, Dmitrii I. [7608-02]S1
Rachwal, Bogumila [7599-22]S6
Rácz, Péter [7600-39]S9
Raczowsky, Jörg [7562-25]S6
Rada-Arias, M. [7548F-145]S2
Rademeyer, Alfred [7565-04]S2
Rademeyer, Pieter [7606-54]SPS3
Radhakrishnan, Padmanabhan [7610-35]SPS3
Radic, Stojan [7582-09]S3
Radke, André [7585-21]S5
Radley, Hannah G. [7554-25]S4
Raduta, Aurel [7549-22]S
Radziunas, Mindaugas [7583-37]S8
Rafailov, Edik [7564-87]SPS1, [7616-12]S3
Rafique, Tariq [7609-38]S9
Raghavachari, Ramesh 7556 Chr, 7556 S5 SessChr, 7568 CoChr, 7576 Chr, 7576 S2 SessChr
Raghavan, Mekhala [7548F-142]S1
Ragheb, John [7548E-136]S4, [7556-20]S5
Rago, Gianluca [7569-13]S2
Rahbar, Elaheh [7572-20]SPS1
Rahbar, Mona [7593-12]S2
Rahimov, Sherzod [7571-40]SPS1
Rahm, Marco [7600-22]S5
Rahman, Anis [7568-08]S4, [7601-11]S3
Rahman, Aunik K. [7568-08]S4
Rahmani Nejad, Akbar [7584-41]SPS2, [7617-07]S2
Rahmanzadeh, Ramtin [7576-01]S1
Rahn, Christian [7568-15]S2, [7570-41]SPS1
Rahn, John R. [7570-17]S4
Rahuel, Nicolas [7613-11]S3
Rahulan, K-Main [7582-48]S10
Rai, Prakash R. [7551-45]SPS1, [7576-01]S1
Raicu, Valerica [7569-34]S5
Raino, G. [7610-07]S2
Rainville, Luc [7577-22]S5
Raisky, Oleg [7583-09]S2
Raj, Kannan [7607-01]S1, [7607-02]S1
Raja, Waseem K. [7593-15]S3
Rajadhyaksha, Miliind [7556-04]S1, [7570-25]S5
Rajagopalan, Raghavan [7551-26]S6, [7551-27]S7
Rajdev, Pooja [7593-21]S4
Rajguru, Suhud M. [7548G-190]S
Rajian, Justin R. [7564-37]S6
Rakich, Peter T. [7579-52]S3
Rakovich, Aliaksandra [7575-11]S5
Rakovich, Yury P. [7575-11]S5
Ralph, Stephen E. [7621-18]S5, [7621-20]S6
Ram, Rajeev J. [7579-51]S3
Ram, Sripad [7570-03]S1, [7575-19]S7
Ramaiah, D. [7576-02]S1, [7576-56]SPS1, [7576-57]SPS1
Ramalho, Fernando S. [7560-02]S1

Index of Authors, Chairs, and Committee Members

- Ramalho, Leandra N. Z. [7560-02]S1
 Ramalho, Luciana M. P. [7552-24] SPS1, [7549-18]S, [7552-14]S3, [7552-25]SPS1
 Ramalho, Maria Jose P. [7549-18]S, [7552-25]SPS1
 Ramalingam, Alkondan [7599-44]S11
 Raman, Rajesh N. [7561-08]S1, [7581-12]S3
 Ramanathan, Shiram [7603-25]S6
Ramanujam, Nimmi [7567-14]S3, [7573-23]S6
 Ramaz, François [7564-88]SPS1
 Ramdane, Abderrahim 7608 ProgComm, 7608 S8 SessChr
Ramella-Roman, Jessica C. 7548A ProgComm, 7548A S SessChr, [7548A-11]S, [7550-73]SPS1, 7562 ProgComm, 7562 S1 SessChr, 7562 S2 SessChr
 Ramesham, Rajeshuni 7592 Chr, 7592 S1 SessChr, [7592-14]S3
 Ramirez, Diego F. [7550-01]S1
 Ramirez, Gabriel G. [7592-21]S4, [7593-29]S6
 Ramirez, Lourdes [7589-28]S7, [7589-43]S8, [7589-43]S12
 Ramirez-San-Juan, Julio Cesar [7562-37]S8
 Ramisetty, Varalakshmi [7604-40]S8
Ramme, Mark [7589-44]S8, [7589-44] S12, [7590-03]S1
 Ramodiharilafy, R. [7575-45]S9
 Ramos, André Luiz [7567-08]S2
 Ramos, Tais A. [7549-15]S2
Ramos-Garcia, Rubén [7562-37]S8
 Ramponi, Roberta [7585-13]S3, [7589-10]S3, [7589-29]S7
Ranasinghesagara, Janaka [7564-03]S1, [7564-14]S3, [7564-32]S5, [7564-68]S10, [7564-72]S10
 Rancuret, Paul L. 7596 ProgComm, 7596 S3 SessChr
 Rand, D. A. [7578-40]S10
 Randall, Adam L. [7568-56]S2, [7568-57]S2
Randberg, Lise L. [7548A-12]S, [7548B-58]S6, [7561-30]S4
 Randell, Scott H. [7554-71]S11
 Randers-Pehrson, Gerhard [7568-93] SPS1
 Ranganathan, Ranjith [7592-11]S2
 Rangel, Liz [7609-15]S4, [7617-31]S6
 Raniero, Leandro [7560-07]SPS1, [7560-13]SPS1, [7568-14]SPS1
 Ranson, Willy [7597-38]S8
 Ranzato, Enrico [7617-23]S4
Rao, Bin [7550-62]SPS1, [7554-106] SPS1, [7564-70]S10, [7564-125] SPS1
 Rao, Haibo [7599-51]S5
 Rao, Zhenghua [7585-17]S4
 Rapaport, Noam [7583-50]SPS2
 Raring, James W. [7602-43]S9
 Rashidian, Bizhan [7597-69]SPS3, [7609-49]S11
Rasigade, Gilles [7606-22]S7, [7606-26]S7
 Rasmussen, Mark A. [7576-39]S10
 Rath, Detlef [7573-20]S5
 Rath, Jatindra K. [7603-13]S3
 Rativa-Millan, Diego-Jose [7582-42] S9
 Ratto, Fulvio [7550-74]SPS1, [7574-30]SPS1, [7577-42]SPS1, [7577-43]SPS1
 Rattunde, Marcel [7578-32]S8, [7583-23]S5, [7616-48]S11
Rau, Iléana 7599 ProgComm, 7599 S8 SessChr, [7599-21]S6
 Raulin, Franck [7585-29]SPS2
 Raveh, Ido [7550-10]S2
 Rawlins, Wilson T. 7581 ProgComm, [7581-03]S1, [7581-06]S1, [7581-21]S4
 Rawool, Sandesh [7592-25]S5
 Ray, Krishanu [7569-01]S, [7571-20] S6, [7577-20]S5, [7577-24]S5
Raymond, Sebastiampillai G. [7599-38]S10
 Razansky, Daniel [7564-19]S3, [7564-20]S3, [7564-27]S4, [7564-62]S9, [7564-80]S11, [7564-110]SPS1
Razeghi, Manijeh 7603 ProgComm, 7603 S3 SessChr, 7605 ProgComm, 7605 S8 SessChr, [7605-18]S7, 7608 Chr, 7608 S SessChr, [7608-11]S3, [7608-60] S13, [7608-94]S16, [7608-95]S1, [7608-96]S3, [7609-14]S4, 7610 ProgComm
 Razzari, Luca [7600-65]S15
 Rea, Ilaria [7606-12]S4
 Readle, Jason D. [7581-19]S4, [7581-20]S4
Reano, Ronald M. [7606-17]S6
 Reardon, Kenneth [7559-20]S
Rebane, Aleksander [7576-15]S4, [7599-30]S8, [7599-31]S8, [7599-43]S11, 7611 ProgComm, [7611-17]S4, [7612-36]S9
 Rebrova, Natalia [7608-02]S1
 Rech, Ivan [7571-15]S5, [7608-85]S18
 Rechmann, Peter 7549 Chr, 7549 S1 SessChr, [7549-06]S1
 Recht, Michael I. [7572-05]S1
 Recker, Robert R. [7548F-140]S1
 Reckfort, Julia [7554-90]SPS1
 Reddington, Alex [7553-17]S5, [7553-19]S5
 Reddy, Vishnu V. B. [7559-28]S
 Redman, Steve [7548E-126]S2
 Reece, Lisa M. [7568-73]S3
 Reed, David C. [7570-18]S4
Reed, Graham T. 7606 Chr, 7606 S9 SessChr, 7606 S5 SessChr, 7606 S6 SessChr, [7606-14]S5, [7606-15]S5, [7606-20]S6, [7606-26]S7, [7606-44]SPS3, 7608 S7 SessChr, [7608-18]S4
 Reese, Jeff [7560-18]S4
 Refai, Hazem [7587-23]S4, [7587-32] S5
 Regehr, Martin W. [7587-10]S2, [7587-16]S3
 Regenfuss, Peter [7589-50]SPS2
 Regnier, Stéphane [7596-10]S3
 Rehder, Gustavo P. [7590-13]S2
Rehioi, Othman M. [7583-40]SPS2
 Rehm, Robert H. [7608-69]S15
 Rehmman, Georg [7580-107]SPS2
 Reich, Oliver [7548B-63]S7
 Reichart, R. [7560-26]S1
 Reichel, Volker [7580-107]SPS2, [7598-09]S2
 Reid, Darlene [7555-38]S8, [7572-07] S2
 Reid, Matthew E. [7600-65]S15
 Reidenbach, Hans-Dieter [7562-41]S9
 Reif, Juergen [7586-17]S4
 Reill, Wolfgang [7583-28]S6
 Reimer, Michael [7608-88]S19
 Reimer, R. [7575-47]S9
 Reinecke, Daniel R. [7564-04]S1, [7564-71]S10, [7564-84]S12, [7564-120]SPS1, [7564-121]SPS1
 Reinecke, Thomas L. [7600-33]S8
 Reineke, Sebastian [7617-39]S8
 Reingand, Nadya O. 7619 ProgComm
 Reinhard, Benjamin [7600-22]S5
 Reinhard, Björn M. [7577-34]S7
 Reinhardt, Kitt C. 7602 ProgComm
 Reinke, Charles M. [7609-48]S11
 Reithmaier, Johann P. 7616 ProgComm, 7616 S3 SessChr, [7616-03]S1, [7597-46]S10
 Reitze, David H. [7603-03]S1
 Reitzenstein, Stephan [7600-44]S10, [7608-03]S1
 Rekas, Mirosław [7580-52]S12
 Remenny, Maxim [7597-16]S4, [7609-16]S4
 Remer, Lorraine A. [7588-13]S3
 Remley, Jennifer [7583-03]S1
Ren, Fan [7603-38]S9
 Ren, Fang [7588-12]S3
 Ren, Hao [7595-22]S4
Ren, Liyong [7612-06]S1
 Ren, Shen [7607-33]S8
 Renard, Julien [7602-36]S8, [7610-34] S8
Rendina, Ivo [7605-02]S1, [7606-12] S4
Renkoski, Timothy [7561-15]S3
 Renninger, William [7580-29]S8
 Renversez, Gilles [7598-22]S5, [7609-36]S8
 Reppen, Trond [7569-101]SPS1
 Reschovsky, Benjamin [7613-22]S6
 Reshchikov, Michael A. [7602-33]S7
 Resnati, Daniele [7571-15]S5
 Resneau, Patrick [7616-35]S8
 Resnick, Paul J. 7590 Chr, 7590 S2 SessChr
 Ressel, Peter [7616-36]S8, [7616-53] S12
 Resta, Vincenzo [7584-04]S1
Restaino, Sergio R. 7595 ProgComm, [7595-07]S2, [7595-08]S2
 Resto, Vicente [7569-49]S7
 Reufer, Martin [7597-54]S12
 Reuter, Dirk [7600-09]S2
 Reuter, Guenter [7548C-100]S5
 Rever, Matthew [7580-33]S8
 Revin, Dmitry [7616-38]S9
Rey, Sara M. [7554-22]S4
 Reyner, C. J. [7610-10]S3
 Reynolds, Jeffery S. 7572 ProgComm
 Reynolds, Kelly [7559-29]S
 Reynolds, Mitch [7583-47]SPS2
 Rezaei, Saeid [7584-06]S2, [7589-31] S8
 Rezaeipoor, Robabeh [7554-69]S11
Rhee, Bum Ku [7582-52]SPS2
Rhee, Chung-Ku [7548C-97]S5, [7552-10]S2
 Rhee, Won Jong [7575-12]S5
 Rhodes, Casey [7608-42]S9
 Rhodes, Patrick [7595-10]S2
 Ribaudo, Troy [7616-46]S11
 Ribeiro, Dayana G. [7560-02]S1
 Ribeiro, Martha S. [7552-17]S3
 Ribet-Mohamed, Isabelle [7608-63] S13, [7608-64]S14
 Ricaud, Sandrine [7589-19]S5
 Rice, Anthony [7602-27]S6
Rice, Joseph P. 7596 ProgComm, 7596 S4 SessChr
 Rice, Photini F. S. [7555-15]S3
Rice, Robert R. [7598-40]S10, 7608 ProgComm
 Rich, Sarah G. [7604-24]S5
 Richard, Maxime [7600-08]S2
 Richards, Benjamin [7597-65]S14
 Richards, Lisa M. [7573-23]S6
Richards-Kortum, Rebecca R. [7548C-68]S1
Richards-Kortum, Rebecca [7558-06]S2
 Richardson, David J. [7580-06]S1, [7580-35]S9, [7582-17]S4
 Richardson, Martin C. 7578 ProgComm, [7578-43]S11, [7578-51]S12, [7580-02]S1, [7580-14] S3, [7580-50]S11, [7580-61]S14, [7589-44]S8, [7589-44]S12, [7590-03]S1
 Richardson, Martin J. 7619 ProgComm
 Riches, Andrew [7555-43]S9, [7568-39]S
 Richmond, Frances [7555-53]SPS1
 Richter, Asmus N. [7613-07]S2
Richter, Claus-Peter [7548C-171]S5, [7548G-190]S, [7548G-191]S
 Richter, Eduardo H. [7556-35]SPS1
 Richter, Gresham [7548C-182]S5
 Richter, Harald H. [7606-41]S11
 Richter, Marc [7560-25]S4
 Richter, Marten [7597-63]S14
 Richter, Sören [7589-30]S8, [7589-43] S8, [7589-43]S12
 Richter, Wolfgang [7578-58]S14
 Ricka, Jaro [7577-38]S8
 Ricken, Raimund [7604-26]S6
 Ridsdale, Andrew [7569-07]S1
 Riedel, Eberhard [7600-40]S10
Riemann, Iris [7548A-03]S, [7555-16] S4, [7568-15]S2, [7569-100]SPS1
 Righini, Giancarlo C. [7559-08]S, 7598 ProgComm, [7598-23]S6, [7604-34] S7, 7605 ProgComm
 Rigneault, Hervé [7569-98]SPS1, [7569-105]S4, 7569 S3 SessChr, [7569-11]S2, [7569-56]S8, [7569-96]S3, [7569-97]SPS1, [7571-09] S2, [7577-19]S5, [7577-32]S7
 Riker, David R. [7548C-80]S2
 Riley, Chris [7564-46]S7
 Riley, Jason D. [7561-36]S5
 Riley, Mark [7559-29]S
 Rill, Michael [7586-14]S3
Rimke, Ingo [7569-16]S2
 Rinaldi, Fernando [7607-10]S3
 Rinehart, Matthew T. [7573-24]S6
 Ringemann, Christian [7571-34]S10
Rioux, David [7575-32]S10
 Rioux, Maxime [7577-22]S5, [7577-48] SPS1
 Ripalda, Jose M. [7610-09]S3
 Ripagen, Brechtje [7556-29]S8
 Ripin, Daniel J. [7578-40]S10
 Ripken, Tammoo [7562-24]S6, [7589-12]S4
 Ririe, Tyson [7573-28]S7, [7573-43] SPS1
 Riris, Haris [7582-19]S5
 Risbud, Subhash H. [7584-17]S7, [7584-17]S11
 Rischitor, Grigore [7569-109]SPS1
 Ritchie, David [7608-31]S7
 Ritsch-Marte, Monika [7570-12]S3, 7613 ProgComm, [7613-20]S6
 Ritter, John E. [7618-01]S1
 Riva, Charles E. [7550-67]SPS1
 Rivallin, Pierrette [7606-22]S7
 Rivard, Maxime [7558-13]S3
 Rivera, A. [7610-09]S3
 Rivera, Arnold [7548C-171]S5
 Rivera Gil, Pilar [7575-36]S11
 Rivest, Benjamin D. [7562-19]S5, [7562-20]S5, [7562-21]S5
 Rizvi, Imran [7551-17]S4, [7551-18]S4
Roach, W. P. [7548G-156]S3
Roach, William P. TrackChr, 7562 ProgComm, 7562 S6 SessChr, [7562-19]S5, [7562-20]S5, [7562-21]S5
 Robbins, Peter [7554-73]S11, [7555-14]S3
 Roberson, Dawnlee [7562-20]S5
 Robert, Yannick [7616-51]S12
 Robert-Philip, Isabelle [7608-86]S18
 Roberts, Cynthia J. [7550-61]SPS1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Roberts, John S. [7597-04]S1, [7616-10]S2
- Roberts, W. Thomas [7587-02]S1, [7587-30]S5, [7587-34]S5
- Roberts, William T. [7587-11]S2
- Robertson, Claudia S. [7564-52]S8
- Robertson, Frank [7550-72]SPS1
- Robertson, Keshia [7560-18]S4
- Robertson, Stephen [7583-24]S5
- Robin, Craig A. [7580-53]S12
- Robinson, Dominic J. [7548C-83]S2, [7548C-181]S5, [7548C-184]S4
- Robinson, J. Paul 7568 CoChr
- Robinson, John M. [7571-27]S7
- Robinson, Tom [7593-02]S1
- Robinson, William N. [7571-36]S10
- Robledo-Martinez, Arturo [7562-37]S8
- Robles, Francisco E.** [7573-36]S9
- Roblyer, Darren M.** [7548C-68]S1
- Rocha, Rick [7549-15]S2
- Rockstuhl, Carsten [7604-12]S3
- Röder, Beate [7551-05]S2
- Rodrigo, Peter John L. [7613-03]S1
- Rodrigues, Lidiany K. A. [7549-17]S
- Rodríguez, Eugenio [7610-08]S2
- Rodríguez, Jean Baptiste [7608-64]S14, [7608-63]S13, [7616-31]S7, [7616-31]S12
- Rodríguez, Luis [7599-37]S10
- Rodríguez Asomoza, Jorge [7620-10]S3
- Rodríguez-Aboytes, Enrique** [7562-37]S8
- Rodríguez-Asomoza, Jorge [7620-08]S3
- Rodt, Sven [7610-15]S4
- Roe, Jeffrey [7572-05]S1
- Roeck, Werner W. [7557-07]S2
- Roeder, Ryan D. [7599-09]S2
- Roefaers, Maarten B. J. [7569-12]S2
- Roehle, Helmut [7601-13]S3
- Roellens, Yannick [7608-41]S9
- Roesch, Petra [7593-01]S1
- Roethlingshoefer, Tobias [7621-08]S3
- Rogalski, Antoni** 7608 ProgComm, 7608 S9 SessChr
- Rogers, David J. 7603 Chr, 7603 S10 SessChr, [7603-41]S9, [7603-46]S10, [7603-67]SPS3
- Rogers, Jeremy D.** [7556-19]S5, [7558-07]S2, [7559-13]S, [7561-28]S4, [7563-05]S1, [7567-13]S3, [7573-10]S3, [7573-34]S8
- Rogers, John A. 7591 ProgComm
- Rogers, Lachlan [7611-04]S1, [7611-07]S2
- Roh, S. David SC877 Inst, [7583-35]S8
- Rohde, Magnus [7585-02]S1
- Rohleder, Marcus [7600-55]S13
- Roider, Johann [7550-05]S1
- Rojas, Armando G. [7594-37]SPS2, [7620-08]S3
- Roldan Cuenya, Beatriz [7604-10]S2
- Rolland, Jannick P.** [7554-84]S12, 7556 ProgComm, 7556 S3 SessChr
- Rolland, Jannick** [7556-10]S3, [7556-11]S3, [7558-26]S6, [7558-26]S2, [7569-67]S9, [7618-02]S1
- Rölle, Thomas [7619-17]S4
- Rollins, Andrew M.** [7548D-109]S1, [7548D-116]S3, 7554 ProgComm, 7554 S4 SessChr, [7554-03]S1, [7554-09]S2, [7554-21]S4, [7556-13]S3
- Rolston, David R. 7607 ProgComm, 7607 S9 SessChr, [7607-09]S2
- Romanato, Filippo [7582-54]SPS2
- Romano, Giuseppe [7597-66]S14
- Romanov, Dmitri A. [7582-12]S3, [7582-21]S5
- Romanov, Oleg G. [7562-10]S3
- Romanowski, Marek [7577-28]S6
- Romasew, Eugen [7616-60]S14
- Romeike, B. [7560-26]S1
- Romeira, Bruno [7608-17]S4
- Romero, Adrian [7556-20]S5
- Romero, Jacqui [7613-20]S6
- Romero, Rosa [7580-23]S6
- Rommel, Jenneé [7565-04]S2
- Rommel, Scott D.** [7618-47]S3
- Romundstad, Pal [7548B-43]S3
- Roney, Celeste A. [7555-51]S10
- Rong, Xiaoying [7618-11]S2
- Roodenburg, Jan L. N. [7548C-184]S4
- Roohi, Abbas [7584-44]SPS2
- Rooms, Frédéric [7550-80]SPS1, [7595-24]S4
- Roopashree, M. B. [7588-09]S2, [7588-05]S1
- Roorda, Austin SC702 Inst, [7550-72]SPS1
- Ropers, Claus [7600-53]S12
- Ros, Robert [7571-08]S2
- Rosanova, Alberto [7578-08]S2
- Rosbach, Kelsey [7548C-68]S1
- Rose, Klaus [7598-15]S4
- Rosen, Jennifer E. [7548C-168]S1
- Rosen, Richard [7554-18]S3, 7561 ProgComm
- Rosenberg, Mireille [7548D-117]S3, [7554-01]S1
- Rosenblatt, Gilad [7612-29]S8
- Rösener, Benno [7578-32]S8
- Rosenfeld, Arkadi [7586-20]SPS2
- Rosenfeldt, Harald [7621-06]S3
- Rosenow, Thomas [7617-39]S8
- Rosenthal, Amir [7564-19]S3, [7564-27]S4, [7564-110]SPS1
- Rosenthal, Sandra J. [7571-36]S10, 7575 ProgComm
- Röser, Fabian [7580-34]S8
- Rosner, Mordechai [7562-39]S9
- Roso, Luis [7598-03]S1
- Ross, Ashley E. [7548B-50]S4, [7548B-51]S4
- Ross, Caroline A. [7604-05]S1
- Ross, Randy [7572-18]SPS1
- Rosset, Samuel [7593-11]S2
- Rossetti, Marco [7602-67]S15
- Rossi, Francesca [7548A-06]S, [7550-74]SPS1, [7550-77]SPS1, [7574-30]SPS1, [7577-42]SPS1, [7577-43]SPS1
- Rossi, Giuliano [7578-72]SPS2
- Rossi, Markus 7591 ProgComm
- Rotari, Eugeniu V. [7578-45]S11, [7580-33]S8
- Rotermund, Fabian [7578-81]SPS2
- Roth, Franziska [7578-87]SPS2
- Roth, Zachary A.** [7580-14]S3, [7580-61]S14
- Rothenberg, Joshua E. [7580-11]S3
- Rothhardt, Jan [7580-30]S8, [7580-46]S11
- Rothhardt, Manfred [7559-11]S, [7580-46]S11
- Roucka, Radek [7606-58]SPS3
- Rougeolle, P. [7616-34]S8
- Rouleau, Christopher [7586-03]S1, [7586-13]S3, [7586-24]SPS2
- Roulet, Patrice [7558-28]SPS1
- Roumeliotis, Michael** [7564-113]SPS1, [7564-115]SPS1, [7564-119]SPS1
- Rouse, Andrew R. [7558-08]S2, [7558-19]S4
- Roussakis, Emmanuel [7569-91]SPS1
- Rousseau, Guy [7564-81]S12
- Rousslet, J.-M. [7616-34]S8
- Rovati, Luigi L. 7550 ProgComm, 7550 S7 SessChr, [7550-11]SPS1, [7550-67]SPS1, [7572-09]S2
- Rowe, Steven M. [7548C-77]S2
- Rowe, T. Scott** [7550-89]SPS1
- Rowen, Adam M. [7590-08]S2, [7590-14]S3, [7591-24]S6
- Roy, Debjit** [7569-72]SPS1
- Roy, Hemant [7568-62]S1, [7573-21]S5
- Roy, Rahul [7569-84]SPS1
- Roy, Ranadhir [7561-17]S3
- Roy, Ronald A. [7564-40]S6, [7564-82]S12
- Roychoudhuri, Chandrasekhar** [7578-47]S11
- Roycroft, Brendan J. [7604-18]S4, [7615-25]S6
- Rozé, Mathieu [7598-01]S1
- Rozmus, Wojciech [7573-19]S5
- Ruan, Gang [7575-20]S7
- Ruan, Pingqiao [7557-02]S1, [7557-24]SPS1
- Ruan, Zhichao [7582-30]S7
- Ruano, Jesus [7593-10]S2
- Rubenchik, Alexander [7561-08]S1
- Rubin, Mark A. [7548B-36]S1
- Rubins, Uldis** [7557-19]S4
- Rubinsky, Boris [7550-28]S6
- Rubinstein, Marc [7548C-169]S5, [7548C-177]S2
- Rubinsztein-Dunlop, Halina H. 7613 ProgComm
- Ruda, Mitchell C.** SC010 Inst
- Ruderman, Sarah** [7556-19]S5, [7559-13]S, [7567-13]S3
- Rudloff, Dirk [7592-24]S5
- Rudrabhatla, Sri Rajya L. [7569-49]S7, [7576-32]S8
- Rueck, Angelika C. 7569 S4 SessChr, [7569-30]S5
- Ruettinger, Steffen** [7569-82]SPS1, [7571-13]S4
- Ruf, Amit [7555-23]S5
- Ruffell, Simon [7606-55]SPS3
- Ruffenach, Sandra [7602-06]S2
- Ruggeri, Marco [7550-42]S9
- Rühle, Wolfgang W. [7597-18]S4, [7597-65]S14
- Ruiz, Blanca [7599-11]S3
- Rukosuev, Alexey L. [7595-18]S4
- Rulev, Oleg A. [7581-02]S1
- Rumpf, Raymond C.** 7591 ProgComm
- Rungta, Parul [7591-37]SPS2, [7599-09]S2, [7599-62]SPS3
- Ruosch, Michael** [7577-38]S8
- Rupper, Greg [7614-12]S4
- Russell, Ashley [7569-102]SPS1
- Russell, Philip S. J. [7609-32]S8
- Ruterana, Pierre [7602-15]S3, [7602-19]S4, [7602-37]S8
- Rutkowska, Katarzyna [7600-57]S13
- Rutz, Frank [7608-69]S15
- Ruvolo, Eduardo C.** [7548A-09]S, [7548A-22]S
- Rybal'chenko, Andrey [7597-16]S4
- Ryckman, Judson D. [7574-19]S4, [7591-07]S2, [7597-37]S8
- Rylander, Henry G. [7554-92]SPS1
- Ryoo, Seungyup [7562-28]S7
- Ryoo, Jae-Hyun [7602-44]S9
- Rypma, Roger L. SC977 Inst
- Ryu, Han-Youl [7602-70]S11, [7602-70]SPS3, [7617-19]S4
- Ryu, Seon Young [7556-39]SPS1, [7557-29]SPS1
- Ryu, Yeon-Hang [7548F-146]S2
- Ryu, Yungryel [7603-43]S10, [7603-58]SPS3
- S**
- Saadany, Bassam [7594-30]S9
- Saadsaoud, N. [7608-35]S8
- Saager, Rolf B.** [7567-05]S2, [7573-17]S4
- Saar, Brian G.** [7569-06]S1, [7569-12]S2, [7569-20]S3
- Sabas, Jerico N. [7609-20]S5
- Sabot, Germain [7585-29]SPS2
- Saby, Julien [7580-17]S1, [7580-17]S4, [7580-17]S6
- Sacconi, Fabio [7597-12]S3
- Sacconi, Leonardo [7548G-164]SPS1, [7589-04]S2
- Sachi, Radek [7571-03]S1
- Sackrow, Marcus [7568-12]S6
- Sacks, Alana [7573-25]S6
- Sacramento, Patricia A. [7549-23]S
- Sadangi, Rajendra K. [7578-38]S10
- Saddawi, Samir [7620-03]S2, [7620-12]S4
- Sadighi-bonabi, Rasoul [7589-47]SPS2
- Sadofev, Sergey [7597-42]S9
- Sadwick, Laurence P. 7601 Chr, 7601 S3 SessChr, 7601 S2 SessChr
- Saenz, Marcela [7568-63]S4
- Safaisini, Rashid** [7615-10]S3, [7615-20]S5
- Safavi-Naeini, Saffiedin [7594-36]SPS2
- Sagan, Zbigniew 7584 ProgComm
- Sagne, Isabelle [7608-31]S7, [7608-26]S6, [7608-86]S18, [7616-41]S9
- Saha, Sibup P. [7548D-120]S4
- Sahar, Nadder D. [7548F-142]S1
- Sahara, Akio [7621-05]S2
- Sahasrabudhe, Adit [7587-25]S4
- Sahin, Serkan [7588-22]S4
- Sahl, Steffen J. [7571-34]S10, [7574-06]S1
- Sahm, Alexander [7582-59]SPS2
- Sahu, Jayanta K. [7580-58]S13, [7598-47]S11
- Saievar Iranizad, Esmail [7600-59]S14, [7617-59]SPS3
- Saigusa, Hiroyuki [7554-94]SPS1
- Saiki, Taku [7578-18]S4
- Saiki, Toshiharu [7577-31]S7
- Saile, Volker [7586-14]S3
- Sailor, Michael J. 7553 ProgComm, 7553 S5 SessChr, [7553-24]S6, [7576-18]S5
- Saini, Sajjan SC817 Inst
- Saint-Jalmes, Arnaud [7604-06]S1
- Saito, Marcia [7567-08]S2
- Saitoh, Daizoh [7551-30]S7, [7564-47]S7
- Sakabe, Masayo [7576-09]S3, [7576-54]SPS1
- Sakad?ić, Sava [7548E-124]S1, [7569-91]SPS1
- Sakahara, Harumi [7561-43]SPS1
- Sakai, Tetsuo [7609-58]SPS3
- Sakai, Tooru [7554-98]SPS1
- Sakaida, Isao [7558-14]S3
- Sakamoto, Fernanda H.** [7548A-02]S
- Sakamoto, Mariko [7607-27]S7
- Sakamoto, Toshihisa [7564-47]S7
- Sakamoto, Yuji** [7619-08]S2, [7619-33]SPS3, [7619-36]SPS3
- Sakane, Kumiko K. [7560-02]S1, [7560-13]SPS1
- Sakano, Tatsunori [7603-62]SPS3
- Sakata, Hironobu [7619-33]SPS3
- Sakaue, Minoru [7587-12]S2
- Sakhno, Oksana V. [7618-35]S10
- Sakota, Daisuke** [7573-44]SPS1
- Sakr, Salam [7602-45]S10
- Sakurai, Ryo 7618 ProgComm, OE123x ProgComm

Index of Authors, Chairs, and Committee Members

- Sakurai, Takashi [7570-33]S7
 Salamo, Gregory J. [7611-26]S6
 Salas, Pedro [7576-25]S6
 Salas-García, Irene [7548A-08]S,
 [7548F-145]S2, [7562-10]S3
 Salas-Montiel, Rafael [7605-19]S7
Salcedo, José R. [7580-23]S6
 Salcedo-Reyes, Juan C. [7609-55]
 SPS3
 Sale, Terry E. [7615-02]S1
Saleh, Bahaa [7570-21]S4
 Sales, D. L. [7610-09]S3
 Sales, Salvador [7612-35]S9
 Sales Neto, Antonio [7575-24]S8
 Salganskiy, Mikhail Y. [7580-43]S10
 Salin, François L. [7580-17]S1, [7580-
 17]S4, [7580-17]S6
 Salomatina, Elena [7563-31]S5
 Salomon, Laurent [7608-37]S8
 Salmarche, Anita [7552-20]S4
 Samarkin, Vadim V. [7595-18]S4
Samatham, Ravikant [7548A-15]S
 Samineni, Prathyush [7569-87]SPS1
Samkoe, Kimberley S. [7551-25]S6,
 [7551-44]SPS1, [7568-74]S2
 Samora, Sally [7591-24]S6, [7604-22]
 S5, [7604-24]S5, [7609-46]S11
 Sampei, Seiichi [7587-31]S5
Sampson, David D. [7554-25]S4,
 [7554-44]S7, [7554-73]S11, [7555-
 14]S3
 Samsel, Paulina [7550-44]S9
 Samson, Bryce N. [7580-09]S2
 Samson, Philip C. [7571-36]S10
 Sana, Ajaz [7620-03]S2, [7620-05]S2,
 [7620-12]S4
Sanchez, Daniel [7582-45]S10,
 [7598-55]SPS3, [7598-56]SPS3
 Sánchez, A. M. [7610-09]S3
 Sanchez-Cortez, Santiago [7577-40]
 SPS1, [7577-41]SPS1
 Sanchis, Pablo [7604-17]S4
 Sandana, Vinod E. [7603-41]S9,
 [7603-46]S10, [7603-67]SPS3
 Sandanayake, Neomal S. [7551-20]S5
 Sandberg, AnnSofi [7568-61]S4,
 [7568-87]S6
 Sandeau, Nicolas [7569-53]S7
 Sandell, Julia [7551-11]S3, [7551-12]
 S3
 Sanders, Lehanna [7568-73]S3
 Sanders, Mary M. [7564-127]SPS1
 Sandhage, Ken H. [7609-24]S6
 Sandison, Ann [7548C-74]S1
 Sandkuilj, Daaf [7569-95]S7
 Sandner, Thilo [7594-02]S5, [7594-02]
 S1, [7594-10]S4, [7594-11]S4,
 [7594-20]S6, [7594-31]S9
 Sandor, George 7548F ProgComm
 Sands, Roger W. [7565-03]S1
 Sanfilippo, Delfo N. [7598-34]S8,
 [7606-05]S2
 Sang, Mei [7601-20]S4
 Sangiorgi, Giuseppe M. [7548D-104]
 S1
 Sangirov, Jamshid [7607-47]SPS3
 Sangleboeuf, Jean-Christophe [7559-
 30]S, [7598-22]S5
 Sani, Ardalan A. [7608-12]S3
 Sankaridurg, Padmaja [7550-20]S4
 Sann, Joachim [7603-04]S1
 Sano, Tomokazu 7584 ProgComm
 Santeford, Andrea C. [7564-05]S1
Santiago, Freddie [7595-07]S2,
 [7595-08]S2
 Santori, Charles M. 7611 Chr, 7611 S1
 SessChr, [7611-07]S2, [7611-09]S2
 Santos, Andre B. O. [7560-04]S4
 Santos, Beate S. [7575-04]S2, [7575-
 07]S3, [7575-10]S4, [7575-24]S8
Santos, Cássio E. A. [7582-47]S10,
 [7610-21]S5
 Santos, Michael R. [7608-22]S5,
 [7608-72]S14, [7616-47]S11
 Santos, Paula [7557-33]SPS1
 Santos, Rui [7597-60]S13
 Santos, Susana I. [7570-32]S7
 Santos-Mallet, Jacenir [7568-59]S3,
 [7575-37]S11
Sapozhnikova, Veronika [7564-09]S2
 Saraf, Laxmikant V. [7593-25]S5
 Saraga, Fernanda [7552-19]S4
 Särchen, Emanuel [7564-53]S8
 Sardar, Dhiraj K. [7562-12]S3, [7576-
 23]S6
 Sardini, Alessandro [7570-16]S4,
 [7573-15]S4
 Saremi, Sumarie [7584-19]S7, [7584-
 19]S11
 Sargent, Edward H. [7600-07]S2
Sariciftci, Niyazi S. 7599 ProgComm
 Sarimollaoglu, Mustafa [7564-51]S8
 Sarkar, Akhee [7565-07]S3
 Sarkar, Pabak [7571-21]S6, [7574-31]
 SPS1
 Sarkisov, Sergey [7598-73]SPS3
 Sarmento, Viviane A. [7552-14]S3,
 [7552-16]S3
 Saroufeem, Ramez [7548D-106]S1,
 [7561-02]S1
 Sarovar, Mohan [7561-13]S2
 Sarpe-Tudoran, Cristian [7600-32]S7
 Sarrach, Sebastian [7585-32]S12,
 [7585-32]S6
 Sarracino, John T. [7578-87]SPS2
 Sarro, Pasqualina M. [7606-08]S3
 Sartor, J. [7597-40]S9
 Sartorius, Bernd [7601-13]S3
 Sarunic, M. V. [7554-93]SPS1
 Sarvazyan, Armen [7548B-39]S2
 Sasaki, Kazuhiro [7554-13]S3
 Sasaki, Keiji [7579-48]SPS2, [7611-
 34]SPS3
Sasaki, Wakao [7597-79]SPS3,
 [7597-80]SPS3
 Sasaki, Yuichi [7619-07]S2
Sato, Akira [7597-51]S11
Sato, Ayumi [7597-51]S11, [7597-61]
 S13
 Sato, Erika T. [7561-39]SPS1
 Sato, Fumiya [7584-21]S7, [7584-21]
 S11
Sato, Hidetoshi [7560-05]S2
 Sato, Ken-ichi 7620 ProgComm
 Sato, Koki [7619-26]SPS3, [7619-30]
 SPS3
Sato, Kunihiko [7619-06]S2, [7619-
 10]S3
Sato, Masato [7566-05]S2
Sato, Shunichi [7551-30]S7, [7562-
 33]S7, [7564-47]S7, [7573-29]S7
 Sato, Tadatak [7584-07]S2
 Sato, Takashi [7590-05]S1
Sato, Takashi [7597-22]S5, [7597-51]
 S11, [7597-61]S13, [7597-85]SPS3
 Sattmann, Harald [7550-27]S5, [7550-
 54]S11, [7554-57]S9
 Sauer, Markus 7568 ProgComm, 7571
 ProgComm, [7571-30]S9, [7571-39]
 SPS1
 Sauer, Michael [7620-06]S3
 Sauer, Paul [7588-08]S2
 Saunders, Christobel [7554-73]S11,
 [7555-14]S3
 Saunders, Ross [7621-15]S5, [7621-
 17]S5
 Saube, Ray [7594-38]SPS2
 Sauvage, Vincent R. [7555-08]S2,
 [7556-01]S1, [7561-07]S1
 Sava, Vasile [7552-26]SPS1
 Savage, H. [7561-41]SPS1
 Savage, Susan [7602-78]SPS3, [7602-
 78]S11
Savchen, Oleksandr [7604-10]S2
 Saveliev, Yuri [7578-53]S13
 Savich, Gregory R. [7608-74]S16
 Savitsky, Alexander [7568-21]S5,
 [7576-14]S4
 Savoldelli, Michèle [7550-29]S6,
 [7589-02]S1
 Savran, Cagri A. [7574-32]SPS1
 Sawa, Miki [7550-57]S11
 Sawaki, Nobuhiko [7602-02]S1
 Sawesky, Greg [7551-31]S7
 Saxena, Geetika Jain [7597-33]S7
Saxena, Tarun [7560-23]S4
 Sayanagi, Kaori [7550-57]S11
 Sayed El-Ahl, Mohammad H. [7555-
 34]S7, [7556-36]SPS1
Saynatjoki, Antti [7598-11]S3, [7598-
 12]S3, [7606-50]SPS3
 Sazonova, Vera [7608-88]S19
 Sberveglieri, Giorgio [7603-40]S9
 Scaffardi, Mirco [7621-11]S3
 Scaggis, Michael J. 7579 ProgComm,
 7579 S8 SessChr
 Scalia, Giuseppe [7571-15]S5, [7608-
 85]S18
Scalise, Lorenzo [7555-52]S10,
 [7556-23]S6, [7556-32]S8
 Scamarco, Gaetano [7608-05]S1,
 [7616-43]S10
 Scamuffa, Robin [7548A-09]S
 Scharlott, Kerry WS933 Inst
 Schaake, Herbert F. [7608-58]S12
 Schacham, Shmuel E. [7602-45]S10
 Schade, Lukas [7602-39]S8
 Schade, Martin [7586-17]S4
 Schaefer, Sebastian [7576-07]S2
 Schaeffer, Ronald D. SC689 Inst
Schaevitz, Rebecca K. [7607-33]S8
 Schäfer, Martin [7600-10]S3
Schaffer, Chris B. [7569-92]SPS1,
 7589 ProgComm
Schanne-Klein, Marie-Claire [7548A-
 01]S, [7550-48]S10, [7569-57]S8,
 [7599-13]S3
 Scharfenorth, Chris [7579-45]S11
Schaub, Michael P. SC384 Inst
 Schecklman, Scott [7601-07]S2
 Scheeren, Carla W. [7582-47]S10
 Scheffel, Andy [7598-09]S2
 Scheibner, Ralf [7608-69]S15
 Scheidig, Ingo [7585-04]S1
 Schell, Alexander [7578-23]S5, [7578-
 71]S16
 Schellenberg, Markus [7596-18]S3
Schenk, Harald SympChair, [7592-20]
 S4, 7594 Chr, [7594-02]S5, [7594-
 02]S1, [7594-10]S4, [7594-11]S4,
 [7594-20]S6, [7594-31]S9
 Schepler, Kenneth L. 7582 ProgComm
 Scherer, Axel 7609 Chr, 7609 S2
 SessChr, [7609-03]S1
 Scherr, Douglas S. [7548B-36]S1
 Scherzer, Otmar [7564-25]S4
 Scheuer, Jacob [7579-41]S10, 7612
 ProgComm, 7612 S1 SessChr,
 [7612-12]S3
 Scheurer, Amber [7603-44]S10
 Schietinger, Stefan [7609-09]S3
 Schiffern, John [7608-13]S3
 Schille, Joerg [7589-39]S5, [7589-39]
 S9, [7589-50]SPS2
 Schillgalies, Marc O. [7602-75]S11,
 [7602-75]SPS3
 Schilling, Bradley [7578-60]S14
 Schimmel, Hagen [7589-21]S6
 Schimpf, Damian N. [7580-13]S3,
 [7580-32]S8, [7580-34]S8, [7580-
 85]SPS2, [7580-91]SPS2
 Schineller, Bernd [7617-24]S5
 Schires, Kevin [7597-59]S13
 Schirner, Michael [7555-17]S4
 Schlanitz, Ferdinand [7550-27]S5
 Schleife, Andre [7603-08]S2
 Schleifenbaum, Frank [7568-12]S6,
 [7568-38]S1, [7571-11]S2
Schleuning, David A. [7583-35]S8
 Schlichting, Abby [7552-07]S2
 Schliwa, Andrei [7610-15]S4
 Schlösser, Alexander [7594-34]S9
 Schlothauer, Jan [7551-05]S2
 Schlott, Kerstin [7550-03]S1, [7550-
 05]S1
 Schlup, Philip [7568-54]S6
 Schmauss, Bernhard [7621-08]S3
 Schmid, Jens H. 7604 ProgComm,
 7604 S6 SessChr, [7606-10]S4,
 [7606-13]S5, [7606-23]S7
 Schmid, Thomas [7586-02]S1
 Schmidt, Andreas [7578-81]SPS2
 Schmidt, Berthold E. [7583-24]S5
 Schmidt, Bodo [7578-11]S3
 Schmidt, Carl [7556-28]S7
 Schmidt, Ernst-Dieter 7621
 ProgComm
 Schmidt, Frank 7604 ProgComm,
 [7604-14]S3, [7606-35]S9, [7609-
 62]SPS3
Schmidt, Hans-Werner [7619-42]S4
 Schmidt, Holger [7591-08]S2, 7606
 ProgComm, 7606 S3 SessChr,
 7606 S4 SessChr, [7606-09]S4,
 7612 ProgComm
Schmidt, Jason D. [7588-02]S1
 Schmidt, Matt C. [7602-43]S9
 Schmidt, Michael [7555-42]S9
 Schmidt, Oliver 7580 ProgComm,
 [7580-64]S15
 Schmidt, Oliver G. [7610-19]S5
 Schmidt, Ralf [7617-54]S11
 Schmidt-Erfurth, Ursula [7550-27]S5
Schmitt, Joseph M. [7548D-114]S3,
 [7554-02]S1, [7558-20]S4
 Schmitt, Michael [7582-06]S2
 Schmitt, Robert [7566-16]S4, [7568-
 23]S2
 Schmitz, Johannes [7608-69]S15,
 [7616-48]S11
 Schmitz Stöwe, Sabine [7590-17]S3
Schmoll, Tilman [7550-15]S3, [7550-
 51]S10, [7550-54]S11, [7554-59]
 S9, [7558-18]S4
 Schnabel, Christian [7554-85]SPS1
 Schneeweiss, Claudia [7619-40]SPS3
 Schneider, Arno [7599-11]S3
 Schneider, Christian [7600-44]S10,
 [7608-03]S1, [7611-22]S5
 Schneider, D. [7597-40]S9
 Schneider, Hans Christian [7600-48]
 S11
 Schneider, Martin [7549-16]S
 Schneider, Stefan W. [7548A-10]
 S, [7555-16]S4, [7555-54]SPS1,
 [7568-15]S2
 Schneiders, Malte [7621-16]S5
 Schnitzer, Mark J. 7558 ProgComm,
 [7594-01]S5, [7594-01]S1
 Schoeberl, Joachim [7573-49]SPS1
 Schoen, Peter [7577-32]S7
 Schoenenberger, Sophie [7605-01]S1
Schoenfeld, Winston V. 7591 Chr,
 7591 S4 SessChr, [7591-06]S2,
 [7603-44]S10
 Schoening, Torsten [7579-12]S4
 Scholles, Michael [7592-20]S4, [7593-
 10]S2
 Scholz, Ferdinand 7602 S13 SessChr,
 [7602-24]S6, [7602-64]S15

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Scholz, Steffen G. [7590-11]S2
Schomacker, Kevin T. [7555-40]S8
Schomaker, Markus [7589-09]S3
Schön, Peter [7569-56]S8
Schötz, Gerhard [7580-107]SPS2
Schouten, Hugo F. [7613-13]S4
Schow, Clint L. [7615-23]S6
Schrader, Sigurd [7579-45]S11, [7606-41]S11
Schrank, Franz [7605-09]S3
Schreiber, Thomas [7580-52]S12, [7580-86]SPS2
Schrenk, Werner [7616-22]S5, [7616-62]S14
Schriempf, J. Thomas 7581 Chr, 7581 S3 SessChr, 7581 S2 SessChr
Schriver, Kenneth E. [7585-06]S2
Schröder, Dominic [7583-08]S2, [7583-29]S6, [7616-54]S13
Schröder, Henning [7604-17]S4, [7607-14]S4
Schroeder, Joerg [7571-03]S1
Schroers, Christian [7583-56]SPS2
Schroeter, Siegmund [7579-23]S6
Schubert, E. Fred SympChair, SC052 Inst, 7597 S SessChr, 7598 S SessChr, 7599 S SessChr, 7600 S SessChr, 7602 S SessChr, 7603 S SessChr, 7604 S SessChr, 7606 S SessChr, 7607 S SessChr, 7608 S SessChr, 7609 S SessChr, 7610 S SessChr, 7612 S SessChr, 7616 S SessChr, 7617 ProgComm, 7617 S SessChr, 7617 S4 SessChr, 7618 S SessChr, 7619 S SessChr
Schuele, Georg 7550 ProgComm, 7550 S1 SessChr, [7550-32]S6
Schuetz, Peter [7584-26]S10
Schug, Michael [7584-19]S7, [7584-19]S11
Schuh, Kolja [7602-35]S8
Schuldut, Thilo [7594-25]S7
Schüle, Wolfgang [7578-10]S3
Schulmeister, Karl BO111 ProgComm
Schultz, Carsten [7576-04]S1
Schultz, Christoph [7583-22]S5
Schultz, Jerry 7553 ProgComm
Schultz, Richard R. [7587-08]S2
Schulz, Julia [7569-100]SPS1
Schulz, Olaf [7571-08]S2
Schulz, Roland [7582-06]S2
Schulz, Stefan [7602-35]S8
Schulz, Uwe [7615-15]S4
Schulze, Haike [7583-29]S6
Schulze, Volker [7585-18]S4
Schulzgen, Axel [7579-18]S5, [7598-72]SPS3
Schumacher, Silvia [7550-30]S6
Schumacher, Stefan [7600-47]S11
Schunemann, Peter G. 7582 ProgComm, [7582-15]S4, [7582-44]S10
Schuoecker, Dieter [7579-13]S4
Schuster, Kay [7598-15]S4
Schuster, Kurt [7562-29]S7
Schüth, Anna [7568-82]S4
Schüttpelz, Mark [7571-30]S9
Schütze, Christopher [7550-27]S5
Schwaiger, Stephan [7602-24]S6
Schwarz, Christina [7550-87]SPS1
Schwarz, Martin [7548A-03]S, [7555-16]S4, [7568-15]S2, [7569-100]SPS1
Schwarz, Thomas [7578-24]S4, [7578-24]S6, [7578-24]S1
Schwarz, Thomas [7582-06]S2
Schwarz, Ulrich T. [7597-50]S11, [7602-39]S8, [7617-21]S4
Schweda, Dawid [7579-45]S11
Schwertfeger, Sven [7616-14]S3
Schwuchow, Anka [7598-09]S2
Schyns, Emile [7598-35]S9
Scolari, Lara [7580-48]S11
Scolaro, Loretta [7554-73]S11, [7555-14]S3
Scott, Alan D. [7594-28]S8
Scott, Andrew M. [7580-66]S15
Scott, J. Campbell [7597-32]S7
Scott, Mike [7576-37]S9
Scott, Peter [7559-22]S, [7572-18]SPS1
Scrymgeour, David A. [7591-24]S6
Scully, Patricia [7589-39]S5, [7589-39]S9
Searcy, Steven M. [7621-18]S5
Seas, Antonios [7578-04]S1, [7578-06]S2, [7578-09]S2
Sebag, Jerry 7550 ProgComm
Sebastian, Jürgen [7583-29]S6
Sedat, John W. [7570-05]S1
Seaddon, Angela B. [7604-30]S7
Sederberg, Matthew S. [7600-38]S9
Seebeck, Jan [7602-35]S8
Seelert, Wolf 7578 ProgComm, [7578-31]S8
Seetamraju, Madhavi [7555-55]SPS1
Seeton, Roger [7564-52]S8
Séfé, Richard [7619-13]S3
Segal, Ester [7576-18]S5
Segawa, Hiroyo [7604-32]S7
Seibel, Eric [7558-05]S2, [7558-12]S3, [7569-12]S2, [7570-17]S4
Seidel, Helmut [7584-19]S7, [7584-19]S11
Seidnitz, Daniel [7616-54]S13
Seifert, Albert [7585-16]S4
Seise, Enrico [7580-32]S8, [7580-57]S13, [7580-85]SPS2, [7580-91]SPS2
Seka, Wolf [7549-06]S1
Seki, Daisuke [7594-14]SPS2
Selb, Juliette J. [7548E-122]S1
Seletskiy, Denis 7614 S4 SessChr, [7614-02]S1, [7614-06]S2, [7614-08]S3
Seleznev, Leonid V. [7581-02]S1
Sell, Alexander [7600-63]S15
Sellars, Matthew J. [7611-06]S1
Selvamanickam, Venkat [7597-07]S2
Selviah, David R. [7607-18]S5
Semjonov, Sergey L. [7580-43]S10
Semke, William H. [7587-08]S2
Sen, Chandan [7557-16]S4
Senanayake, Pradeep N. [7610-30]S7
Sencan, Ikbal [7568-86]S3
Senellart, Pascale [7608-26]S6
Sengo, Gabriel [7604-02]S1
Sennaroglu, Alphan [7598-46]S11
Senoh, Takanori [7619-05]S1, [7619-34]SPS3
Senpan, Angana [7576-37]S9
Senthil Murugan, Ganapathy [7598-18]S4
Seo, Chi Hyung [7564-41]S6
Seo, InSeok [7548A-24]S
Seo, Jangwon [7599-45]S12
Seo, Kwang Il [7618-43]SPS3
Seo, Min-Kyo [7598-41]S10, [7618-44]SPS3
Seo, Soo-Ah [7569-27]S4
Seo, Sungkyu [7568-86]S3
Seo, Yong Gon [7602-66]S15
Seo, Yu Jung [7602-70]S11, [7602-70]SPS3
Seok, Hyojun [7609-60]SPS3
Separovic, Duska [7565-01]S1
Sercel, Jeffrey P. [7584-28]S10, [7585-28]S12, [7585-28]S6
Serebrennikova, Yulia [7572-14]S3
Sergeant, Gerard [7570-31]S6
Sergeev, Andrei V. [7608-73]S16
Sergey, Karandashev [7597-16]S4
Serra, Christophe [7618-28]S7
Sersic, Ivana [7600-37]S9
Sessions, Neil P. [7604-31]S7
Sestini, Serena [7569-104]SPS1
Setyawati, Onny [7591-26]S6
Seurin, Jean-Francois 7615 ProgComm, [7615-14]S4, [7615-16]S4
Sevilla, Paz [7577-41]SPS1
Seward, George H. SC865 Inst Sextl, Gerhard [7591-40]SPS2, [7607-29]S7
Seyffert, Gerrit [7556-06]S2
Seyffert, Volker [7578-67]S16
Shabaev, Andrew [7600-33]S8
Shadgan, Babak [7548B-32]S1, [7555-38]S8, [7572-07]S2
Shaffer, Etienne [7569-50]S7
Shaffer, Michael R. [7564-116]SPS1
Shaffer, Michael K. [7581-14]S4
Shafiee, Houran [7599-28]S7
Shafiiha, Roshanak [7607-03]S1
Shafir, Ehud [7580-78]SPS2
Shafirstein, Gal [7548C-176]S2, [7548C-182]S5
Shah, Lawrence [7578-51]S12, [7580-02]S1, [7580-14]S3, [7580-50]S11, [7580-61]S14
Shah, Priya [7548C-94]S4
Shah, Udayan K. 7548C ProgComm
Shah Hosseini, Ehsan [7609-19]S5
Shaheen, George [7560-24]S6
Shaheen, Nicholas J. [7573-24]S6
Shahriar, Selim M. 7611 ProgComm, 7612 Chr, [7612-13]S3, [7612-17]S4
Shahriari, Mahmoud R. [7576-42]S10
Shakeel, Saad [7550-12]S3, [7550-65]SPS1
Shakhova, Natalia M. 7554 ProgComm, [7557-18]S4
Shalaev, Vladimir M. 7586 ProgComm
Sham, Lu Jeu [7611-20]S5
Shamay, Moshe [7583-11]S3
Shamir, Joseph [7579-08]S2
Shamir, Yariv [7580-62]S14, [7580-78]SPS2
Shams, Maitham [7593-26]S5
Shaner, Eric A. [7616-46]S11
Shang, Yu [7548D-120]S4, [7557-08]S2
Shanley, Patrick [7573-33]S8
Shannugam, Sivabalan [7561-29]S4
Shao, Guocheng [7593-25]S5
Shao, Wen-Qing [7559-10]S
Shaoqun, Zeng [7572-23]SPS1
Shapovalov, Lisa [7616-17]S4
Sharkawy, Ahmed S. [7599-20]S5, [7606-30]S8, [7609-22]S5
Sharma, Arun B. [7549-09]S1
Sharma, Enakshi K. [7597-56]S12, [7604-16]S3, [7597-33]S7, [7598-21]S5
Sharma, Gargi [7600-65]S15
Sharma, Jaswinder [7576-20]S5
Sharma, Rahul [7548E-130]S3
Sharma, Utkarsh [7556-14]S4, [7558-15]S4
Sharma, Vijay S. [7555-46]S10
Sharma, Vishwani [7548E-138]S4
Sharova, Natalia P. [7550-68]SPS1
Sharples, Steve D. [7570-30]S6
Sharts, Olga N. [7568-77]SPS1, [7574-18]S3, [7574-28]S4
Shashkov, Evgeny V. [7564-39]S6, [7564-51]S8, [7565-09]S3
Shastri, Karthik [7556-18]S5
Shavliakadze, Thea [7554-25]S4
Shaw, George [7578-08]S2, [7578-09]S2
Shaw, L. Brandon 7580 ProgComm, 7580 S15 SessChr
Shaw, Michael J. [7605-11]S4
Shawe-Taylor, John [7573-04]S1
Shay, Thomas M. 7580 ProgComm, [7580-53]S12
Shchegrov, Andrei V. 7582 ProgComm, 7582 S2 SessChr, [7582-01]S4, [7582-01]S6, [7582-01]S1
Shcherbakov, Alexandre S. [7582-45]S10, [7582-50]SPS2, [7597-49]S11, [7598-55]SPS3, [7598-56]SPS3, [7600-52]S12
Shchukin, V. A. [7597-27]S6, [7597-48]S11, [7597-53]S12, [7610-23]S6, [7615-22]S6, [7616-54]S13
Shea, Herbert R. 7592 ProgComm, [7593-11]S2
Sheen, Nick [7550-55]S11
Sheen, Yi-Shuan [7552-08]S2
Sheik-Bahae, Mansoor 7614 Chr, [7614-02]S1, [7614-06]S2, [7614-08]S3, [7614-10]S3, [7614-13]S4
Sheldakova, Julia V. [7579-04]S4
Shellikeri, Gandhar P. [7578-92]S7
Shelton, Ryan L. [7564-35]S5
Shen, Ji-Lin [7576-38]S9
Shen, Jin-Hui [7550-33]S6
Shen, Jun [7578-23]S5
Shen, Kun-Ching [7602-08]S2, [7602-60]S14, [7609-18]S4, [7617-30]S6
Shen, Shyh-Chiang [7602-44]S9
Shen, Xiaokang [7585-08]S2, [7585-09]S2
Shen, Yuen-Ron 7618 S4 SessChr, [7618-12]S3
Sheng, Chao [7567-18]S4
Shepherd, Whitney E. B. [7599-25]S6
Sheppard, Colin J. R. [7570-26]S5
Sherif, Sherif S. [7554-104]SPS1
Sherwood, Michael E. [7594-08]S3
Sheu, Yae-Lin [7564-10]S2, [7564-16]S3
Shevchenko, Yanina Y. [7559-21]S, [7577-16]S4
Shi, Jing [7607-02]S1
Shi, Jin-Wei [7617-13]S3
Shi, Peng [7578-23]S5, [7578-71]S16
Shi, Ping [7556-24]S6
Shi, Shouyuan [7609-20]S5, [7609-22]S5
Shi, Wei [7564-32]S5
Shi, Wei 7582 ProgComm, 7582 S5 SessChr, [7582-26]S6, [7582-29]S7
Shi, Yanhui [7568-50]S3
Shi, Yi-Wei 7559 ProgComm, 7559 S SessChr, [7559-03]S, [7559-09]S, [7559-10]S
Shi, Zhenzhi [7563-20]SPS1
Shi, Zhong [7604-49]SPS3
Shiao, Wen-Yu [7602-08]S2, [7602-60]S14
Shibata, Suichi [7598-50]S12, [7604-32]S7
Shibuya, Takeshi [7590-22]SPS2
Shieh, Dar-Bin [7569-55]S8
Shih, Chih-Kang [7611-26]S6
Shikama, Kota [7599-02]S1
Shilagard, Tuya [7569-49]S7, [7576-32]S8
Shilyagin, Pavel A. [7554-109]SPS1
Shim, Jong Hyun [7603-36]S8
Shim, Jong-In [7602-55]S12, [7617-19]S4
Shima, Akihiro [7583-02]S1
Shimada, Naoyuki [7583-02]S1

Index of Authors, Chairs, and Committee Members

- Shimada, Ryoko [7602-59]S13, [7602-77]S11, [7602-77]SPS3
 Shimazaki, Natsumi [7562-32]S7
 Shimidzu, Naoki [7619-14]S3
 Shimizu, Hitoshi [7615-01]S1
 Shimizu, Naofumi [7601-12]S3
Shimotsuma, Yasuhiko [7600-41]S10
 Shin, Dong Myung [7599-55]SPS3, [7599-56]SPS3
 Shin, Hyun-Joon [7591-39]SPS2
 Shin, In H. [7568-72]S1, [7568-76]S1
 Shin, Jae-Cheol [7616-23]S5
 Shin, Jae-Heon [7601-21]SPS3
 Shin, Jonghwa [7601-10]S2
Shin, Sang-Mo [7568-72]S1, [7568-76]S1
 Shin, Sungeui [7599-56]SPS3, [7599-55]SPS3
Shin, Sunghwan [7556-14]S4
 Shin, Young Chul [7602-70]S11, [7602-70]SPS3
 Shinagawa, Tsutomu [7586-19]S4, [7603-60]SPS3
 Shingledecker, Aurora D. [7562-29]S7
 Shinohara, Kunio [7589-45]SPS2
 Shinohara, Yuuki [7584-21]S7, [7584-21]S11
 Shinojima, Hiroyuki [7606-27]S8
 Shinomiya, Nariyoshi [7551-30]S7
 Shinozaki, Tatsuya [7580-16]S4, [7580-16]S6, [7580-16]S1
Shipp, Dustin [7560-16]S5
 Shirakawa, Akira [7580-38]S9
 Shirakawa, Tatsuya [7597-28]S7
 Shirato, Yoji [7607-27]S7
 Shiratori, Yoshitaka [7548D-110]S2
 Shirley, Eric L. [7567-15]S4
Shirnanova, Marina [7568-21]S5, [7568-46]S2, [7575-34]S10, [7599-36]S9, [7577-25]S6
 Shishkov, Milen [7548D-117]S3, [7548D-121]S4, [7554-01]S1, [7554-04]S1, [7554-10]S2, [7557-11]S3, [7558-02]S1, [7558-10]S3, [7558-17]S4
 Shiu, Matthew [7606-13]S5
 Shkerdin, Gennady [7597-35]S8, [7597-38]S8
 Shoa, Tina [7589-14]S4
 Shoaf, Jodie [7610-22]S5
 Shoemaker, Kurt [7548A-09]S
 Shoenly, Joshua E. [7549-06]S1
 Shoji, Yozo [7587-12]S2
 Shokatsu, Eiji [7604-32]S7
 Shome, Krishanu [7553-14]S4
 Shon, Pong Kyun [7617-57]SPS3, [7618-43]SPS3
 Shori, Ramesh K. 7578 Chr, 7578 S13 SessChr, 7578 S12 SessChr, [7580-60]S14, 7582 ProgComm
 Short, Michael A. [7560-21]S1
 Shou, Nathan [7583-35]S8
 Shrestha, Sebina [7554-32]S5, [7561-23]S4
 Shrestha, Yujan [7591-11]S3
 Shrivastava, Sangeeta [7604-16]S3
 Shtairf, Mark [7580-62]S14, [7580-78]SPS2
 Shterengas, Leon [7616-66]S2
 Shtoyko, Tanya [7571-21]S6, [7574-31]SPS1
 Shtrichman, Itay [7608-65]S14
 Shu, Dan [7571-06]S2
 Shubin, Alexey V. [7580-39]S9
 Shubin, Ivan N. [7607-02]S1, [7607-11]S3
 Shukla, Prashant [7561-19]S3
 Shukla, Vijay [7578-38]S10
 Shul, Randy J. [7604-24]S5
 Shuler, Michael L. [7568-41]S3, [7596-07]S2
 Shulkin, Brian [7562-19]S5
 Shulman, Ilya L. [7598-04]S1
 Shulman, Shiri [7562-39]S9
 Shung, K. Kirk [7557-10]S3, [7564-12]S2, [7564-77]S1, [7555-01]S1
 Shur, Vladimir Y. [7579-02]S1
 Shvartsman, Leonid D. [7563-09]S2
Siadat, Mohammad-Reza [7548F-141]S1
Siahmakoun, Azad [7594-35]SPS2
 Siddique, Masood 7561 ProgComm
 Siddiqui, Ozair [7599-22]S6
Sidorin, Yakov TrackChr, 7604 ProgComm
 Sieber, Jason [7548C-90]S3
 Sieber, Jochen [7578-67]S16
 Siebert, Rainer [7548E-131]S3, [7567-06]S2
 Siegel, Peter H. [7562-17]S5
 Siegert, Joerg [7605-09]S3
Sieluzicka, Katarzyna [7573-28]S7, [7573-43]SPS1
 Sierra, Heidy [7570-04]S1
 Sierzputowski, Leszek [7602-11]S3
 Sigal-Zafrani, Brigitte [7554-80]S12, [7555-13]S3
 Sigel, Eric [7548C-176]S2
 Sigg, Hans C. [7600-10]S3
 Signorini, Raffaella [7582-46]S10, [7582-54]SPS2
 Sigrist, Markus W. [7608-07]S2
 Silbergleit, Alexander S. [7562-34]S8
 Sillard, Pierre [7598-14]S4
 Silva, Elias A. [7568-06]S2
 Silva, Luciana M. H. [7568-06]S2
 Silva, Wagner F. [7612-18]S5
Silva Martinho, Herculanio d. [7551-34]SPS1, [7561-39]SPS1
 Silveira Junior, Landulfo [7552-15]S3
 Silverman, Kevin L. 7610 ProgComm
Silverman, Ronald H. [7564-33]S5
 Silversmith, Donald J. 7602 ProgComm, 7603 ProgComm, 7608 ProgComm, 7608 S16 SessChr
 Sim, Eunji [7577-47]SPS1
 Simanovskaia, Natalia [7582-01]S4, [7582-01]S6, [7582-01]S1
 Simanovski, Dmitrii [7562-34]S8
 Simmonds, Boris [7559-23]S
 Simmons, Calvin L. [7580-15]S4, [7580-15]S6, [7580-15]S1
 Simmons, Jerry A. 7617 ProgComm
 Simon, Christoph [7578-31]S8
 Simonenko, Georgy V. [7563-30]SPS1
 Simonova, Varvara A. [7564-79]S11
 Simpson, Trefford [7550-12]S3
 Sims, James S. [7610-32]S8
Sims, Robert A. [7578-51]S12, [7580-02]S1, [7580-14]S3, [7580-50]S11, [7580-61]S14
 Sin, Yongkun [7583-06]S1
 Sinclair, Charles K. [7581-22]SPS2
 Sinclair, Michael B. [7570-01]S1
 Sinclair, William [7606-13]S5
Sinescu, Cosmin [7549-03]S1, [7549-22]S, [7554-88]SPS1
Singer, Kenneth D. 7599 ProgComm
 Singh, Deo Raj [7569-34]S5
 Singh, Fouran [7603-56]S12
 Singh, Gajendra [7562-03]S1
 Singh, Ghanshyam [7598-66]SPS3
Singh, Gurinder P. 7585 ProgComm
 Singh, Harvinder [7573-27]S7
 Singh, Jagdeep [7603-54]S12
 Singh, Jasprit [7602-53]S1
Singh, Kanwarpal [7569-94]SPS1
 Singh, Rahul S. [7555-22]S5, [7555-39]S8
Singh, Rajbeer [7561-19]S3
Singh, Rajendra [7591-22]S6
 Singh, Rajiv [7617-38]S7
 Singh, Ram Gopal [7603-56]S12
 Singh, Rashmi [7598-21]S5
 Singh, S. P. [7560-03]S1
 Singh, Tikendra P. [7582-49]SPS2
 Singh, Udaibir [7582-49]SPS2
Singh, Upendra N. [7578-02]S1
 Singharoy, Subhamoy [7574-29]SPS1
 Singaravelu, Ganesan [7561-11]S1
 Sinityn, Dmitry V. [7581-02]S1
 Sinnott, Susan B. [7603-29]S7
 Sintov, Yoav [7580-62]S14, [7580-78]SPS2
 Sipe, John E. 7553 S4 SessChr, [7553-21]S6, [7591-07]S2
Sipes, Donald L. [7580-47]S11, [7587-26]S4
 Sipma, Henrik [7578-22]S5
 Sirbu, Alexei [7615-19]S5
 Sirk, S. [7575-48]S10
 Sironi, Laura [7574-02]S1
 Sirotkina, Marina Alexandrovna [7577-25]S6
 Sirtori, Carlo [7608-31]S7, [7616-41]S9
 Šiška, Petr [7597-70]SPS3
 Sisto, Marco Michele [7592-03]S1
 Sitar, Zlatko [7602-27]S6
 Sivagurunathan, K. [7564-145]SPS1
 Sivakumar, Ganapathy [7592-11]S2, [7592-13]S3, [7592-19]S4, [7592-21]S4, [7592-25]S5, [7592-27]S5, [7593-18]S3, [7594-17]S5, [7595-23]S4
 Skala, Melissa C. [7561-22]S4
 Skalkos, Dimitris [7548B-61]S7, [7548B-66]SPS1
 Skapa, Jan [7597-70]SPS3
Skauli, Torbjørn [7548A-12]S, [7561-30]S4
 Skidmore, Jay A. [7583-17]S4
Skoczowsky, Danilo [7582-07]S2, [7583-37]S8
?koda, Václav [7578-78]SPS2, [7578-82]SPS2, [7578-84]SPS2
 Skormin, Victor [7587-14]S3
 Skovgaard, Peter M. W. [7580-45]S11, [7580-84]SPS2
 Skripatchev, I. [7609-36]S8
Skutnik, Bolesh J. [7559-18]S
 Slagle, Rick [7585-28]S12, [7585-28]S6
 Slayden, Richard A. [7559-14]S
 Slight, Thomas J. [7608-17]S4
Sliney, David H. BO111 ProgComm
Slinger, Christopher W. 7619 ProgComm
 Slivken, Steven 7608 ProgComm, [7608-11]S3, [7608-95]S1, [7608-96]S3, [7609-14]S4
Sluss, Jim J. [7618-06]S2
 Smail, Bruce [7559-04]S
 Smalley, Daniel [7619-02]S1
 Smalling, Richard [7564-09]S2
 Smallwood, Rod [7566-17]S4
Smalyukh, Ivan I. 7618 S9 SessChr, [7618-17]S4
 Smektala, Frederic [7598-22]S5, [7609-36]S8
 Smelser, Christopher W. [7589-15]S5
 Smetana, Alexander [7593-33]S7
 Smir, Katherine [7611-20]S5
 Smirnov, Aleksandr V. [7569-68]S9
 Smirnov, Sergey [7580-74]SPS2, [7580-79]SPS2
 Smirnov, Vadim I. [7578-45]S11, [7580-33]S8, [7580-63]S15, [7580-65]S15, [7583-38]S8, [7598-28]S7
 Smith, Andrew J. [7606-15]S5
Smith, Arlee V. [7578-65]S15, [7582-28]S6
 Smith, Brady [7591-41]SPS2
Smith, Bryan [7560-17]S5, [7574-05]S1, [7575-31]S10
 Smith, Christopher W. [7569-38]S6, [7570-28]S6
 Smith, David J. [7608-21]S5
 Smith, Don J. 7599 ProgComm
 Smith, Jennifer [7572-14]S3
 Smith, Linda A. WS973 Inst
 Smith, Louise E. [7566-17]S4
 Smith, Michael [7548D-115]S3
 Smith, Philip G. [7569-42]S6
 Smith, Reed [7587-01]S1
 Smith, Richard J. [7570-30]S6
 Smith, Stan M. 7598 ProgComm
 Smith, Stanley D. [7580-26]S7
 Smith, Steve [7571-02]S1
 Smith, Terry L. [7617-72]S10
 Smith, Zachary J. [7560-16]S5
Smithwick, Quinn [7619-02]S1
 Smolyakov, Gennady A. [7575-33]S10
 Smowton, Peter M. 7616 Chr, [7616-04]S1, [7616-64]SPS3, [7616-65]SPS3
 Smy, Tom J. [7606-23]S7
 Smyrek, Peter [7585-23]S5
 Snapi, Noam [7608-65]S14
 Snopova, Ludmila [7548B-41]S2
 Snyder, Ryan M. [7594-35]SPS2
Snyman, Lukas W. [7606-38]S10
So, Franky OE123x ProgComm
 So, Kelvin [7548G-155]S2
 So, Peter T. C. 7558 ProgComm, [7561-01]S1, 7569 Chr, 7569 S6 SessChr, [7569-60]S9, [7569-54]S8
So, Stephen G. [7608-12]S3, [7615-08]S3
 Soares, Jason W. [7603-54]S12
 Sobel, Eric S. [7548F-170]S3, [7548F-172]S
 Sobol, Emil [7548C-84]S3, [7566-11]S3
 Sodagar, Majid [7608-20]S4
 Soddu, Silvia [7574-02]S1
 Söderberg, Per G. 7550 Chr, 7550 S SessChr, [7550-50]S10
Söderlund, Mikko J. [7580-10]S2, [7580-97]SPS2
Söderström, Thomas [7603-09]S3
Sodnik, Zoran 7587 ProgComm, 7587 S5 SessChr, [7587-04]S1
 Soetikno, Roy [7558-22]S5, [7558-22]S1
 Soga, Kohei [7576-22]S6, [7598-05]S2
 Soghomonyan, Suren [7582-01]S4, [7582-01]S6, [7582-01]S1
 Sohler, Wolfgang [7604-26]S6
 Soibel, Alexander [7587-27]S4
 Sojic, Neso [7571-38]S10
 Sokolov, Konstantin [7564-09]S2, [7564-61]S9, [7564-65]S9, [7564-118]SPS1, [7576-24]S6, [7576-26]S7, [7576-28]S7, [7577-39]S8
 Sokolovsky, Bogdan S. [7597-73]SPS3, [7598-67]SPS3
 Sola, Iñigo J. [7598-03]S1
 Solam, Anupama [7604-13]S3
Solarte, Efrain [7563-12]S1, [7567-11]S3
 Soldat, Henning [7597-26]S6
 Solgaard, Olav [7558-22]S5, [7558-22]S1, [7558-23]S5, [7558-23]S1
 Solheim, Brian H. [7594-28]S8
 Solheim, Ed [7593-37]S7
 Soliman, George [7606-51]SPS3
Sollis, David [7617-61]SPS3
Soliz, Peter 7550 ProgComm, 7550 S8 SessChr, [7550-52]S11
Soller, Babs [7559-22]S, [7572-18]SPS1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Solli, Daniel R. [7582-35]S8
Solmaz, Mehmet [7579-54]S3, [7605-23]S9
Solomon, Glenn S. [7608-92]S4
Solomon, Wayne L. [7581-01]S1
Soloviev, Vadim Y. [7573-15]S4
Solt, Kristin J. [7548F-141]S1
Soma, Venugopal R. [7599-59]SPS3, [7599-60]SPS3
Somekh, Michael G. [7570-30]S6, [7577-17]S4
Sommer, Mehmet [7598-46]S11
Sommer, Nadine [7568-15]S2
Sommerhalter, Christof [7617-24]S5
Son, Ho-Hyun [7572-10]S2, [7572-19]SPS1
Son, Jun Ho [7617-14]S3, [7617-66]SPS3
Sone, Cheolsoo 7602 ProgComm, [7617-55]S11
Song, Cheol [7568-25]SPS1
Song, Chul-Gyu [7554-89]SPS1
Song, Feng 7598 ProgComm, [7598-02]S1, [7598-61]SPS3
Song, Hoseong [7568-64]S4, [7570-43]SPS1, [7580-83]SPS2
Song, Jae-Won [7554-91]SPS1
Song, Jin-Joo 7600 Chr, 7600 S1 SessChr, 7600 S SessChr
Song, Kwang Hyun [7564-66]S9, [7564-106]SPS1, [7564-111]SPS1
Song, Liang [7564-18]S3, [7564-77]S1
Song, Lipai [7564-109]SPS1
Song, Woosub [7571-41]SPS1
Song, Wuzhou [7593-07]S1, [7594-22]S6, [7599-48]S12
Song, Xiangyang [7584-28]S10, [7585-28]S12, [7585-28]S6
Song, Yang Hee [7617-14]S3, [7617-66]SPS3
Song, Yanrong [7583-45]SPS2
Song, Young Min [7608-36]S8
Song, Zhenyu [7603-63]SPS3
Songmuang, Rudeesun [7602-36]S8
Sonnefried, Yannick [7586-05]S1
Sönnichsen, Carsten [7575-05]S3
Sood, Anup [7557-09]S3
Sooklal, Valmiki [7548C-90]S3
Sorba, Lucia [7600-63]S15
Sorbara, Luigina [7550-12]S3
Sorensen, Thomas [7571-21]S6
Soria, Guadalupe [7569-99]SPS1
Soria, Silvia [7559-08]S
Soroka, Andrew [7558-10]S3
Sorokina, Irina T. 7578 ProgComm
Soroshian, Behrouz [7564-58]S8
Soskin, Marat S. 7613 ProgComm, 7613 S3 SessChr, 7613 S6 SessChr, [7613-05]S2, [7613-15]S4, [7613-19]S5
Soskind, Yakov G. 7607 ProgComm, 7607 S10 SessChr, [7607-40]S9, 7621 S1 SessChr
Sotobayashi, Hideyuki [7621-22]S6
Sotor, Jaroslav [7578-90]SPS2
Sotto, David [7575-12]S5
Sourani, Sason [7594-07]S3
Sousa, Gary [7578-49]S12
Sousa, Jeanlex [7575-10]S4
Sousa, João M. [7584-42]SPS2
Souvestre, Florent [7596-10]S3
Souza, Marcelo [7567-08]S2
Souza, Sidney J. d. F. [7550-76]SPS1
Sowa, Michael [7548D-115]S3, [7549-04]S1, [7555-12]S3
Sowade, Rosita [7582-60]S5
Sowa-Soehle, Eveline [7548C-99]S5
Spagnolo, Vincenzo [7608-05]S1
Sparks, Robert T. WS985 Inst
Speck, James S. [7602-43]S9, [7609-15]S4, [7616-19]S4, [7617-02]S1, [7617-31]S6
Speicher, Marco [7554-90]SPS1, [7564-92]SPS1
Spektor, Boris [7579-08]S2
Spencer, James E. [7609-45]S10
Spencer, Peter [7616-05]S1
Sperling, Ralph [7575-06]S3
Spiclin, Ziga [7556-17]S4
Spiegelman, Jeffrey [7590-20]SPS2
Spigulis, Janis [7557-19]S4
Spinelli, Lorenzo [7556-15]S4
Spinka, Thomas M. [7581-19]S4, [7581-20]S4
Spitsberg, Richie [7587-08]S2
Spitz, Erich [7608-01]S
Spletzer, Matt M. [7592-30]S6
Sponsel, Klaus [7621-08]S3
Sprague, Robert A. OE123x ProgComm
Spreemann, Martin [7583-22]S5
Sprigle, Stephen [7557-13]S3, [7560-27]SPS1
Spring, Bryan [7551-14]S3
Sramek, Christopher [7550-04]S1, [7550-31]S6, [7550-32]S6
Sree Roop, S. S. [7619-20]S4
Sreekumar, Krishnapillai [7619-20]S4
Sridhar, Hamsa [7569-79]SPS1, [7613-33]SPS3
Sridhar, Srinivas [7574-08]S1
Srinivasan, Pradeep 7591 S7 SessChr
Srinivasan, Subhadra [7551-25]S6, [7551-45]SPS1
Srinivasan, Vivek J. [7548E-124]S1, [7550-43]S9, [7550-56]S11, [7569-91]SPS1
Sriram, Rashmi [7553-18]S5
Sriramoju, V. [7561-40]SPS1
Srisungsthisunti, Pornsak [7584-30]S11
Srivastava, Atul K. 7621 Chr, 7621 S2 SessChr, 7621 S4 SessChr
Srivastava, Kripa [7551-26]S6, [7551-27]S7
Sry, Kelly [7567-05]S2
St. Lawrence, Keith [7555-35]S7
St. Pierre, Stephanie A. [7565-04]S2
Stace, Christopher [7580-66]S15
Stacey, Craig D. [7580-66]S15
Stach, Martin [7607-10]S3
Stachs, Oliver [7550-01]S1, [7550-30]S6, [7550-49]S10
Stack, B. [7548C-176]S2
Stahl, Cecilia V. [7568-59]S3
Stahl, Jonathan [7549-05]S1
Staleva, Hristina [7600-12]S3
Staley, Jacob [7564-28]S4
Stamatas, Georgios N. [7561-33]S5
Stampouli, Despoina [7569-104]SPS1
Stanca, Sarmiza E. [7569-35]S5
Standish, Beau A. [7551-22]S6, [7554-43]S7, [7558-29]SPS1, [7580-100]SPS2, [7580-101]SPS2, [7580-102]SPS2, [7589-14]S4
Stanescu, Sorin L. [7552-26]SPS1
Staninec, Michal [7549-07]S1
Stanley, Bruce [7568-08]S4
Stanley, Colin R. [7611-21]S5
Stanley, Ross P. 7617 ProgComm, 7617 S6 SessChr
Stanton, Christopher J. [7603-03]S1
Stantz, Keith M. [7564-15]S3, [7564-44]S7, [7564-54]S8, [7564-59]S9, [7564-116]SPS1, [7564-120]SPS1, [7564-121]SPS1
Stanze, Dennis [7601-13]S3
Stapels, Christopher [7594-18]S5
Staples, John W. [7581-23]SPS2
Stark, Andrew J. [7621-20]S6
Starman, LaVern A. [7592-10]S2, [7592-32]S6
Starosta, Matthew S. [7562-06]S1
Staurengi, Giovanni [7550-17]S3
Stavropoulos, Nikos E. [7548B-61]S7, [7548B-66]SPS1
Stearns, Joshua [7584-28]S10
Steckel, Jonathan S. [7618-01]S1
Steegmüller, Ulrich [7582-06]S2
Steel, Duncan G. [7611-20]S5
Steel, Michael [7589-16]S5
Steenbergen, Wiendelt 7563 S3 SessChr, PanelMember, [7563-17]S4, 7564 ProgComm, 7564 S4 SessChr, 7572 ProgComm
Steenhusen, Sönke [7591-40]SPS2
Steeves, Diane [7599-39]S10, [7599-42]S11, 7603 S11 SessChr, [7603-54]S12
Stefani, Mario A. [7556-35]SPS1
Stefanini, Federico M. [7568-20]S5
Stefanovic, Bojana [7564-85]S12
Steier, William H. [7579-32]S8
Steiger, Ruth [7570-12]S3
Stein, Daniel [7548F-144]S2
Steiner, Gerald [7560-10]S3
Steiner, Johannes T. [7582-32]S7
Steiner, Michael J. [7612-02]S1
Steiner, Ullrich [7591-16]S4, [7609-05]S2
Steinmetz, Alexander [7578-58]S14
Steinmeyer, Günter [7578-81]SPS2
Steinwurzle, Paul [7604-42]S9
Stelzle, Florian [7555-42]S9
Stelzle, Martin 7593 S4 SessChr, [7593-14]S3
Stepanek, Miroslav [7571-03]S1
Stephan, Christian [7621-08]S3
Stephan, Mark A. [7578-08]S2, [7578-09]S2, [7582-26]S6
Stephens, Douglas N. [7548D-105]S1, [7555-01]S1, [7555-18]S4
Stephens, Edward F. [7583-03]S1, [7583-18]S4
Stephenson, William [7576-61]SPS1
Stapp, Herbert G. [7548C-81]S2, [7548C-174]S1
Stenberg, H. J. C. M. [7548C-69]S1, 7548C ProgComm, 7548C S2 SessChr, [7548C-83]S2, [7548C-181]S5, [7548C-184]S4
Sterling, Joshua A. [7548B-36]S1
Stern, Nathaniel P. [7579-39]S10
Stevens, Benjamin J. [7616-10]S2
Stewart, Charles N. [7554-31]S5, [7573-37]S9
Stewart, Ciaran [7577-17]S4
Stewart, Jason B. [7595-03]S1, [7595-11]S2, [7595-21]S4
Stewart, Tara [7548E-136]S4
Stichel, Thomas [7591-40]SPS2
Stieger, Romeo [7607-19]S5
Stiehl, Cornelia [7585-04]S1
Stiens, Johan [7597-35]S8, [7597-38]S8
Stiff-Roberts, Adrienne [7609-12]S3
Stiles, Paul L. [7593-33]S7
Stillhart, Marcel B. [7599-11]S3
Stingl, Andreas [7550-51]S10, [7578-62]S15
Stock, Erik [7610-15]S4
Stock, Volker [7594-38]SPS2
Stockman, Mark I. SC727 Inst, [7600-20]S5
Stoddart, J. Fraser [7574-24]S4
Stodilka, Robert Z. [7564-119]SPS1
Stoefelerle, Thilo [7605-01]S1, [7610-07]S2
Stojanoff, Christian G. [7619-18]S4
Stojanovic, Ivana [7570-21]S4
Stojanovic, Vladimir [7579-51]S3
Stolen, R. [7598-40]S10
Stollhof, Jürgen [7578-69]S16
Stolow, Albert [7569-07]S1
Stolz, Wolfgang [7578-35]S9, [7597-18]S4, [7597-25]S6, [7616-30]S7, [7616-30]S12
Stolzenburg, Christian [7578-10]S3, [7578-69]S16
Stone, James M. [7568-75]S2
Stone, Nicholas [7548C-70]S1, 7560 ProgComm
Stone, Steven M. [7580-66]S15
Stoneman, Michael R. [7569-34]S5
Stoppa, Alexander [7601-16]S4
Storey, Craig [7616-49]S11
Stork, Wilhelm [7618-04]S1
Stothers, Lynn [7548B-32]S1
Stowers, Jason K. [7603-24]S6
Stoyneva, Valentina [7556-19]S5, [7561-28]S4, [7567-13]S3
Straatsma, Cameron J. [7600-21]S5, [7600-69]SPS3
Stracke, Frank [7548A-03]S, [7555-16]S4, [7564-36]S5, [7568-15]S2, [7569-100]SPS1
Straesser, Alexander [7578-70]S16
Strasser, Gottfried [7602-45]S10, [7608-73]S16, 7616 S6 SessChr, [7616-22]S5, [7616-62]S14
Strat, Daniela [7555-19]S4
Strata, Piergiorgio [7548G-164]SPS1
Straub, Adam [7569-89]SPS1
Strauch, Olaf [7580-107]SPS2
Strauß, Micha [7600-44]S10
Strauss, Uwe [7582-06]S2, [7583-28]S6, [7616-16]S4
Strauss, Wolfgang S. L. [7555-19]S4
Streck, Andreas [7618-04]S1
Streek, Andre [7589-50]SPS2
Streeker, Jackson [7552-18]S4
Strekowski, Lucjan [7576-06]S2
Streltsov, Alexander M. [7584-27]S10, [7607-36]S9
Streltsova, Olga [7548B-41]S2
Stremovskiy, Oleg A. [7575-34]S10
Streubel, Klaus P. TrackChr, TrackChr, 7617 Chr, 7617 S1 SessChr
Stricker, Christian [7548E-126]S2
Stride, Eleanor [7564-107]SPS1
Striemer, Christopher C. 7553 ProgComm
Strittmatter, A. [7597-27]S6, [7616-17]S4
Strohmaier, Stephan G. [7583-10]S2
Strohsahl, Christopher M. 7553 ProgComm
Strojnik, Marija 7608 ProgComm, 7608 S11 SessChr
Strotkamp, Michael [7578-24]S4, [7578-24]S6, [7578-24]S1
Strougov, Nikolay [7583-09]S2
Strubbe, Filip [7613-10]S3
Strupler, Mathias [7558-13]S3
Strupler, Mathias [7599-13]S3
Stuck, Bruce E. 7562 ProgComm, 7562 S9 SessChr, BO111 Chr
Stuckey, Daniel W. [7570-16]S4, [7573-15]S4
Studier, Hauke [7548A-05]S, [7554-90]SPS1, [7555-54]SPS1, [7568-48]S1, [7569-37]S6, [7569-43]S6
Stumpe, Joachim [7618-35]S10
Stus', Nicolay [7597-16]S4, [7609-16]S4
Stute, Uwe [7578-69]S16
Stutzki, Fabian [7580-55]S13
Stutzmann, Martin [7597-20]S5
Stypula, Yolanda [7573-21]S5

Index of Authors, Chairs, and Committee Members

- Su, Chun-Hsu [7604-03]S1
 Su, Erica [7548F-15]S3
 Su, Fuhai [7600-65]S15
 Su, Jianping [7548E-137]S4
Su, Jimmy L. [7564-95]SPS1
 Su, Kuan-Wei [7578-34]S8
 Su, Mehmet F. [7609-29]S7
 Su, Min-Ying [7557-34]SPS1
 Su, Ping-Jung [7569-52]S7, [7569-54]S8, [7569-73]SPS1
 Su, Richard [7564-24]S4, [7564-67]S10, [7564-73]S11, [7564-74]S11, [7564-129]SPS1
Su, Ting-Wei [7568-86]S3
 Su, Wei-Fang [7603-50]S11
Su, Wei-Hung [7613-30]S8
 Su, Xuantao [7573-19]S5
 Su, Yan-Kuin [7598-43]S10
Su, Yikai [7579-34]S8
 Su, Yuan-Deng [7566-10]S3
 Su, Yu-Chuan 7590 ProgComm
 Subbaraman, Harish [7609-44]S10
 Subhash, Hrebesh [7554-19]S3
 Subramanian, Ananth Z. [7604-31]S7, [7613-26]S7
 Subramanian, Hariharan [7573-02]S1, [7573-21]S5
 Such, Mario [7580-107]SPS2
Sudesh, Vikas [7578-51]S12, [7580-02]S1, [7580-14]S3, [7580-50]S11, [7580-61]S14
 Sudha Kartha, Cheranellore [7603-64]SPS3, [7619-20]S4
Sudharsanan, Rengarajan 7608
 CoChr
 Sudheendran, Narendran [7550-06]S2
 Sudo, Hisao [7610-12]S3
 Suedmeyer, Isabelle J. [7585-02]S1
 Suemone, Ikuo 7597 ProgComm, [7597-15]S4
 Suen, James Y. [7548C-176]S2, [7548C-182]S5
 Suen, Yick-Keung [7565-14]S4
 Suenari, Tsukasa [7548D-108]S1, [7551-40]SPS1
 Suess, Tino [7589-50]SPS2
 Suetsugu, Tatsuya [7598-64]SPS3
 Suffczynski, Jan [7608-86]S18
 Sugawara, Mitsuru [7610-12]S3
 Sugg, Alan [7587-26]S4
 Sugihara, Okihiro [7599-06]S2, [7605-07]S2
Sugioka, Koji 7584 ProgComm, 7584 S10 SessChr, [7584-25]S9, [7584-40]SPS2, [7584-45]SPS2, 7585 ProgComm, [7585-12]S3
 Sugiyama, Atsushi [7616-61]S14
 Sugiyama, Norikazu [7570-33]S7
 Suh, Hyunsuk [7548C-168]S1
 Suh, Myung-Whan [7548C-97]S5, [7552-10]S2
 Sühr, Ephraim [7607-42]S1, [7607-42]S10
 Suite, Michele R. [7587-01]S1
 Sujatha, L. [7592-31]S6
 Sukhanova, Alyona [7575-11]S5
 Sukhorukov, Andrey A. [7612-22]S6
 Sukhovatkin, Vladimir N. [7600-07]S2
Sukuta, Sydney WS972 Inst
Sulc, Jan [7549-08]S1, [7578-75]SPS2, [7578-76]SPS2, [7578-78]SPS2, [7578-82]SPS2, [7578-84]SPS2
Suleski, Thomas J. SympChair, 7591 Chr
 Sulser, Frederik [7604-29]S6
 Sumetsky, Mikhail [7612-03]S1
 Summers, Huw D. [7616-64]SPS3, [7616-65]SPS3
 Summers, Ronald M. [7555-51]S10
 Sumpf, Bernd [7554-52]S8, [7582-02]S4, [7582-02]S6, [7582-02]S1, [7582-03]S2, [7616-53]S12, [7616-55]S13, [7616-57]S13
 Sun, Bang-Shan [7559-10]S3
 Sun, Bo [7611-20]S5
 Sun, Bo [7613-09]S3
 Sun, Chia-Wei [7555-24]S5, [7573-47]SPS1
Sun, Chi-Kuang [7569-51]S7, [7569-55]S8, 7600 ProgComm, [7600-42]S10, [7601-14]S3, [7602-25]S6
Sun, Ching-Cherng 7617 S3
 SessChr, [7617-10]S3, [7617-65]SPS3
Sun, Fangwen [7605-15]S6
 Sun, Fei [7559-02]S5, [7604-02]S1
 Sun, Feng [7548A-04]S
 Sun, Greg [7600-35]S8
Sun, Hui [7548F-151]S3, [7562-43]SPS1
 Sun, J. [7594-03]S5, [7594-03]S1
 Sun, Jiayang [7548E-130]S3
 Sun, Jingjing [7562-28]S7
 Sun, Jinyan [7548E-128]S2
 Sun, Kewei [7602-44]S9
Sun, Lei [7580-125]S
 Sun, Lei [7609-12]S3
 Sun, Peng [7606-17]S6
 Sun, Qian [7617-45]S9
Sun, Quan [7591-19]S5
 Sun, Tzu-Lin [7555-57]SPS1
 Sun, Wenjia [7581-10]S3
 Sun, Xiaoguang [7617-72]S10
 Sun, Xiaoli [7578-01]S1
 Sun, Xiaowei [7610-06]S2
 Sun, Xinyu [7615-03]S1, [7615-07]S2, [7615-23]S6
 Sun, Yang [7548D-105]S1, [7555-01]S1, [7555-18]S4, [7566-04]S1
Sun, Yao [7548F-170]S3
 Sun, Yinghua [7548D-105]S1, [7548D-106]S1, [7555-01]S1, [7555-18]S4, [7566-04]S1
Sun, Yuansheng [7569-27]S4
Sun, Yuze [7604-09]S2, [7604-38]S8, [7606-32]S9
 Sun, Zheng [7600-29]S7
 Sung, Jiha [7569-08]S1
 Sung, Jong Hwan [7568-41]S3, [7596-07]S2
Sung, Kung-Bin [7561-25]S4, [7573-13]S3
 Superfine, Richard [7554-71]S11
 Suriano, Raffaella [7589-29]S7
 Suris, Robert A. [7610-25]S6
 Surya Prakash, Tewari [7599-59]SPS3, [7599-60]SPS3
 Suscavage, Michael J. [7602-14]S3
 Suslick, Kenneth [7576-35]S9
Suter, Jonathan D. [7579-30]S7, [7606-32]S9
Suter, Melissa J. [7548C-80]S2, [7548D-112]S2, [7548D-117]S3, [7548D-121]S4, [7554-01]S1, [7554-10]S2, [7554-64]S10, [7558-02]S1, [7558-16]S4, [7558-17]S4
 Sutherland, James S. [7584-27]S10, [7607-36]S9
Sutherland, Richard 7618
 ProgComm
 Sutter, Dirk [7578-10]S3, [7578-69]S16
Suttman, Oliver [7589-38]S5, [7589-38]S9
 Sutton, Bradley P. [7554-69]S11
 Suwal, Om K. [7606-53]SPS3
 Suzuki, Atsushi [7602-58]S13
 Suzuki, Jun'ichi [7589-26]S7
 Suzuki, Nobuaki [7548D-110]S2
 Suzuki, Seigo [7555-41]S9
 Suzuki, Shuichi [7597-28]S7
Suzuki, Takamasa [7597-85]SPS3
 Suzuki, Takatoshi [7594-14]SPS2
Suzuki, Takenobu [7598-08]S2, [7598-57]SPS3, [7598-58]SPS3, [7598-59]SPS3
 Suzuki, Takuya [7554-66]S10
 Suzuki, Toshihiko [7561-43]SPS1
Svaasand, Lars Othar [7548A-12]S
 Sverchikov, Sergey E. [7598-04]S1
 Sverdllov, Boris N. [7583-21]S5, [7616-56]S13
 Sviridov, Alexander [7548C-84]S3
 Svirko, Yuri P. [7600-41]S10
 Svistushkin, Valery [7548C-84]S3
 Svrcek, Martin [7559-04]S
 Swain, Debasis [7599-60]SPS3
Swartzlander, Grover A. 7613
 ProgComm
Sweeney, Stephen J. [7616-07]S2, [7616-11]S2
 Sweet, Julian [7597-65]S14
 Swick, Aaron M. [7548F-140]S1
 Swider, Stacy [7602-14]S3
 Swillam, Mohamed A. [7598-19]S5, [7604-43]S10
Syed, Saba [7550-46]S9
Sylwestrzak, Marcin [7554-68]S10
 Syperek, Marcin [7610-09]S3
 Syrett, Barry A. [7606-23]S7
 Syrkin, Alexander [7616-17]S4
 Sysoliatin, Alexej A. [7580-81]SPS2
 Syzonenko, Nicholas [7559-35]S
 Szameit, Alexander 7584 ProgComm, 7589 ProgComm
 Szameit, Alexander [7589-28]S7
 Szczurek, Mirosław [7584-29]S10
 Sze, Jia Yun [7577-21]S5
 Szkopek, Thomas [7601-18]S4
Szkulmowska, Anna [7550-70]SPS1, [7554-37]S6, [7554-39]S6
 Szkulmowski, Maciej [7550-16]S3, [7550-18]S4, [7550-70]SPS1, [7554-37]S6, [7554-39]S6, [7554-74]S11
Szlag, Daniel [7550-70]SPS1, [7554-39]S6
 Szmancinski, Henryk [7569-01]S, [7577-20]S5
Szmulowicz, Frank [7608-71]S13, 7610 Chr
 Szpulak, Marcin [7609-36]S8
 Sztul, Henry I. [7613-04]S1, [7613-17]S5, [7613-28]S8

T

 Ta, Haisen [7571-18]S5
 Tabacnick, Manfredo [7588-13]S3
Tabata, Yutaka [7586-21]SPS2
 Tabatabah, Shahin [7548B-63]S7
 Tabchoury, Cinthia [7549-14]S2
 Taboada, Alfonso G. [7610-09]S3
 Taccheo, Stefano [7598-72]SPS3, 7604 ProgComm, 7604 S4
 SessChr, [7604-08]S2
 Tada, Kozo [7584-21]S7, [7584-21]S11
 Taday, Philip F. [7589-22]S6, [7601-01]S1
 Taflove, Allen [7573-02]S1, [7573-10]S3
 Tafuya, Jason D. [7580-47]S11
 Tagaya, Akihiro [7599-02]S1, [7599-28]S7
 Taghavi, Mehran [7572-07]S2
 Taghavinia, Nima [7617-59]SPS3
 Taguchi, Takahisa 7568 ProgComm
 Taguchi, Tsunemasa [7558-14]S3
 Taguchi, Yoshihiro [7593-04]S1, [7594-21]S6
 Taha, Hesham [7568-43]S6, [7574-22]S4, [7591-30]S7
 Taha, Mahmoud R. [7609-29]S7
 Taher, Masud [7598-72]SPS3
Taheri, Bahman [7618-32]S9
 Tahir, Khadija B. [7570-16]S4, [7573-15]S4
 Tai, Dean [7559-04]S, [7569-61]S9
 Taillon, Yves [7580-69]SPS2, [7580-96]SPS2
 Tainoff, Dimitri [7603-16]S3
Taira, Takunori [7582-37]S8
 Tajouri, Nadja [7550-45]S9
 Takada, Daisuke [7562-36]S8
 Takahama, Keizo [7607-27]S7
 Takahashi, Hiroyuki [7597-28]S7
 Takahashi, Tetsuo [7621-05]S2
 Takahashi, Toru [7579-50]SPS2, [7597-67]SPS3
 Takaki, Keishi [7615-01]S1
 Takaki, Yasuhiro [7618-08]S2, [7619-01]S1
 Takaku, Hiroyuki [7559-03]S
 Takakura, Hideo [7568-49]SPS1
 Takakuwa, Atsushi [7590-22]SPS2
 Takamatsu, Tetsuro [7564-98]SPS1
 Takashima, Hideaki [7611-34]SPS3
 Takatani, Setsuo [7573-44]SPS1
 Takayama, Katsuhiko [7580-16]S4, [7580-16]S6, [7580-16]S1
 Takayama, Yoshihisa [7587-02]S1, [7587-12]S2, [7587-19]S3
 Takeda, Kenichiro [7602-76]S11, [7602-76]SPS3
 Takenaka, Hideki [7587-29]S4
 Takenaka, Tatsuji [7560-05]S2
 Takeshita, Kenji [7578-18]S4
 Takeuchi, Shigeki [7611-15]S4, [7611-34]SPS3
 Takeuchi, Toshiyuki [7576-75]S2
 Takezoe, Hideo [7618-33]S9
 Takiguchi, Mikio [7583-31]S7
 Taklo, Maaike M. V. [7592-17]S3
 Tam, Jasmine [7564-118]SPS1, [7576-28]S7, [7577-39]S8
Tam, Justina [7564-118]SPS1, [7576-28]S7, [7577-39]S8
 Tamanoi, Fuyui [7576-17]S5
Tamborski, Szymon [7550-16]S3, [7554-37]S6, [7554-74]S11
 Tamotsu, Satoshi [7589-45]SPS2
 Tan, Bing [7548C-91]S4
Tan, Chee-Keong [7616-01]S1
Tan, Chee-Loon [7616-01]S1
 Tan, Dawn [7607-04]S1
 Tan, Freddy S. [7605-07]S2
 Tan, Hsin-Yuan [7550-58]SPS1
 Tan, I. B. [7548C-181]S5
 Tan, Jason [7615-02]S1
 Tan, Jinhui [7617-71]SPS3
 Tan, Michael R. [7607-06]S2
 Tan, Wei [7559-09]S
 Tan, Weihong 7574 ProgComm
Tan, Xin [7553-12]S3
 Tanabe, Rie [7584-21]S7, [7584-21]S11
Tanabe, Setsuhisa 7598 ProgComm, [7598-07]S2
Tanaka, Shuhei [7589-26]S7
 Tanaka, Yu [7610-12]S3
Tanaka, Yuji [7586-19]S4, [7603-60]SPS3
Tanaka, Yuto [7584-15]S6, [7584-15]S10, [7589-46]SPS2, [7609-58]SPS3
 Tanase, Tomokazu [7585-22]S5
 Tanbakuchi, Anthony A. [7558-08]S2
 Taneja, Mukesh [7550-86]SPS1
 Tanemoto, Yumi [7619-01]S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Tanemura, Takuo [7605-04]S2
Tang, G. C. [7561-42]SPS1
Tang, Jao [7576-38]S9, [7608-90]S19
Tang, Jonathan [7595-03]S1
Tang, Lingling [7609-27]S6
Tang, Mengxing [7564-109]SPS1
Tang, Shuo [7548A-23]S
Tang, Singhai [7610-38]SPS3
Tang, Tsung-Yi [7602-08]S2, [7602-60]S14, [7617-30]S6
Tang, Yuan [7565-11]S3
Tang, Zhiwen [7593-25]S5
Tangen, Kyrre [7596-13]S3
Tangermann-Gerk, Katja [7555-42]S9
Tanigawa, Motomu [7554-94]SPS1
Tankala, Kanishka 7580 Chr, 7580 S SessChr, [7580-09]S2
Tanner, Danelle M. 7592 ProgComm, 7592 S5 SessChr, [7592-08]S2
Tannert, Sebastian [7571-13]S4
Tannous, Bakhos [7557-03]S1
Tansu, Nelson [7597-17]S4, [7597-58]S12, [7602-29]S6, [7602-52]S12, 7616 ProgComm, 7616 S2 SessChr, [7617-16]S3, [7617-33]S6
Tao, Yuankai K. [7550-53]S11, [7554-14]S3
Tararova, Ekaterina [7548B-41]S2
Tarasov, Il'ya S. [7597-49]S11
Targowski, Piotr [7554-68]S10
Tarnok, Attila 7568 CoChr, [7568-16]S5, [7568-17]S5
Tarr, N. Garry [7606-44]SPS3
Taruttis, Adrian [7564-110]SPS1
Tashima, Yoshiyuki [7587-12]S2
Tasyurek, Emel [7607-33]S8
Tata, Darrell B. [7552-07]S2, [7565-10]S3
Tatukolov, Alexander S. [7550-68]SPS1
Tatsuguchi, Kenichi [7550-69]SPS1
Tatsuo, Okada [7584-35]S12, [7584-35]S6
Tatum, Jim A. [7615-05]S2
Taubman, Matthew S. [7608-13]S3
Tauscher, Jason [7594-08]S3
Tautz, Sönke [7602-75]S11, [7602-75]SPS3
Tavakoli, Behnoosh [7564-130]SPS1
Tay, Chia Meng B. [7554-87]SPS1
Tay, Savas [7568-02]S3
Taylor, Douglas [7555-44]S9
Taylor, James Roy 7580 ProgComm, 7580 S8 SessChr
Taylor, Jonathan M. [7613-23]S7
Taylor, Rebecca E. 7599 ProgComm
Taylor, Ulrike [7573-20]S5
Taylor, Zachary D. [7555-39]S8
Tazawa, Hidehisa [7579-32]S8
Tchernycheva, Maria [7602-45]S10
Teare, Scott W. [7595-07]S2, [7595-08]S2
Tearney, Guillermo J. [7548C-77]S2, [7548C-78]S2, [7548C-79]S2, [7548C-80]S2, 7548D Chr, 7548D S2 SessChr, [7548D-107]S1, [7548D-111]S2, [7548D-112]S2, [7548D-117]S3, [7548D-121]S4, 7554 ProgComm, 7554 S7 SessChr, [7554-01]S1, [7554-04]S1, [7554-10]S2, [7554-64]S10, [7557-11]S3, 7558 Chr, 7558 S1 SessChr, [7558-02]S1, [7558-03]S1, [7558-04]S1, [7558-10]S3, [7558-16]S4, [7558-17]S4, [7560-14]S5, [7571-26]S7
Tedaldi, Matthew [7570-40]SPS1
Teepe, Mark [7616-17]S4
Teh, Ming [7560-11]S1
Teh, SK [7560-11]S1
Teherani, Ferechteh H. 7603 Chr, [7603-41]S9, [7603-46]S10, [7603-67]SPS3, 7608 S10 SessChr
Teich, Malvin C. [7570-21]S4
Teichman, Joel M. H. [7548B-52]S5, [7548B-55]S5
Teissier, Roland [7616-37]S9
Teitell, Michael A. [7562-02]S1
Teixeira, Carolina S. B. [7560-04]S4
Teixeira da Silva, Daniela F. [7567-07]S2
Tekin, Tolga [7604-17]S4, [7605-05]S2, [7607-13]S3
Telecky, Alan [7603-24]S6
Telenkov, Sergey A. [7564-144]SPS1
Telfair, William B. 7550 ProgComm, 7550 S1 SessChr
Tellex, Armando [7548D-112]S2
Tellez, Jason A. [7588-02]S1
Tempea, Gabriel [7578-62]S15, [7578-63]S15, [7582-10]S3
Teng, Li-Feng [7603-39]S9
Tentori-Santa Cruz, Diana [7598-68]SPS3
Teo, Ee Jin [7606-18]S6, [7606-20]S6
Teo, Qiao Qi [7577-21]S5
Tepolt, Gary B. [7592-06]S1
Tepper, Michal [7559-35]S
Terada, Shinsuke [7607-27]S7
Terada, Takaya [7562-13]S4, [7562-47]SPS1
Terakawa, Mitsuhiro [7562-33]S7
Teramae, Fumiharu [7602-58]S13
Terekhov, Yuri [7578-54]S13
Terpelov, Dmitry A. [7554-109]SPS1
Terrel, Matthew A. [7612-11]S3
Terry, Nathan B. [7597-86]SPS3, [7616-15]S3
Terry, Neil G. [7573-18]S4, [7573-24]S6
Teruya, Chikako [7561-43]SPS1
Tervonen, Ari [7598-11]S3, [7598-12]S3, [7606-50]SPS3, [7621-09]S3
Teshima, Kazuki [7602-58]S13
Tessier, Gilles [7576-33]S8
Tessler, Renana [7583-11]S3
Testa, Genni [7606-08]S3
Teva-Merono, Jordi [7605-09]S3
Tewari, Priyamvada [7555-39]S8
Texier-Nogues, Isabelle [7576-49]S12
Teynor, William [7577-26]S6
Thacker, Hireen [7607-02]S1, [7607-11]S3
Thakur, Dhananjay [7575-20]S7
Thamm, Douglas H. [7559-12]S
Thangaraj, Charles [7598-36]S9
Thayer, David A. [7557-34]SPS1, [7557-38]SPS1
Thayil, Anisha [7569-48]S7, [7595-13]S3
Theeg, Thomas [7580-88]SPS2
Thiagarajan, Prabhu [7583-20]S5
Thibault, Simon [7558-28]SPS1, [7617-35]S7
Thiel, Charles W. [7611-17]S4
Thiel, Michael [7586-14]S3
Thielecke, Hagen [7560-06]S2
Thielen, James [7617-72]S10
Thieme, Jörg [7580-19]S5
Thienpont, Hugo [7606-36]S10, [7608-33]S8
Thieroff, Christoph [7559-11]S
Thierry, Robin [7603-61]SPS3
Tholl, Hans D. [7616-60]S14
Thoman, Andreas [7601-16]S4
Thomas, Brian K. [7569-07]S1
Thomas, Eddy [7572-12]S3
Thomas, Fabrice [7604-39]S8
Thomas, Gareth J. [7548C-72]S1, [7548C-73]S1
Thomas, Jayan [7599-04]S1, [7619-41]S4
Thomas, Jens U. [7580-55]S13, [7589-16]S5
Thomas, Kai [7548A-10]S, [7555-16]S4, [7555-54]SPS1
Thomas, Linda M. [7587-01]S1
Thomas, Robert J. 7562 Chr, 7562 S4 SessChr, 7562 S8 SessChr
Thomas, Robert [7616-64]SPS3
Thomas, Robert J. BO111 ProgComm
Thomas, Thommey P. [7553-02]S1
Thomaz, André A. [7568-57]S2
Thomazy, David M. [7608-12]S3
Thomidis, Christos [7608-21]S5
Thompson, Deanna L. [7571-32]S9
Thompson, Kevin P. [7554-84]S12
Thompson, Kevin P. [7569-67]S9, [7618-02]S1
Thompson, Michael A. [7571-33]S10
Thompson, Oliver B. [7563-07]S5
Thompson, Paul [7548E-130]S3
Thomschke, Michael [7617-43]S8
Thomson, Dave [7606-26]S7, [7608-18]S4
Thomson, Ian J. [7578-20]S5
Thon, Susanna [7609-06]S2
Thonke, Klaus [7602-64]S15
Thonnard, Norbert [7586-13]S3
Thornbury, Keith [7570-31]S6
Thornton, Michael M. [7564-04]S1
Thorsos, Eric I. [7601-05]S1
Trichard, Angela [7597-19]S4
Thuillier, Philippe [7573-27]S7
Thurston, Thomas [7617-38]S7
Thursz, Mark [7561-07]S1
Tian, Jianguo [7598-02]S1
Tian, Jinrong [7583-45]SPS2
Tian, Zhaobing [7608-72]S14, [7616-47]S11
Tibuleac, Sorin [7621-20]S6
Tichauer, Kenneth M. [7555-35]S7
Tidrow, Meimei Z. 7608 ProgComm, 7608 S13 SessChr, [7608-55]S12
Tiedje, Thomas [7597-19]S4
Tien, Chung-Hao [7617-06]S2
Tijero, José Manuel G. [7597-46]S10, [7597-54]S12, [7616-50]S12
Tillack, Bernd [7606-41]S11
Tillema, Joshua [7599-22]S6
Tilleman, Michael M. [7578-41]S10, [7618-10]S2
Tillo, Shane E. [7576-15]S4
Timlin, Jerilyn A. [7570-01]S1
Timm, Rainer [7610-11]S3, [7610-13]S3
Timmerman, Annemoon [7556-29]S8
Timmermann, Andre [7583-56]SPS2
Timmons, G. [7575-33]S10
Ting, Chien Kun [7555-04]S1
Ting, Choon Meng [7560-01]SPS1
Tinne, Nadine [7562-24]S6
Tiribilli, Bruno [7559-08]S
Tissot, Yann [7587-03]S1
Titova, Lyubov V. [7600-65]S15
Tittel, Frank K. [7608-12]S3, [7608-14]S3
Titterton, David H. 7578 ProgComm, 7578 S2 SessChr, 7578 S15 SessChr
Titus, Albert H. [7553-29]S, [7574-27]S4
Tiware, Ashish K. [7573-21]S5
Tkaczyk, Tomasz S. SC978 Inst, [7555-09]S2, 7556 ProgComm, 7556 S2 SessChr
Tkaczyk, Tomasz [7558-06]S2, [7558-07]S2, [7558-24]S6, [7558-24]S2, [7570-35]S7, [7590-09]S2
To, Tung T. [7600-17]S4
Tobita, Seiji [7576-75]S2
Toda, Risaku [7594-27]S8
Todd, Paul W. [7593-21]S4
Todea, Carmen C. [7549-22]S
Todescato, Francesco [7582-46]S10, [7582-54]SPS2
Todi, Ravi M. [7604-10]S2
Todros, Silvia [7603-40]S9
Todi, René [7583-44]SPS2
Töfflinger, Jan A. [7610-15]S4
Toffoli, Daniel J. [7552-17]S3
Toguchida, Junya [7566-05]S2
Tokes, Szabolcs [7568-47]S6
Tokita, Masatoshi [7618-27]S7
Tolic-Nørrelykke, Iva M. [7569-32]S5
Toll, Rani [7563-32]SPS1
Tolle, John [7606-58]SPS3
Tolstik, Alexei L. [7562-10]S3
Tomaino, Joseph L. [7582-32]S7
Tomar, Krishna K. S. [7561-19]S3
Tomaselli, Alessandra [7570-42]SPS1
Tomasi, David H. [7610-22]S5
Tomioka, Katsuhiko [7608-25]S6
Tomita, Yasuo [7612-06]S1, [7618-38]S10
Tomlins, Pete [7570-40]SPS1, [7566-19]S4, [7567-03]S1
Tomljenovic-Hanic, Snjezana [7606-40]S11, [7609-37]S9
Tomm, Jens [7597-54]S12, [7616-52]S12
Tomohiro, Kira [7606-48]SPS3
Tonelli, Mauro [7578-81]SPS2, [7614-02]S1, [7614-06]S2, [7614-08]S3
Tong, Hua [7597-17]S4, [7602-29]S6
Tong, Zhisong [7579-24]S6
Tongue, Thomas [7562-19]S5
Ton-That, Cuong [7603-17]S4
Toor, Fatima [7608-14]S3
Topala, Florin [7549-03]S1
Topart, Patrice A. [7592-03]S1
Topol, Igor [7576-14]S4
Tor, Yitzhak [7576-44]S11
Torbet, Jim [7566-09]S2
Torbica, Pavle [7564-108]SPS1
Törndahl, Tobias [7603-12]S3, [7603-14]S3
Torner, Lluís [7613-11]S3
Toronov, Vladislav Y. 7563 ProgComm
Toropov, Aleksandr I. [7610-15]S4
Torous, Svetlana V. [7588-03]S1, [7588-10]S2
Torres, Francis A. [7579-42]S10
Torres, Francisco E. [7572-05]S1
Torres, Jérôme [7608-41]S9
Torres, Juan P. 7613 ProgComm
Torres, Richard [7555-36]S7, [7555-50]S10
Torres-Hurtado, Susuna [7562-37]S8
Torricelli, Alessandro [7556-15]S4
Torruellas, William E. 7580 ProgComm, 7580 S6 SessChr
Tortschanoff, Andreas [7594-20]S6, [7594-31]S9
Tosato, Maira G. [7560-07]SPS1
Toselli, Italo [7588-19]S4
Tosi, Alberto [7556-15]S4
Toth, Cynthia A. [7550-60]SPS1, [7554-14]S3
Totsuka, Kouki [7554-66]S10, [7554-98]SPS1
Toubaru, Kiyota [7611-34]SPS3
Tourbot, Gabriel [7602-36]S8
Tourne, Eric [7616-31]S7, [7616-31]S12
Toussaint, Kimani C. [7569-80]SPS1
Tovmasyan, Artak G. [7551-39]SPS1
Town, Graham E. [7580-09]S2, [7604-15]S3
Toy, Muhammed Fatih [7570-09]S2
Toya, Kazuyuki [7586-10]S3
Toyoshima, Morio 7587 ProgComm, [7587-12]S2, [7587-19]S3, [7587-29]S4
Toytman, Ilya [7562-34]S8

Index of Authors, Chairs, and Committee Members

- Tozburun, Serhat** [7548B-46]S4, [7548G-192]S
 Tozian, Tani [7594-18]S5
 Träger, Frank 7586 Chr, 7586 S2 SessChr, [7586-18]S4
 Traggis, Nick [7578-15]S4
 Tran, Chuong 7602 S12 SessChr, [7602-56]S13
 Tran, Quynh [7608-40]S9
 Tranberg, Karl-Goran 7565 ProgComm
 Tränkle, Günther [7616-14]S3, [7616-53]S12, [7616-55]S13
 Trappe, Neil A. 7601 S2 SessChr, [7601-09]S2
 Traub, Martin [7582-03]S2
 Travis, Kort [7576-26]S7, [7576-28]S7, [7577-39]S8
 Traynor, Nicholas [7580-04]S1
Trebaol, Stéphane [7612-25]S7
Trebino, Rick P. SC746 Inst, 7589 Chr, 7589 S6 SessChr, [7589-20]S6
 Tredicucci, Alessandro [7600-63]S15, [7608-09]S19
 Treeby, Bradley E. [7564-17]S3, [7564-55]S8
 Treffer, R. [7560-25]S4
 Trela, Natalia [7578-20]S5, [7580-06]S1, [7583-33]S8
 Treviño-Martinez, Fernando [7598-68]SPS3
 Trifanov, Irina [7580-23]S6
 Trivedi, Sudhir B. [7578-38]S10, [7578-89]SPS2
 Trivellini, Nicola [7617-23]S4
 Troccoli, Mariano [7616-58]S14
 Troger, Joerg [7616-56]S13
 Troles, Johann [7559-30]S, [7598-22]S5, [7609-36]S8
Tromberg, Bruce J. [7554-106]SPS1, [7555-46]S10, [7555-47]S10, [7567-02]S1, [7569-130]SPS1, 7573 ProgComm
 Tromsdorf, U. I. [7575-47]S9
 Trono, Cosimo [7574-11]S2, [7604-34]S7
 Troppmann, Christoph [7561-08]S1
 Trouillard, Geraldine [7598-16]S4
 Troupaki, Elisavet [7578-04]S1, [7578-06]S2
 Troy, Neil [7589-32]S8
 Troyanova, Petranka [7563-33]SPS1
 Troyon, Michel [7575-11]S5, [7603-46]S10
 Trubenko, Pavel A. [7583-09]S2
 Trunina, Natalia A. [7563-29]SPS1
 Trunov, Mihail [7598-53]SPS3
 Truong, Amanda M. [7602-20]S5
 Trussell, Charlie W. [7578-60]S14
 Tsai, Cheng-Ho [7575-22]S8
 Tsai, Chuang-Chuang [7617-06]S2
 Tsai, George P. [7569-85]SPS1
 Tsai, Hai-Lung [7585-17]S4
 Tsai, Jui-che [7555-24]S5, [7573-47]SPS1
 Tsai, Liren [7591-36]SPS2
 Tsai, Meng-Tsan [7554-06]S1, [7554-11]S2, [7554-33]S5
 Tsai, Miao-Chang [7597-75]SPS3
Tsai, Ming-Rung [7569-55]S8
 Tsai, Shang-Yu [7617-10]S3
 Tsai, Tsung-Han [7554-08]S2, [7554-49]S8, [7558-20]S4, [7570-19]S4
 Tsai, Wan-Chen [7618-36]S10
 Tsai, Wu-Jung [7585-17]S4
 Tsai, Ying-Chiuan [7617-53]S11
 Tsai, Yu-Li [7602-50]S10
 Tsao, Jeffrey Y. [PW10OOP1-02]SOPL3, [PW10OOP1-02]S
 Tsay, Jenq-Dar [7602-74]S11, [7602-74]SPS3
 Tse, Jorden [7573-41]SPS1
 Tsen, Kong-Thon [7561-32]S5, 7600 Chr, 7600 S10 SessChr
 Tsen, Shaw-Wei D. [7561-32]S5
 Tseng, Derek [7568-86]S3
 Tseng, Meng-Kai [7565-08]S3
Tseng, Snow H. [7573-01]S1
 Tseng, Te-Yu [7561-25]S4
 Tseng, Ya-Ming [7575-22]S8
 Tsia, Kevin K. [7582-35]S8
 Tsiens, Richard W. [7575-23]S8
 Tsimaris, Ioannis [7548B-61]S7, [7548B-66]SPS1
 Tsin, Andrew [7562-12]S3
 Tsironis, Ioannis [7548B-61]S7
 Tsou, Mei-Yung [7555-04]S1
 Tsuchizawa, Tai [7606-27]S8
 Tsuda, T. [7618-16]S4
 Tsui, Polly B. [7562-11]S3
 Tsui, Ying Y. [7573-19]S5
 Tsujik, Koichi [7589-18]S5
 Tsujikawa, Motokazu [7550-57]S11
 Tsukamoto, Katsutoshi 7620 Chr, 7620 S4 SessChr, 7620 S3 SessChr, [7620-15]SPS3
 Tsukiji, Naoki [7615-01]S10
 Tsvid, Gene [7597-44]S10, [7616-28]S7, [7616-28]S12, [7616-66]S2
 Tsviliuk, Olena [7610-31]S7
 Tsyalkovskyy, Volodymyr [7591-37]SPS2, [7599-09]S2, [7599-62]SPS3
 Tsybin, Igor [7580-52]S12
 Tsytsarev, Vassily [7564-06]S1
 Tu, Feng [7559-01]S
 Tu, Haohua [7554-31]S5, [7556-14]S4, [7558-15]S4, [7569-77]SPS1, [7573-37]S9
 Tu, Li-Wei 7617 Chr, 7617 S9 SessChr, [7617-45]S9, [7617-46]S9
 Tu, Xiaoyan [7599-42]S11
 Tu, Yupeng [7551-14]S3, [7554-60]S9
 Tuchin, Valery V. 7550 ProgComm, 7554 Chr, 7554 S12 SessChr, 7563 Chr, 7563 S SessChr
 Tuchin, Valery V. [7563-30]SPS1, [7565-09]S3, [7576-53]SPS1
 Tuchina, Elena [7576-53]SPS1
 Tucker, Erik [7568-11]S2
 Tudeau, Rodica A. [7574-14]S2
 Tuer, Adam [7569-95]S7
 Tulkki, Jukka [7597-13]S3, [7614-15]S4
 Tumlinson, Alexandre R. [7550-44]S9
 Tun, Chun-Ju [7603-66]SPS3
 Tünnermann, Andreas [7578-58]S14, [7579-102]S, [7579-102]S, [7579-102]S, [7579-102]S, [7579-102]S, [7579-102]S, [7579-102]S, [7579-102]S, 7580 ProgComm, 7580 S10 SessChr, [7580-13]S3, [7580-30]S8, [7580-32]S8, [7580-34]S8, [7580-46]S11, [7580-49]S11, [7580-52]S12, [7580-55]S13, [7580-57]S13, [7580-64]S15, [7580-85]SPS2, [7580-86]SPS2, [7580-90]SPS2, [7580-91]SPS2, [7585-04]S1, [7589-16]S5, [7589-28]S7, [7589-30]S8, [7589-43]S8, [7589-43]S12, [7595-17]S3
 Tuokko, Reijo O. [7590-06]S1
 Tuomisto, Pietari [7578-27]S7
 Turchin, Ilya V. [7557-18]S4, [7568-21]S5, [7568-46]S2, [7575-34]S10
 Turchinovich, Dmitry [7580-68]SPS2, [7600-67]SPS3
 Turek, John J. [7573-09]S2
 Turetz, Joseph [7562-40]S9
Türkcan, Silvan C. [7575-02]S2
 Turner, Andrew J. [7580-66]S15
 Turner, George W. [7618-19]S5
 Turrell, Sylvia [7604-34]S7
 Turri, Stefano [7589-29]S7
 Turton, David [7601-16]S4
 Turzhitsky, Vladimir M. [7561-28]S4, [7563-05]S1, [7573-34]S8, [7559-13]S
 Twyman, Marlon [7610-22]S5
 Tyagi, Somdev D. [7576-61]SPS1
 Tyazhev, Aleksey [7582-13]S4
Tyson, Robert K. 7588 ProgComm
-
- ## U
- Uang, Kai-Ming [7617-26]S5, [7617-27]S5
 U-Chan, Chung [7603-28]S7
 Uchida, Hiroyuki [7583-31]S7
 Uchida, Yuji [7558-14]S3
 Uchiyama, Taro [7581-05]S1
Uchugonova, Aisada [7568-48]S1, [7569-37]S6
 Udalagama, Chamika N. [7593-16]SPS2
 Udreia, Mircea [7552-26]SPS1
 Uebernickel, Mirko [7582-59]SPS2
Ueda, Ken-ichi [7579-01]S1, [7580-38]S9
 Ueda, Yoshihiro [7554-94]SPS1
 Ueda, Yukio [7561-43]SPS1
 Uedono, Akira [7602-07]S2
 Uehara, Hiyori [7598-50]S12
 Uehara, Mituo [7560-13]SPS1
 Ufret-Vincenty, Rafael [7596-03]S1
 Ugolotti, Elena [7570-42]SPS1
 Uhd Jepsen, Peter [7600-67]SPS3
 Uhlhorn, Stephen R. [7550-21]S4, [7550-42]S9
 Ukaegbu, Ikechi A. [7607-47]SPS3
 Ullmann, Frank [7589-50]SPS2
 Ulloa, Jose María M. [7610-09]S3
Ulmer, Melville P. [7608-48]S11
 Ulrich, Sven [7585-23]S5
 Umemura, Nobuhiro [7582-05]S2, [7582-55]SPS2
 Umeyama, Shinji [7557-30]SPS1
 Ungar, Jeffrey E. [7583-51]SPS2
 Unger, Sonja [7580-08]S2, [7598-09]S2
 Unglert, Carolin [7548C-78]S2, [7548C-79]S2
 Unlu, Burcin [7557-34]SPS1, [7557-35]SPS1, [7567-16]S4, [7557-09]S3
 Unlu, Selim M. [7587-28]S4, [7553-17]S5, [7607-33]S8, [7553-19]S5
 Unold, Heiko [7582-06]S2
 Unrau, Waldemar [7610-15]S4
 Unterhuber, Angelika [7554-22]S4
 Untermann, Tino [7573-49]SPS1
 Unterrainer, Karl [7616-62]S14
 Unterseher, Fred D. 7619 ProgComm
 Uozumi, Yoichi [7573-29]S7
 Upile, Tahwinder [7548C-67]S1, [7548C-72]S1, [7548C-73]S1, [7548C-74]S1, [7548C-92]S4, [7548C-94]S4, [7548C-96]S5, [7548C-102]S5, [7548C-103]S5, [7548C-174]S1, [7548C-180]S4
 Urani, Chiara [7550-59]SPS1, [7568-20]S5
 Urano, Yasuteru [7568-49]SPS1, 7576 ProgComm, 7576 S11 SessChr, 7576 S12 SessChr, [7576-09]S3, [7576-54]SPS1, [7576-60]SPS1
 Urata, Yoshiharu [7580-16]S4, [7580-16]S6, [7580-16]S1
 Urayama, Shiro [7561-02]S1
 Urrea, Hernan [7563-12]S1
 Uru, Raksha [7550-21]S4, [7550-42]S9
 Uryu, Seiji [7608-53]S11
 Usechak, Nicholas G. [7616-06]S2
-
- ## V
- Vacchi, Carla [7570-42]SPS1
 Vachon, Martin [7606-10]S4
 Vacirca, Nicholas A. [7591-09]S2
 Vagidov, Nizami Z. [7608-73]S16
 Vahala, Kerry J. [7579-36]S9
Vaillancourt, Jarrod N. [7608-66]S14
 Vaillant, Joel [7598-75]S9
 Vaissie, Laurent [7583-51]SPS2
 Vakhtin, Andrei B. [7554-103]SPS1
 Vakob, Ben [7558-10]S3, [7548D-117]S3, [7548D-121]S4, [7554-01]S1, [7554-64]S10, [7558-02]S1
 Val, Vadim [7593-37]S7
 Valavanis, Alexander [7616-26]S6
Valdes, Claudia [7567-11]S3
 Valencia, Sergio [7603-57]S5
 Vallee, Fabrice 7600 ProgComm, [7600-02]S1
Vallée, Réal [7598-17]S4
 Valley, Justin K. [7596-08]S2
 Vallius, Tuomas [7578-27]S7
 Valster, Adriaan [7615-15]S4
 Valvo, Giuseppina [7598-34]S8, [7606-05]S2
 van Bergen en Henegouwen, Paul [7569-24]S4
Van Daele, Peter 7607 ProgComm, [7607-15]S4, 7620 ProgComm
 van de Linde, Sebastian [7571-30]S9, [7571-39]SPS1
 van den Berg, Albert 7593 ProgComm
 van den Bergh, Hubert [7548B-57]S6
 van Dijk, Thomas [7613-13]S4
 van Driel, Henry M. 7600 S7 SessChr, [7600-25]S6
 Van Hoe, Bram [7607-15]S4
 van Kuijk, Harry [7598-32]S8
 Van Leeuwen, Robert [7615-14]S4, [7615-16]S4
van Leeuwen, Ton [7548A-20]S, [7550-47]S9, [7563-17]S4
 van Leeuwenhoek, Antoni [7548C-91]S4
 van Mameren, Joost [7613-12]S3
 van Meer, Gerrit [7569-24]S4
 van Melick, Rene G. M. [7596-02]S1
 van Oudanaarde, Kim [7548C-91]S4
van Raaij, Martijn E. [7564-85]S12
 Van Steenberge, Geert [7607-15]S4
Van Stryland, Eric W. [7600-07]S2
 van Swol, Christiaan F. P. [7548B-34]S1
 Van Tendeloo, Gustaf [7586-08]S2
 Van Thourhout, Dries [7606-26]S7
 van Veen, R. L. P. [7548C-181]S5
 van Veen, Robert L. [7548C-83]S2
 van Veldhoven, Peter J. [7610-37]S5
 Van Zeghbroeck, Bart [7597-78]SPS3
 Vanbesien, Olivier [7609-21]S5
 Vance, Calvin [7598-73]SPS3
 Vandermeiren, Werner [7597-35]S8, [7597-38]S8
 Vanderwall, Philip [7569-67]S9

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Vanek, Michael D. [7608-80]S17
Vangala, Shivashankar [7601-04]S1
Vanholtsbeeck, Frederique [7559-04]S4
Varadi, Gyula [7594-18]S5
Varani, Luca [7608-41]S9
Vardi, Alon [7602-45]S10
Varela, Oscar [7578-92]S7
Vargas, Gracie [7569-49]S7, [7576-32]S8
Vargis, Elizabeth [7555-03]S1
Vargis, Elizabeth [7560-18]S4
Varlamova, Olga [7586-17]S4
Varlet, Pascale [7548E-131]S3
Váró, György [7600-40]S10
Varsanik, Jonathan [7577-26]S6
Vasa, Nilesh J. [7584-35]S12, [7584-35]S6, [7590-18]S3, [7590-19]S3
Vasalatiy, Olga [7576-12]S3, [7576-72]SPS1
Vasdekis, Andreas E. [7594-22]S6, [7599-48]S12
Vasefi, Fartash [7557-37]SPS1, [7562-09]S2, [7568-34]S6, [7577-35]S8
Vasile, Liliana [7549-03]S1
Vasile, Stefan A. [7587-28]S4
Vasil'ev, Vasily [7613-05]S2, [7613-19]S5
Vasilyev, Aleksey [7578-04]S1, [7578-06]S2, [7578-08]S2
Va?inek, Vladimir [7597-70]SPS3
Vatnik, Sergei [7578-14]S3
Vauchier, Claude M. 7593 ProgComm
Vaupel, Andreas [7578-43]S11
Vawter, G. A. [7605-11]S4
Vazquez-Montiel, Sergio [7572-22]SPS1
Veal, Tim D. [7603-08]S2
Vedenyapin, Vitaliy [7582-13]S4
Vedin, Ivan [7578-14]S3
Vedula, Rahul [7553-17]S5, [7553-19]S5
Veiko, Vadim P. [7584-18]S7, [7584-18]S11
Veith, Michael [7590-17]S3, [7591-15]S4
Velez, Christian [7602-67]S15
Velicu, Silviu [7594-33]S9, [7608-70]S15
Vellekoop, Ivo M. [7554-108]SPS1
Velmiskin, Vladimir V. [7580-43]S10
Venkatesan, Thirumalai [7610-38]SPS3
Venter, Petrus J. [7606-37]S10, [7606-54]SPS3, [7607-34]S8
Ventura, Liliane [7550-76]SPS1, [7550-78]SPS1, [7550-84]SPS1, [7555-32]S6, [7556-35]SPS1
Venugopal, Vivek [7557-44]S1, [7557-45]S2
Venus, George B. [7580-63]S15, [7580-65]S15, [7583-38]S8
Vera Marquina, Alicia [7594-37]SPS2, [7620-08]S3
Verboven, Bart [7613-10]S3
Verdaasdonk, Rudolf M. 7548B ProgComm, 7548B S2 SessChr, 7548B S4 SessChr, [7548B-34]S1, [7548B-42]S3, [7548G-157]S3, [7549-13]S2, [7555-30]S6, 7556 ProgComm, 7556 S8 SessChr, [7556-29]S8, [7556-30]S8, [7561-24]S4, [7562-30]S7
Verdeyen, Joseph T. [7581-01]S1, [7581-19]S4, [7581-20]S4
Vergien, Christopher L. [7580-53]S12, [7580-93]SPS2
Vergnole, Sebastien [7548D-115]S3, [7549-04]S1, [7554-104]SPS1
Verhalen, Brandy [7571-24]S7
Verma, Pramode [7604-37]S8
Vermeulen, Nathalie [7606-36]S10, [7608-33]S8
Vernon, Marcia [7553-11]S3
Veronis, Georgios [7582-30]S7, [7604-47]S9
Verslegers, Lieven [7604-23]S5
Versteegh, Marijn A. [7600-04]S1
Vesal, Mohammad [7597-69]SPS3
Vetrovec, John [7578-11]S3, [7583-19]S4, [7617-37]S7
Vetter, Sharon L. [7578-33]S8
Veyrié, David [7592-02]S1
Viani, Jacob [7571-08]S2, [7571-13]S4
Viator, John A. [7564-38]S6, [7564-48]S7, [7564-50]S7
Vicente, M. Graca H. [7593-36]S7
Vidal, Eva [7583-15]S3
Vieira, Gislaïne [7568-56]S2, [7568-57]S2
Vieira Stahl, Cecilia [7575-37]S11
Vien, Van [7600-38]S9
Viera, Gregorio [7583-15]S3
Vignola, Joseph [7564-83]S12
Vigreux-Bercovici, Caroline [7604-04]S1
Vijayakumar, K. P. [7603-64]SPS3
Vijayasai, Ashwin P. [7593-18]S3
Vilalta Clemente, Arantxa [7602-19]S4
Villanueva-Luna, Adrian [7572-22]SPS1
Villar Jiménez, Ernesto [7610-08]S2
Villar Kuri, Jorge [7550-08]S2
Vileneuve, Alain [7580-01]S1
Villiger, Martin L. [7550-15]S3, [7554-42]S7, [7554-77]S12, [7554-99]SPS1
Villoresi, Paolo [7595-15]S3
Vimal Kumar, T. V. [7603-64]SPS3
Vincelette, Rebecca L. [7562-29]S7
Vinci, Richard P. [7617-16]S3
Vinegoni, Claudio [7564-62]S9
Vinet, Françoise [7576-49]S12
Vinitha, G. [7582-48]S10, [7599-44]S11
Vinogradov, Sergei A. [7548E-124]S1, [7569-91]SPS1
Virgili, Tersilla [7585-13]S3
Viselga, Rimas [7578-44]S11
Vishnubhatla, Krishna C. [7585-13]S3, [7589-10]S3
Visser, Taco D. [7613-13]S4
Viswanathan, Nirmal K. [7613-06]S2, [7613-18]S5
Vitiello, Miriam S. 7608 S4 SessChr, [7616-43]S10, 7608 ProgComm
Vitkin, Alex [7558-29]SPS1
Vitkin, Edward [7573-25]S6
Vitkin, I. A. [7551-22]S6, [7554-35]S6, [7554-43]S7
Vivien, Laurent [7598-13]S3, [7602-45]S10, [7606-22]S7, [7606-26]S7
Vladimir, Zharov [7565-09]S3
Vodeneev, Vladimir V. [7575-34]S10
Vo-Dinh, Tuan TrackChr, 7555 Chr, 7555 S1 SessChr, 7555 S2 SessChr, [7555-11]S2, [7561-04]S1, [7561-05]S1, 7577 Chr, 7577 S1 SessChr, 7577 S2 SessChr, [7577-06]S2, [7577-11]S3
Vodopyanov, Konstantin L. 7582 ProgComm, 7582 S8 SessChr, [7582-30]S7, [7582-33]S7, 7601 ProgComm, 7601 S3 SessChr
Voelkel, Reinhard [7594-13]S4
Voellkopf, Volker [7569-82]SPS1
Voelz, David G. [7588-25]S4
Vogel, Alfred 7562 ProgComm, [7568-82]S4, 7589 ProgComm
Vogel, Curtis R. [7595-12]S2
Vogel, Robert [7571-44]S9
Vogel, Uwe [7593-10]S2
Vogt, Helmut [7585-32]S12, [7585-32]S6
Vohnsen, Brian [7582-42]S9
Voigt, Jan [7555-17]S4
Voigt, Karsten [7606-41]S11
Voigt, Sebastian [7559-11]S
Voigtländer, Christian [7580-55]S13, [7589-16]S5
Voisin, Paul [7608-86]S18
Vola, Jean-Pierre [7599-12]S3, [7599-24]S6, [7604-28]S6
Volgger, Veronika [7548C-174]S1
Völk, Stefan [7610-18]S4
Volkert, Jörg [7583-16]S4
Völk, Jakob [7564-108]SPS1
Volkmer, Andreas [7569-09]S1, [7571-01]S1
Volkov, Kirill A. [7621-25]SPS3, [7621-26]SPS3
Vollmer, Frank [7553-04]S1, [7579-29]S7
Volluet, Gerard [7583-40]SPS2
Volz, Kerstin [7597-18]S4, [7597-20]S5, [7616-30]S7, [7616-30]S12
Vomiero, Alberto [7603-40]S9
von Freymann, Georg [7586-14]S3, 7591 ProgComm, 7591 S1 SessChr, [7591-02]S1, [7609-67]S1
von Känel, Hans [7600-10]S3
von Lerber, Tuomo [7621-09]S3
von Volkmann, Konrad [7600-63]S15
Voorakaranam, Ram [7619-41]S4
Vorbeck, Sascha 7621 ProgComm, [7621-16]S5
Vorobiova, Natalia [7548C-84]S3
Vorobyev, Anatoliy Y. [7589-40]S6, [7589-40]S10
Vorobyov, Vasily [7550-44]S9
Vos, Marten H. [7560-20]S3
Vos, Willem [7617-32]S6
Voss, Andreas [7579-17]S4, [7579-22]S6
Voss, John [7571-14]S4
Voss, P. [7603-46]S10
Vounckx, Roger [7597-35]S8, [7597-38]S8
Vrancic, Christian [7560-12]S3, [7608-06]S2
Vu, Tania Q. 7575 ProgComm, 7575 S7 SessChr, [7575-21]S7
Vuckovic, Jelena [7609-08]S3, 7611 S4 SessChr, [7611-23]S5, [7611-27]S6, [7611-28]S6
Vukmirovic, Nenad V. [7616-26]S6
Vuong, Barry [7580-101]SPS2, [7580-102]SPS2
Vural, Emre [7548C-176]S2
Vurgaftman, Igor [7616-23]S5
Vysotsky, Dmitry [7580-72]SPS2
-
- W**
- Waarts, Robert G. 7580 ProgComm, 7580 S1 SessChr
Wachmann, Ewald [7605-09]S3
Wachsmann-Hogiu, Sebastian [7569-78]SPS1
Wächter, Christoph A. 7604 CoChr, 7604 S3 SessChr, [7617-42]S8
Wachulak, Przemyslaw W. [7584-29]S10
Wada, Kazumi [7606-27]S8
Wada, Osamu [7597-34]S8, [7597-57]S12, [7610-24]S6
Wada, Satoshi [7580-16]S4, [7580-16]S6, [7580-16]S1
Wada, Yoshio [7580-16]S4, [7580-16]S6, [7580-16]S1
Wade, Kent [7615-05]S2
Wadekar, Paritosh V. [7617-46]S9
Wadsworth, William J. 7609 ProgComm
Waechter, Clemens [7602-31]S7
Waghmare, Prashant R. [7593-17]S3
Wagner, Armin [7618-04]S1
Wagner, Christoph [7594-31]S9
Wagner, Clark J. [7581-19]S4, [7581-20]S4
Wagner, Joachim [7578-32]S8, [7583-23]S5, [7608-08]S2, [7616-48]S11, [7616-60]S14, [7617-21]S4, [7617-54]S11
Wagner, Katherine [7613-21]S6
Wagner, Lars [7583-08]S2
Wagner, Markus R. [7602-27]S6, [7602-30]S7, [7603-04]S1
Wagner, Michael [7592-24]S5
Wagner, Uwe [7585-24]S12, [7585-24]S6
Wagnieres, Georges A. 7555 ProgComm, [7548B-57]S6
Wahl, Dietmar [7607-10]S3
Wahl, Michael [7568-87]S6, [7569-26]S4, [7569-106]SPS1, [7571-13]S4, [7571-18]S5
Wahl, Ulrich [7603-19]S4
Wahlbrink, Thorsten [7605-01]S1
Wahsheh, Rami A. [7604-44]S9
Wakabayashi, Kazuya [7583-31]S7
Wakatsuki, Atsushi [7601-12]S3
Wakayama, Yuki [7610-12]S3
Wakunami, Koki [7619-09]S2
Walczak, Rafal [7593-10]S2
Waldis, Severin [7594-19]S6, [7594-26]S7
Waldman, Jerry [7601-04]S1
Waldron, Philip [7606-23]S7, [7616-49]S11
Walker, Roland [7619-42]S4
Wall, R. Andrew [7558-25]S6, [7558-25]S2
Wallart, Xavier [7608-35]S8
Walraven, Jeremy A. [7592-08]S2
Walsh, Alex J. [7562-31]S7, [7562-50]S7
Walsh, Gary [7577-34]S7
Walsh, Joseph T. [7548B-38]S2, [7555-29]S6
Walsh, K. [7548B-62]S7
Walsworth, Ronald [7612-08]S2
Walter, Christoph [7582-06]S2
Walters, Deron [7571-08]S2, [7571-13]S4
Walther, Julia [7554-05]S1, [7554-83]S12, [7554-95]SPS1
Walther, Markus [7601-16]S4
Walther, Martin 7608 S14 SessChr, [7608-69]S15
Walton, Ian [7560-19]S1
Walton, Matthew [7597-86]SPS3
Wan, Aizuddin [7619-07]S2
Wan, Cheng-Tien [7598-43]S10
Wan, Qiuji [7554-70]S11
Wang, Alan X. 7607 S8 SessChr, [7607-24]S6, [7607-32]S8, [7607-48]SPS3
Wang, Bao-Jun [7604-20]S4
Wang, Bing-Hsiao [7601-14]S3
Wang, Bo [7564-07]S2, [7564-09]S2, [7564-95]SPS1
Wang, Buguo [7602-14]S3
Wang, Chao [7557-13]S3, [7560-27]SPS1
Wang, Chen-Chia [7578-38]S10
Wang, Chengao [7614-10]S3, [7614-13]S4
Wang, Chun [7583-51]SPS2
Wang, Chun-Chin [7561-38]S5, [7569-52]S7
Wang, Chun-Wei [7559-23]S, [7559-25]S, [7559-27]S, [7559-28]S

Index of Authors, Chairs, and Committee Members

- Wang, Chun-Yang [7555-24]S5
Wang, Churng-Ren C. [7564-63]S9, [7564-104]SPS1
Wang, Evelyn [7592-01]S1
Wang, Fei [7588-15]S3, [7588-18]S4
Wang, Fengtao [7557-13]S3, [7560-27]SPS1
Wang, Gerald [7548B-36]S1
Wang, Haifeng [7569-126]SPS1
Wang, Hailin 7600 ProgComm, [7611-08]S2
Wang, Hailong [7610-33]S8
Wang, Han-Wei [7564-90]SPS1
Wang, Hao [7560-14]S5
Wang, Hao [7610-37]S5
Wang, Hequn [7548A-16]S, [7548A-23]S
Wang, Hezhou [7619-21]S4
Wang, Hongwei [7551-24]S6
Wang, Hsiang-Chen [7551-35]SPS1, [7597-76]S8
Wang, Hsin-Neng [7555-11]S2, [7577-06]S2, [7577-11]S3
Wang, Hsueh-Hsiao [7575-06]S3, [7575-22]S8
Wang, Hui [7548D-109]S1, [7554-03]S1, [7554-09]S2
Wang, Ji 7580 ProgComm, 7580 S9 SessChr, 7598 ProgComm
Wang, Jiafu [7599-42]S11, [7599-39]S10
Wang, Jian Jim 7591 Chr, 7591 S2 SessChr
Wang, Jingxiong [7578-23]S5
Wang, Jinyu [7570-22]S5
Wang, Jiwu [7560-27]SPS1
Wang, Jun [7583-01]S1, [7583-04]S1, [7583-46]SPS2
Wang, Jun [7593-25]S5
Wang, Junlong [7601-20]S4
Wang, Jyhyppyng [7600-43]S10, [7609-18]S4
Wang, Kai [7607-18]S5
Wang, Ken [7551-13]S3, [7551-37]SPS1, [7551-07]S2, [7551-36]SPS1
Wang, Kenneth K. 7551 ProgComm, 7551 S5 SessChr, [7551-19]S5
Wang, Kun [7564-24]S4
Wang, Le [7617-68]SPS3
Wang, Lei [7565-16]S4
Wang, Li [7617-48]S10
Wang, Ligang [7598-27]S6
Wang, Lihong V. [7550-62]SPS1, 7561 S5 SessChr, [7561-21]S4, 7563 ProgComm, PanelMember, [7563-01]S, 7564 Chr, 7564 S SessChr, 7564 S5 SessChr, 7564 S1 SessChr, 7564 S SessChr, [7564-01]S1, [7564-05]S1, [7564-06]S1, [7564-12]S2, [7564-18]S3, [7564-31]S5, [7564-34]S5, [7564-43]S7, [7564-66]S9, [7564-69]S10, [7564-70]S10, [7564-77]S1, [7564-78]S11, [7564-90]SPS1, [7564-91]SPS1, [7564-106]SPS1, [7564-111]SPS1, [7564-124]SPS1, [7564-125]SPS1, [7564-128]SPS1, 7567 ProgComm, 7567 S1 SessChr, [7567-20]S4, [7572-21]SPS1, [7576-37]S9, PW10SE S SessChr
Wang, Liquan [7608-17]S4
Wang, Meng [7593-43]SPS2
Wang, Miao [7577-04]S2
Wang, Pei-Nan [7568-04]S1
Wang, Pei-Ren [7617-26]S5, [7617-27]S5
Wang, Peng [7599-22]S6
Wang, Po-Hong [7617-26]S5
Wang, Po-Hsun [7564-100]SPS1, [7564-104]SPS1, [7564-126]SPS1
Wang, Qi Jie [7616-27]S6
Wang, Qiang [7550-23]S4, [7550-26]S5, [7550-37]S7
Wang, Qin [7602-78]SPS3, [7602-78]S11
Wang, Qing [7615-14]S4, [7615-16]S4
Wang, Qingpu [7581-10]S3
Wang, Qingru [7598-02]S1
Wang, Qiuyin [7563-20]SPS1
Wang, Quanzeng [7556-18]S5
Wang, Roy [7555-20]S4
Wang, Rui [7566-20]S4
Wang, Ruikang K. [7548E-125]S1, [7550-71]SPS1, 7554 ProgComm, 7554 S10 SessChr, [7554-19]S3, [7554-36]S6, [7554-40]S6, 7563 ProgComm, 7563 S4 SessChr, PanelModerator, [7563-06]S1, [7563-13]S3, [7563-21]SPS1, 7566 Chr, 7566 S4 SessChr, [7566-15]S4, [7566-18]S4, [7568-11]S2
Wang, Sean [7598-37]S9
Wang, Shing-Chung [7602-40]S9
Wang, Shui-Jinn [7617-26]S5, [7617-27]S5
Wang, T. L. [7578-35]S9
Wang, Tao [7588-27]SPS2
Wang, Thomas D. 7558 Chr, 7558 S2 SessChr, [7558-22]S5, [7558-22]S1
Wang, Tianyi [7548B-52]S5, [7562-28]S7
Wang, Tingting [7570-45]SPS1
Wang, Tsung-Jen [7550-64]SPS1
Wang, W. B. [7561-42]SPS1
Wang, Wanjun 7593 CoChr, [7593-25]S5
Wang, Wei [7604-20]S4
Wang, Weichung [7564-16]S3
Wang, Weina [7559-12]S, [7559-20]S
Wang, Wenhui [7559-16]S, [7574-17]S3
Wang, Wenjuan [7571-06]S2
Wang, Wentao [7598-61]SPS3
Wang, Wubao B. 7561 ProgComm, 7561 S4 SessChr, [7561-09]S1, [7561-41]SPS1
Wang, Xianwang [7565-23]SPS1
Wang, Xiaojun [7608-14]S3
Wang, Xiaojun [7616-58]S14, [7616-59]S14
Wang, Xiaolan [7617-48]S10
Wang, Xiaolong 7607 ProgComm, [7607-26]S6
Wang, Xiaoming [7603-03]S1
Wang, Xingwei [7559-16]S, [7574-17]S3
Wang, Xiuli [7551-24]S6
Wang, Xueding [7564-37]S6, [7564-75]S11
Wang, Xuefeng [7574-16]S3
Wang, Xuhua [7576-47]S11, [7576-59]SPS1
Wang, Yan [7548E-135]S4, [7548G-152]S1, [7548G-153]S1, [7548G-166]SPS1
Wang, Yanzhu [7554-65]S10
Wang, Ye [7612-17]S4
Wang, Yiding [7583-42]SPS2, [7598-71]SPS3, [7603-63]SPS3
Wang, Yih-Ming [7554-11]S2, [7554-33]S5
Wang, Yihong [7554-08]S2, [7570-19]S4
Wang, Yiliang [7599-18]S5
Wang, Ying Min [7574-10]S1
Wang, Yuhua [7557-27]SPS1
Wang, YuYan [7591-11]S3
Wang, Zhechao [7606-01]S1
Wang, Zheng H. [7579-52]S3, [7612-33]S9
Wang, Zhibin [7603-10]S3
Wang, Zhiping [7565-19]SPS1
Wang, Zhong Lin 7603 ProgComm
Wang, Ziming [7587-08]S2
Wanke, Michael C. 7601 ProgComm, 7601 S1 SessChr, [7590-08]S2
Wanner, Molly [7548A-02]S
Ward, Benjamin G. 7580 ProgComm, 7580 S11 SessChr, [7580-36]S9, [7580-47]S11
Ward, E. Sally [7570-03]S1, [7575-19]S7
Wardlaw, Michael [7580-60]S14
Warger, William [7554-10]S2
Warming, Till [7610-15]S4
Warnasooriya, Nilanthi [7576-33]S8
Warren, Warren S. [7569-10]S2, [7569-87]SPS1
Washio, Kunihiko 7585 Chr, 7585 S1 SessChr, [7590-05]S1
Wasige, Edward [7608-17]S4
Wasman, Sergio [7554-64]S10
Wasserman, Daniel M. 7616 S10 SessChr, [7616-46]S11
Wassner, Thomas A. [7597-20]S5
Watanabe, Akira 7585 ProgComm, [7585-22]S5
Watanabe, Hirofumi [7599-47]S12
Watanabe, Junji 7618 S7 SessChr, [7618-27]S7
Watanabe, Kei [7607-27]S7
Watanabe, Masayoshi [7599-10]S3
Watanabe, Michiko [7548D-116]S3, [7554-21]S4
Watanabe, Satoshi [7562-26]S6
Watanabe, Toshifumi [7606-27]S8
Watanabe, Toshiyuki 7599 ProgComm
Watanabe, Wataru 7584 S7 SessChr, [7585-10]S3, 7589 ProgComm, 7589 S11 SessChr
Watanabe, Yuuki [7554-100]SPS1
Watkins, Simon C. 7569 ProgComm
Watt, Webb W. 7561 ProgComm
Wattellier, Benoit F. [7570-14]S3
Watts, Benjamin R. [7555-27]S6
Watts, Michael P. 7599 ProgComm
Waurisch, C. [7575-47]S9
Wawro, Debra D. [7572-13]S3
Wax, Adam P. 7573 Chr, 7573 S6 SessChr, 7573 S4 SessChr, [7573-18]S4, [7573-24]S6, [7573-36]S9
Waxman, Sergio [7548D-117]S3, [7554-01]S1
Way, Winston I. 7621 ProgComm
Waynant, Ronald W. 7552 Chr, 7552 S3 SessChr, [7552-07]S2, 7559 S SessChr, [7565-10]S3
Wayne, David T. [7588-08]S2, [7588-19]S4
Wayne, Jeffrey [7565-04]S2
Weaver, Michael S. [7617-03]S1
Webb, Anthony J. [7572-02]S1
Webb, Benjamin [7578-43]S11
Webb, Bryan M. [7554-21]S4
Webb, Watt W. [7548B-36]S1, [7561-31]S5, [7569-39]S6, [7569-65]S9
Weber, Patricia [7585-18]S4
Weber, Stefan M. [7594-19]S6
Webster, Nathan A. [7559-36]S
Webster, Paul J. L. [7554-34]S5, [7584-31]S11, [7590-02]S1
Webster, Scott [7600-07]S2
Weckhuysen, Bert [7569-13]S2
Wedel, Björn [7580-107]SPS2
Weeks, David E. [7581-17]S4
Weeks, Tyler J. [7569-78]SPS1
Wegener, Martin [7586-14]S3, [7591-02]S1, [7597-65]S14, [7609-67]S1
Wei, Chen-Wei [7564-63]S9
Wei, Hui [7571-02]S1
Wei, Jianjun [7577-14]S4
Wei, Lei [7580-48]S11
Wei, Ming-Tzo [7569-41]S6
Wei, Qiuyan [7602-44]S9
Wei, Xunbin 7565 ProgComm, 7565 S4 SessChr, [7565-12]S4
Weible, Kenneth J. [7594-13]S4
Weiershausen, Werner 7621 Chr, 7621 S3 SessChr, 7621 S5 SessChr
Weiershausen, Werner [7621-09]S3
Weigel, Thomas [7587-03]S1
Weigl, Bernhard H. 7593 ProgComm, 7593 S3 SessChr, [7593-20]S4
Weiler, Sascha [7578-69]S16, 7584 ProgComm
Weingartner, Harald [7608-23]S5
Weinigel, Martin [7555-16]S4, [7589-05]S2
Weirich, Johannes [7580-48]S11
Weiss, Alexander J. [7585-16]S4
Weiss, Erik [7621-13]S4
Weiss, Peter [7600-22]S5
Weisbuch, Claude [7609-15]S4, [7617-31]S6
Weiser, Marc S. [7619-17]S4
Weiss, Eike [7564-36]S5
Weiss, Eliezer [7608-65]S14
Weiss, Jonas [7607-19]S5, [7607-20]S5
Weiss, Robert S. [7569-39]S6
Weiss, Sharon M. 7553 ProgComm, [7553-21]S6, [7553-23]S6, 7574 S4 SessChr, [7574-19]S4, [7591-07]S2, [7597-37]S8
Weiss, Shimon 7571 ProgComm, [7571-15]S5, [7571-44]S9, [7575-48]S10, [7608-85]S15
Weissbach, Carmen [7555-17]S4
Weissman, Jesse [7548A-13]S
Weisspennig, Christian T. [7569-62]S9
Weisz, Giora [7548D-117]S3, [7554-01]S1
Weich, Ashley J. [7562-29]S7, [7562-31]S7, [7562-50]S7
Wellen, Jeroen S. 7620 ProgComm
Weller, Horst [7575-08]S4, [7575-47]S9
Wells, Jonathon D. 7548G ProgComm, [7548G-190]S
Welpl, Hubert [7554-101]SPS1
Welzel, Julia [7554-90]SPS1
Weman, Helge [7608-46]S10
Wen, Xiang [7562-46]SPS1
Wen, Yu-Chieh [7600-42]S10, [7602-25]S6
Wenck, Horst [7568-15]S2, [7570-41]SPS1
Wendler, Joachim [7608-69]S15
Wendt, Joel R. [7591-24]S6, [7604-22]S5, [7604-24]S5, [7609-46]S11
Weng, Change [7606-58]SPS3
Weng, Jiawen [7570-07]S2
Weng, Peng-Shiang [7602-40]S9
Wenger, Jérôme [7571-09]S2, [7577-19]S5, [7577-32]S7
Wenzel, G. I. [7548C-100]S5
Wenzel, Hans [7583-43]SPS2, [7616-14]S3, [7616-36]S8, [7616-53]S12, [7616-57]S13
Werley, Steven T. [7593-21]S4
Werner, Ekkehard [7583-08]S2
Werner, James H. [7576-20]S5
Werner, Johannes [7578-88]SPS2
Werner, John S. [7550-36]S7, [7550-89]SPS1, [7554-105]SPS1
Werner, Stefan [7602-38]S8
Wernicke, Tim [7602-39]S8
Wertz, Esther [7608-26]S6
Wessels, Bruce W. [7608-22]S5
West, Dennis P. [7565-04]S2
Westbergh, Petter [7615-04]S2
Westhofen, Martin [7548C-99]S5

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Westlake, Karl R. [7605-11]S4, [7617-17]S4
Weyers, Markus [7602-39]S8
Weyll, Barbara M. P. [7552-25]SPS1
Weynant, Eric [7598-16]S4, [7598-17]S4
Whaley, Ralph D. [7604-13]S3
Wheelock, Asa M. [7568-61]S4, [7568-87]S6
Whelan, Harry T. [7552-12]S3
Whelan, Maurice [7554-24]S4
Whelan, William M. 7564 ProgComm, 7564 S9 SessChr, [7564-46]S7, [7564-58]S8
Whelan-Curtin, William [7604-17]S4
White, Henry [7603-43]S10, [7603-58]SPS3
White, Ian M. [7579-30]S7, [7606-07]S3
White, Ian H. [7607-23]S6, [7616-51]S12
White, John G. [7569-44]S6
White, Lisa [7555-45]S9
Whitmer, Deborah B0111 ProgComm
Whitten, James E. [7603-54]S12
Wicker, Ryan B. [7596-15]S4
Wickliffe, Samuel A. [7576-37]S9
Wicks, Gary W. [7608-74]S16
Wieck, Andreas D. [7600-09]S2
Wiczorek, Sebastian [7597-62]S13
Wiedenmann, Dieter [7615-06]S2
Wiederkehr, Rodrigo S. [7559-36]S3
Wiederrecht, Gary P. [7600-19]S5
Wiegand, Gordon [7568-92]S
Wiegert, Joachim [7617-54]S11
Wieser, Wolfgang [7554-41]S7, [7554-51]S8, [7554-56]S8
Wigdor, Harvey A. 7549 ProgComm
Wikswio, John P. [7571-36]S10
Wilcox, Christopher C. [7595-07]S2, [7595-08]S2
Wilcox, Russell B. [7581-23]SPS2
Wilde, Claudia [7549-21]S
Wildeman, Maarten [7548C-91]S4
Wildenhain, Michael [7594-10]S4, [7594-11]S4, [7594-20]S6
Wildner-Smith, Petra [7554-72]S11
Wilhelm, Allison [7559-29]S
Wilke, Ingrid [7600-66]S15
Wilke, Lee [7573-23]S6
Wilkins, Stephan [7571-24]S7
Wilkinson, James S. [7598-18]S4, [7604-31]S7, [7613-26]S7
Willadino, Lilia G. [7568-06]S2
Williams, Forrest L. [7580-15]S4, [7580-15]S6, [7580-15]S1
Williams, Grant V. M. [7599-38]S10
Williams, Matthew O. [7600-56]S13
Williams, Michelle D. [7548C-68]S1
Williams, Robert J. [7580-24]S6
Williams, Robin L. [7608-88]S19
Willis, Christina C. [7580-02]S1, [7580-61]S14
Willner, Alan E. 7587 ProgComm, 7611 ProgComm
Wilmerk, Gerald J. [7548G-156]S3, 7562 ProgComm, 7562 S5 SessChr, [7562-19]S5, [7562-20]S5, [7562-21]S5
Wilson, Brian C. [7551-22]S6, [7551-37]SPS1, [7554-35]S6, [7558-12]S3
Wilson, C. [7551-04]S2
Wilson, Clive G. [7550-81]SPS1
Wilson, David L. [7554-21]S4
Wilson, David [7554-40]S6
Wilson, Jerry A. 7608 ProgComm, 7608 S17 SessChr
Wilson, Katherine E. [7564-99]SPS1, [7576-19]S5
Wilson, Keith E. 7587 S4 SessChr, [7587-02]S1, [7587-11]S2, [7587-34]S5
Wilson, Robert H. [7548F-142]S1, [7555-02]S1
Wilson, Tony [7569-38]S6, [7569-48]S7, 7570 Chr, [7570-28]S6, [7595-13]S3
Wimpenny, Ian [7566-09]S2
Winebrenner, Dale P. [7601-05]S1
Winkelkemper, Momme [7602-38]S8, [7610-15]S4
Winkler, Amy M. [7555-15]S3, [7572-03]S1
Winkler, Moritz [7589-03]S1
Winoto, Lukman [7570-05]S1
Winston, Donald [7591-10]S3
Winter, Jessica O. [7575-20]S7
Wippermann, Frank C. [7556-06]S2
Wirth, Christian [7580-52]S12
Wirth, Ralph [7617-72]S10
Wirthmüller, Alexander [7602-45]S10
Wise, Damian [7583-01]S1, [7583-04]S1, [7583-46]SPS2
Wise, Frank W. [7569-17]S3, [7569-83]SPS1, 7580 ProgComm, [7580-29]S8, [7581-22]SPS2
Wiseman, Paul W. 7569 ProgComm
Wissler, Jörg [7571-04]S1
Wissmann, Markus [7590-12]S2
Wisweh, Henning [7548C-76]S2
Witcher, Jonathan J. [7584-17]S7, [7584-17]S11, [7589-32]S8, [7589-42]S8, [7589-42]S12
Withers, Nathan J. [7575-33]S10
Withford, Michael J. [7580-24]S6, [7589-16]S5, [7589-27]S7
Witjes, Max J. [7548C-83]S2, [7548C-181]S5, [7548C-184]S4
Witte, Frank [7554-27]S4
Witte, Mikael [7557-14]S3
Witte, Russell [7564-122]SPS1, [7564-123]SPS1
Wittern, Klaus-Peter [7568-15]S2, [7570-41]SPS1
Wittrock, Ulrich 7595 ProgComm
Witzack, Stefan [7591-26]S6
Witzigmann, Bernd 7597 Chr, 7597 S9 SessChr, 7597 S2 SessChr, [7597-03]S1
Wixforth, Achim [7609-06]S2, [7610-18]S4
Wlodarczyk, Krystian [7578-20]S5
Wober, Munib A. [7591-12]S3
Woehl, Jorg C. [7571-07]S2
Woerner, Heinz [7562-25]S6
Woerner, Michael [7600-64]S15
Wohlmut, Matthias [7578-88]SPS2
Wohlwend, Jennifer L. [7603-29]S7
Woidt, Carsten [7591-26]S6
Woit, Tatjana [7591-26]S6
Wojcik, Greg L. [7607-31]S8
Wojtkiewicz, Stanislaw [7563-16]S3
Wojtkowski, Maciej [7550-16]S3, [7550-18]S4, [7550-70]SPS1, 7554 ProgComm, 7554 S3 SessChr, [7554-37]S6, [7554-39]S6, [7554-74]S11
Wokaun, Alexander [7586-11]S3
Wolak, Edmund [7583-05]S1
Wolf, Jean-Pierre [7594-19]S6
Wolf, Martin [7600-63]S15
Wolff, Frank [7585-21]S5
Wolff, Leopold [7603-05]S2
Wolff, Marcus [7564-49]S7
Woll, Dirk [7578-59]S14
Wollenhaupt, Matthias [7600-32]S7
Wolter, Steve [7571-30]S9, [7571-39]SPS1
Wolters, Janik [7597-63]S14
Won, Young Jae [7568-10]S4
Wong, Angela W. [7569-92]SPS1
Wong, Brian J. 7548C Chr, 7548C S SessChr, 7548C S3 SessChr, 7548C S2 SessChr, [7548C-85]S3
Wong, Brian J. [7548C-167]S2, [7548C-177]S2, [7548F-151]S3, [7548C-86]S3
Wong, Chee Wei [7605-15]S6, [7609-11]S3, [7609-43]S10
Wong, Chee-Howe [7570-26]S5
Wong, Chun-Kwok [7565-14]S4
Wong, Kin-yip K. [7580-100]SPS2, [7582-27]S6
Wong, Michael [7548A-27]SPS1
Wong, Michael S. 7575 ProgComm
Wong, Molly [7563-04]S1
Wong, Ping-Show [7610-30]S7
Woo, Han Young [7599-53]SPS3
Woo, Henry [7548B-63]S7
Woo, J. H. [7599-33]S9, [7599-40]S10, [7601-17]S4
Wood, Michael [7551-22]S6
Wood, Tobias [7555-08]S2, [7556-01]S1
Woodard, Brian S. [7581-01]S1
Woodhams, Josephine H. [7573-26]S7
Woodrum, David A. [7548B-44]S3
Woods, Daniel [7554-63]S10
Woolliams, Peter D. [7567-03]S1
Woolley, John T. [7573-24]S6
Worhoff, Kerstin [7604-02]S1, [7559-02]S1, [7604-07]S2, [7605-20]S7
Wosinski, Lech [7606-01]S1
Woskov, Peter [7595-03]S1
Wouters, Michiel [7600-08]S2
Wozniak, Anna [7613-12]S3
Wozniak, Mariusz [7588-12]S3
Wraback, Michael 7608 ProgComm, 7608 S9 SessChr
Wrachtrup, Joerg 7611 ProgComm
Wree, Andreas [7550-01]S1
Wright, Amanda J. [7569-114]SPS1
Wright, Colin [7560-24]S6
Wright, Dallas [7580-36]S9
Wright, Ewan M. 7613 ProgComm
Wright, Graham A. [7589-14]S4
Wright, Jeremy B. [7605-11]S4
Wright, Lisa [7583-09]S2
Wright, Malcolm W. [7587-02]S1, [7587-10]S2, [7587-11]S2, [7587-16]S3, [7587-27]S4, [7587-34]S5
Wright, Nicholas M. [7606-15]S5
Wu, A. [7575-48]S10
Wu, Bang-Yenn [7602-68]S11, [7602-68]SPS3
Wu, Bin [7591-08]S2
Wu, Chen-Yu [7608-54]S11
Wu, Chien-Jang [7609-65]SPS3
Wu, Chung-Shieh [7604-09]S2
Wu, Elizabeth [7576-18]S5
Wu, Frank F. [7578-57]S14, [7582-16]S4, [7582-53]SPS2, [7584-37]SPS2, [7584-38]SPS2
Wu, Han-Hsuan [7568-75]S2
Wu, Huiting [7610-33]S8
Wu, Jeong-Weon [7599-33]S9, [7599-40]S10, [7601-17]S4
Wu, Jheng-Syong [7573-46]SPS1
Wu, Jian-Sheng [7597-76]S8
Wu, Jigang [7570-08]S2
Wu, Jui-Pin [7604-19]S4
Wu, June-Tai [7554-06]S1
Wu, Lei [7594-03]S5, [7594-03]S1
Wu, Ming C. [7596-08]S2
Wu, Ming Hsien OE123x Chr
Wu, Mo [7602-23]S5, [7602-59]S13, [7602-63]S14, [7602-73]S11, [7602-73]SPS3, [7602-77]S11, [7602-77]SPS3
Wu, Nan [7559-16]S, [7574-17]S3
Wu, Peiheng [7611-35]S7
Wu, Peng [7572-25]SPS1
Wu, Ping-Han [7585-17]S4
Wu, QiuHe [7552-05]S1
Wu, Rueli-Jr [7569-73]SPS1
Wu, Sheng [7608-10]S2
Wu, Shengnan [7565-21]SPS1
Wu, Shin-Tson 7618 ProgComm
Wu, Shulian [7568-32]SPS1
Wu, Song-Nan [7597-08]S2, [7614-11]S3, [7617-11]S3
Wu, Stewart H. [7556-02]S1
Wu, Stewart T. [7582-19]S5
Wu, Ting-Hsiang [7562-02]S1
Wu, Tsu-Hsiung [7604-19]S4
Wu, Wei [7577-05]S2, 7591 ProgComm
Wu, Wei [7601-08]S2
Wu, Weitai [7575-15]S6
Wu, Xiao-Xu [7559-10]S
Wu, Xingjia [7552-11]S2
Wu, Xunqi [7598-70]SPS3
Wu, Yangzhe [7568-81]SPS1
Wu, Yicong [7554-12]S2, [7558-11]S3
Wu, Yicong [7569-69]S9, [7569-86]SPS1
Wu, Yuehao [7596-12]S3
Wu, Yuh-Renn [7602-53]S12, [7610-17]S4
Wu, Yu-Mei [7598-13]S3
Wu, Yu-Tsung [7569-41]S6
Wuensche, Hans-Juergen [7597-42]S9
Wueppen, Jochen [7582-03]S2
Wullinger, Ingo [7592-24]S5
Wunderer, Thomas [7602-24]S6, [7602-64]S15
Wurdinger, Thomas [7557-03]S1
Wuu, Dong-Sing [7602-50]S10, [7617-53]S11
Wyant, James C. SC212 Inst
Wynn, James D. [7615-14]S4
Wynne, Klaas 7600 ProgComm, [7601-16]S4
Wyrowski, Frank [7573-49]SPS1, [7579-12]S4, [7589-21]S6, [7594-15]S5
Wysocki, James S. [7548B-36]S1
Wysocki, Gerard [7615-08]S3

X

- Xi, Jiefeng [7554-12]S2, [7569-69]S9, [7569-86]SPS1
Xia, Andong 7571 ProgComm
Xia, Sean [7617-03]S1
Xia, Younan [7564-66]S9, [7564-111]SPS1
Xiao, Bo-Wen [7617-06]S2
Xiao, Fan [7562-02]S1
Xiao, Fenglian [7565-17]SPS1
Xiao, Rong [7592-01]S1
Xiao, Sanshui [7606-40]S11
Xiao, Xifeng [7588-25]S4
Xiao, Y. [7583-54]SPS2
Xiao, Yanhong [7612-08]S2
Xiao, Yunfeng [7605-15]S6
Xie, Chuan [7615-03]S1, [7615-07]S2, [7615-23]S6
Xie, Hongtao [7548D-105]S1, [7555-01]S1, [7555-18]S4
Xie, Huikai [7594-03]S5, [7594-03]S1
Xie, Jinqiao [7602-27]S6
Xie, Junqing [7617-72]S10
Xie, Shusen [7557-27]SPS1, [7565-13]S4
Xie, Sunney X. 7569 ProgComm, 7569 S1 SessChr, [7569-06]S1, [7569-84]SPS1, [7569-03]S, [7569-20]S3, [7569-45]S6, [7571-12]S3, [7569-12]S2

Index of Authors, Chairs, and Committee Members

- Xie, Zhiqiang [7585-08]S2, [7585-09]S2
Xie, Zhixing [7554-29]S5, [7564-64]S9
Xie, Zili [7602-12]S3
Xin, Yong-Chun [7616-06]S2, [7616-13]S3
Xing, Da [7565-21]SPS1, [7565-22]SPS1, [7565-23]SPS1
Xing, Xiaoman [7551-06]S2
Xiong, Boqian [7606-18]S6, [7606-20]S6
Xiong, Chuanbing [7617-48]S10
Xiong, Wei [7585-07]S2
Xu, Xiangqian [7602-03]S1, [7602-12]S3
Xu, Aqing [7557-27]SPS1
Xu, Ben B. [7587-01]S1
Xu, Bing [7615-16]S4
Xu, Chang-Qing [7555-27]S6
Xu, Chenyang [7554-02]S1
Xu, Chris [7569-65]S9, [7569-89]SPS1, [7569-92]SPS1
Xu, Dan-Xia [7594-28]S8, 7606 ProgComm, [7606-10]S4, [7606-13]S5
Xu, Dapeng [7583-01]S1, [7583-04]S1, [7583-46]SPS2
Xu, Di [7609-26]S6
Xu, Feng [7551-17]S4
Xu, Gang [7590-23]SPS2
Xu, Gangyi [7616-41]S9
Xu, Guoyang [7615-14]S4, [7615-16]S4
Xu, J.-M. [7575-48]S10
Xu, Jeff S. [7550-61]SPS1, [7556-28]S7, [7567-19]S4, [7567-20]S4
Xu, Jian [7609-12]S3, 7610 ProgComm, [7610-03]S1
Xu, Jingjun [7598-02]S1
Xu, Kexin [7553-26]SPS1, [7563-20]SPS1, [7563-21]SPS1, 7572 ProgComm, [7572-17]SPS1, [7572-25]SPS1, [7572-26]SPS1
Xu, Lina [7589-20]S6
Xu, Min [7573-33]S8
Xu, Qi [7571-02]S1
Xu, Qinghua [7610-38]SPS3
Xu, Ronald X. [7550-61]SPS1, [7551-32]S7, [7556-28]S7, [7557-16]S4, [7567-19]S4, [7567-20]S4
Xu, Songbo [7551-32]S7, [7557-16]S4
Xu, Weiwei [7611-35]S7
Xu, Xianfan [7584-30]S11, [7585-05]S2, 7586 ProgComm, 7586 S1 SessChr
Xu, Xiaodong [7611-20]S5
Xu, Xiaoyin [7569-20]S3
Xu, Yong 7609 ProgComm
Xu, Zhengbin [7554-81]S12, [7573-32]S8
Xu, Zhihua [7571-22]S6
Xu, Zhizhan [7584-45]SPS2, [7585-12]S3
Xudong, Yang [7599-54]SPS3
Xue, Weiqi [7612-35]S9
- Y**
- Yaacobovitz, Barak [7608-65]S14
Yablou, Andrew D. SC974 Inst, [7580-40]S10
Yablouovitch, Eli 7609 ProgComm
Yachimski, Patrick S. [7554-10]S2
Yadav, Amrita [7553-18]S5
Yadav, R. P. [7598-66]SPS3
Yadav, Rahul [7550-22]S4
Yadav, Raj B. [7564-101]SPS1
Yagi, Tetsuya [7583-02]S1
Yakovlev, Dmitri R. [7600-60]S14
Yakovlev, Vladislav V. [7553-16]S4, [7568-51]S4, [7569-15]S3
Yakovlev, Yury P. [7608-61]S13
Yalamanchili, Prasad [7583-17]S4
Yalcin, Ayca [7553-17]S5
Yamada, Akihiro [7554-94]SPS1
Yamada, Hirohito [7606-48]SPS3
Yamada, Hiroki [7586-21]SPS2
Yamada, Koji [7606-27]S8
Yamada, Toru [7557-30]SPS1
Yamada, Yasufumi [7597-28]S7
Yamada, Yukio [7557-20]SPS1
Yamaguchi, Ichirou 7619 ProgComm
Yamaguchi, Kazuhiro [7619-08]S2
Yamaguchi, Kenzo [7577-45]SPS1, [7604-48]SPS3
Yamaguchi, Masahiro [7619-09]S2
Yamaguchi, Takeshi [7619-23]SPS3
Yamaji, Masahiro [7589-26]S7
Yamakawa, Koichi [7589-18]S5
Yamakawa, Shiro 7587 ProgComm, [7587-02]S1, [7587-12]S2, [7587-24]S4
Yamakoshi, Manabu [7618-11]S2
Yamamoto, Hajime [7598-06]S2
Yamamoto, Hirosada [7548D-110]S2
Yamamoto, Kenji 7575 Chr, 7575 S11 SessChr, [7575-38]SPS1
Yamamoto, Kenji [7619-05]S1, [7619-34]SPS3
Yamamoto, Michiharu [7599-22]S6, [7619-41]S4
Yamamoto, Naokatsu [7621-22]S6
Yamamoto, Tsuyoshi [7610-12]S3
Yamamoto, Yoshihisa [7611-21]S5, [7611-22]S5
Yamanaka, Takeshi [7561-43]SPS1
Yamanari, Masahiro [7550-14]S3, [7550-24]S5, [7550-25]S5, [7554-58]S9
Yamanishi, Masamichi [7616-61]S14
Yamaoka, Yoshihisa [7564-98]SPS1
Yamashita, Daisuke [7561-43]SPS1
Yamashita, Naoto [7598-64]SPS3
Yamashita, Yoji [7602-76]S11, [7602-76]SPS3
Yamashita, Yutaka [7561-43]SPS1, [7570-33]S7
Yamauchi, Toyohiko [7568-66]S4
Yamauchi, Toyohiko [7570-33]S7
Yan, Han [7557-07]S2, [7557-35]SPS1
Yan, Hung-Jung [7604-19]S4
Yan, Ping [7564-124]SPS1
Yan, Rongjin [7559-14]S, [7606-11]S4
Yan, Weiqiang [7568-63]S4
Yan, Xin [7598-58]SPS3
Yanagimachi, Shigenari [7607-07]S2
Yanai, Hideo [7558-14]S3
Yanez, Ciceron O. [7576-46]S11, [7576-47]S11, [7576-59]SPS1
Yang, Byungchoon [7617-04]S2
Yang, Changhui [7570-08]S2, [7570-10]S3, [7574-10]S1
Yang, Chaobo [7612-14]S3
Yang, Chen [7564-86]S12
Yang, Chih-Chung [7554-06]S1, [7554-11]S2, [7554-33]S5, 7600 ProgComm, 7602 ProgComm, [7602-08]S2, [7602-60]S14, [7609-18]S4, 7617 S6 SessChr, [7617-30]S6
Yang, Chih-Kai [7617-45]S9
Yang, Chun-Ting [7617-09]S2
Yang, Cong-Hui [7559-09]S
Yang, De-Ming [7556-02]S1
Yang, Eui-Hyeok [7592-22]S5
Yang, Fang [7557-02]S1, [7557-22]SPS1, [7557-24]SPS1
Yang, Guang Hua [7606-43]SPS3
Yang, Guoguang [7591-21]S5
Yang, Hao-Chung [7557-10]S3, [7564-12]S2
Yang, Hongjun [7609-12]S3
Yang, Hongqin [7557-27]SPS1
Yang, Hongwei [7578-77]SPS2
Yang, Hua [7598-60]SPS3, [7604-18]S4
Yang, Huai [7618-24]S7
Yang, Ji Won [7602-66]S15, [7602-70]S11, [7602-70]SPS3
Yang, Jin-Kyu [7618-44]SPS3
Yang, Joel K. W. [7591-10]S3
Yang, Joon-Mo [7564-12]S2
Yang, Joseph [7617-72]S10
Yang, Kai-Min [7554-11]S2, [7554-33]S5
Yang, Lian Xiang [7548F-141]S1
Yang, Lijun [7600-51]S12
Yang, Liu [7604-47]S9
Yang, Owen [7573-06]S2
Yang, P. [7618-14]S9
Yang, Pengyuan [7606-20]S6
Yang, Qian [7548F-143]S1
Yang, Quankui K. [7608-08]S2, [7616-60]S14
Yang, R. Q. [7587-27]S4
Yang, Renjie [7572-26]SPS1
Yang, Rui Q. [7608-72]S14, [7616-47]S11
Yang, Ruoxi [7604-44]S9
Yang, Sangsik [7592-23]S5, [7592-26]S5, [7592-28]S5
Yang, Sean [7568-91]S5
Yang, Seungjoon [7570-38]S7
Yang, Shu 7609 S7 SessChr, [7609-25]S6
Yang, Sihua [7565-22]SPS1
Yang, Tian [7577-26]S6, [7604-42]S9
Yang, Tianxin [7601-20]S4
Yang, Victor X. [7551-22]S6, [7554-34]S5, [7554-35]S6, [7554-43]S7, [7558-29]SPS1
Yang, Weiguo [7598-37]S9
Yang, Wenzhong [7568-10]S4, [7568-79]S1, [7570-43]SPS1, [7574-07]S1, [7575-40]SPS1
Yang, Xiao Dong V. [7580-100]SPS2, [7580-101]SPS2, [7580-102]SPS2, [7589-14]S4
Yang, Xiaodong [7583-51]SPS2
Yang, Xiaodong [7605-15]S6, [7609-11]S3
Yang, Xinmai [7564-28]S4
Yang, Ye [7572-18]SPS1
Yang, Yifeng [7578-50]S12
Yang, Ying 7566 ProgComm, 7566 S2 SessChr, [7566-07]S2, [7566-09]S2, [7566-18]S4
Yang, Yu [7599-47]S12
Yang, Zhihong H. [7616-17]S4
Yang, Zhiyong [7559-29]S, [7559-30]S
Yang, Zhou [7599-11]S3
Yanik, Mehmet F. [7568-42]S3
Yanina, Irina Y. [7563-30]SPS1
Yannick, Ledemi [7598-01]S1
Yano, Tetsuji [7598-50]S12, [7604-32]S7
Yanson, Dan A. [7583-50]SPS2
Yao, Chunjing [7578-73]SPS2
Yao, Hai [7566-20]S4
Yao, Jie [7598-37]S9
Yao, Jin [7607-02]S1, [7607-11]S3
Yao, Jun [7595-22]S4
Yao, Junjie [7564-01]S1, [7564-05]S1, [7564-06]S1, [7564-91]SPS1
Yao, Minyu [7621-11]S3
Yao, Peng [7599-20]S5
Yao, Sheng [7576-47]S11, [7576-59]SPS1, [7599-29]S8, [7599-61]SPS3
Yao, Takafumi [7602-01]S1
Yao, Xin-Cheng [7548E-139]S4, [7550-13]S3, [7570-22]S5
Yao, Yu [7608-14]S3
Yao, Zhidong [7582-26]S6, [7582-29]S7
Yap, Kuan Pei [7606-23]S7
Yaqoob, Zahid [7568-65]S6
Yarborough, Michael J. [7597-25]S6
Yaroslavsky, Anna N. [7555-68]SPS1, [7563-31]S5, [7601-03]S1
Yase, Kiyoshi [7590-22]SPS2
Yaseen, Mohammad A. [7548E-124]S1, [7569-91]SPS1
Yashkov, Mikhail V. [7580-43]S10
Yasrebi, Navid [7609-49]S11
Yassen, Michael [7608-65]S14
Yasuda, Keiko [7589-45]SPS2
Yasuda, Ryohei [7569-87]SPS1
Yasuno, Yoshiaki [7550-14]S3, [7550-24]S5, [7550-25]S5, [7550-57]S11, 7554 ProgComm, [7554-13]S3, [7554-38]S6, [7554-58]S9
Yasuoka, Fatima M. M. [7578-72]SPS2
Yata, Yoshihiro [7603-62]SPS3
Yatagai, Toyohiko 7619 ProgComm
Yatsui, Takashi [7586-12]S3
Yavtushenko, Marina [7580-81]SPS2
Yazdanfar, Siavash [7561-35]S5, [7569-64]S9
Yazici, Birsen 7557 ProgComm
Yazinski, Stephanie A. [7569-39]S6
Ye, Changgeng [7580-41]S10
Ye, Jing Y. [7553-02]S3
Ye, Jong-Chul [7570-44]SPS1
Ye, Peng [7596-12]S3
Ye, Winnie N. [7591-12]S3
Ye, Yungpeng [7569-64]S9, [7576-36]S9
Yegnanarayanan, Siva [7569-79]SPS1
Yeh, Dong-Ming [7609-18]S4
Yeh, H. [7618-14]S9
Yeh, Hsin-Chih [7576-20]S5
Yeh, Hung-I [7575-06]S3, [7575-22]S8
Yeh, Jui-Hung [7602-08]S2
Yeh, Ping-hui S. [7602-71]S11, [7602-71]SPS3
Yeh, Yu-Wen [7591-38]SPS2
Yehezkel, Oren [7550-10]S2, [7550-83]SPS1
Yelin, Dvir [7558-01]S1, [7558-03]S1
Yelissev, Alexander P. [7582-13]S4
Yelton, Graham [7590-14]S3
Yen, Sheng-Hong [7597-75]SPS3
Yen, Wei-Ting [7556-25]S6
Yeo, Joon Hock [7560-01]SPS1
Yeoh, Khay Guan [7591-11]S1
Yeshua, Talia [7591-30]S7
Yesilkoy, Filiz [7605-13]S5
Yi, Dingrong [7557-13]S3, [7560-27]SPS1
Yi, Fei [7599-18]S5
Yi, Gyu-Chul [7617-49]S10
Yi, Ji [7554-26]S4
Yi, Jonghoon [7578-80]SPS2
Yi, Junsin [7603-15]S3
Yi, Steven X. [7557-39]SPS1
Yi, Zhangjing [7559-20]S
Yih, T. C. 7590 ProgComm
Yilmaz, Tolga [7580-03]S1
Yim, Jong Hyuk [7578-81]SPS2
Yin, Dongliang [7607-31]S8
Yin, Guang-Yu [7612-32]S9
Yin, Huijuan [7548B-59]S6, [7549-10]S2
Yin, Jiechen [7554-07]S2, [7557-10]S3
Yin, Yadong [7593-03]S1, [7609-40]S9
Yoboue, Pamela [7590-21]SPS2
Yoder, Douglas [7602-44]S9

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Yodh, Arjun G. 7557 ProgComm
Yofis, Boris [7608-65]S14
Yokouchi, Noriyuki 7615 ProgComm
Yokoyama, Hiroshi 7618 ProgComm,
7618 S8 SessChr, [7618-18]S5
Yokoyama, Shiyoshi 7599 S7 SessChr,
[7599-15]S4
Yonai, Jun [7598-32]S8
Yonemura, Masatoshi [7605-07]S2
Yoo, Han G. [7606-39]S10
Yoo, Hongki [7548C-79]S2, [7557-11]
S3, [7558-02]S1, [7558-04]S1,
[7558-16]S4
Yoo, Simon S. [7565-04]S2
Yoo, Sou Young [7610-36]SPS3
Yoon, Byong-Ho [7618-09]S2
Yoon, Euijoon 7602 CoChr, 7602 S9
SessChr
Yoon, Geun-Young [7550-22]S4
Yoon, Jeong-Ae [7599-03]S1
Yoon, Jonghee [7568-45]SPS1
Yoon, Mina [7586-13]S3
Yoon, Min-Seok [7598-20]S5
Yoon, Soon Joon [7564-118]SPS1
Yoon, Tae-Hoon 7618 S2 SessChr,
[7618-30]S8
Yoon, Tae-Young [7618-21]S6
Yoshida, Harumasa [7602-76]S11,
[7602-76]SPS3
Yoshida, Hidetsugu [7618-16]S4
Yoshida, Ken [7564-47]S7
Yoshida, Naruki [7619-31]SPS3
Yoshie, Tomoyuki [7609-27]S6
Yoshihara, Toshitada [7576-75]S2
Yoshihumi, Mizuno [7556-34]SPS1
Yoshikawa, Hiroshi [7619-23]SPS3
Yoshimi, Tomoaki [7597-79]SPS3
Yoshimoto, Kenji [7561-43]SPS1
Yoshimoto, Naoto [7620-04]S2
Yoshimura, Elisabeth [7567-08]S2
Yoshimura, Tetsuzo 7607 ProgComm
Yoshinaga, Yukiyasu [7550-69]SPS1
You, Guanjun [7610-38]SPS3
You, Jungmok [7599-03]S1
You, Xiaoli [7617-48]S10
Young, Erica [7548A-04]S
Young, Geoffrey S. [7569-20]S3
Young, M. [7554-93]SPS1
Yow, Christine M. N. [7565-15]S4
Yu, Alexey Dan Chin [7575-44]S8
Yu, Anthony W. [7578-01]S1, [7578-
06]S2, [7578-08]S2, [7578-09]S2,
[7582-19]S5
Yu, Bong-Ahn [7555-58]SPS1
Yu, Che-Hang [7569-51]S7
Yu, Chin-Ping [7609-35]S8, [7609-56]
SPS3, [7609-57]SPS3
Yu, Guoqiang [7548D-120]S4, [7557-
08]S2
Yu, Hanry [7569-61]S9
Yu, Hsin-Chieh [7598-43]S10
Yu, Jae Su 7608 S2 SessChr, [7608-
36]S8
Yu, Jirong [7578-02]S1
Yu, Jiun Yann [7569-71]SPS1, [7568-
75]S2
Yu, Joe X. Z. [7584-31]S11, [7590-02]
S1
Yu, Julia [7570-17]S4
Yu, Lifeng [7548C-86]S3, [7548E-
123]S1, [7554-07]S2, [7554-86]
SPS1, [7554-102]SPS1, [7554-106]
SPS1, [7569-83]SPS1
Yu, Li-Ping [7573-46]SPS1
Yu, Mingbin [7609-11]S3
Yu, Mingxi [7565-24]SPS1
Yu, Nan [7582-08]S3
Yu, Nanfang [7616-27]S6
Yu, Ping [7603-43]S10, [7603-58]
SPS3, [7619-12]S3
Yu, S. Q. [7616-07]S2
Yu, Sheng-Fu [7602-10]S2, [7602-57]
S13
Yu, Shui-Qing [7597-08]S2, [7614-11]
S3, [7617-11]S3
Yu, Shuqing [7597-03]S1
Yu, Tian [7568-81]SPS1
Yu, Wan-Chun [7575-06]S3
Yu, Yingqiu [7548A-23]S
Yu, Yuwen [7610-29]S7
Yu, Zongfu [7604-23]S5, [7605-22]S8
Yuan, Baohong [7564-83]S12, [7564-
117]SPS1
Yuan, Chi-Tsu [7576-38]S9
Yuan, Jiayue [7610-37]S5
Yuan, Jie [7579-47]SPS2
Yuan, Jing [7571-26]S7
Yuan, Jingli [7568-36]S5
Yuan, Min [7551-06]S2
Yuan, Ping [7608-82]S17
Yuan, Ping [7612-14]S3
Yuan, Shuai [7555-51]S10, [7563-19]
S4
Yuan, Xiacong [7566-20]S4
Yuan, Yijia [7588-12]S3
Yuan, Zhen [7548F-172]S
Yudovsky, Dmitry [7555-40]S8,
[7555-59]SPS1
Yuen, Horace P. 7611 ProgComm
Yum, Honam [7612-17]S4
Yun, Jonghee [7562-16]S4
Yun, Lijuan [7568-31]SPS1
Yun, Seok-Hyun [7569-88]SPS1
Yunusova, Ekaterina [7548B-41]S2
Yurtsever, Gunay [7554-46]S7
Yust, Brian G. [7562-12]S3
Yuste, Rafael [7548G-154]S2
Yusuke, Morita [7556-34]SPS1
Yvind, Kresten [7615-09]S3
-
- Z**
- Zablocki, Mathew J.** [7606-30]S8,
[7609-22]S5, [7599-20]S5
Zacharia, Nicole [7593-06]S1, [7609-
38]S9
Zachariah, Leslie [7569-62]S9
Zacharovas, Stanislovas J. [7619-22]
SPS3
Zadيرانov, Yurii M. [7609-16]S4
Zagainova, Elena V. [7577-25]S6,
[7548B-41]S2
Zahir, Mustapha [7594-39]S8
Zahoor, Abbasi A. [7575-35]S11
Zaidi, Syed R. [7620-03]S2, [7620-05]
S2, [7620-12]S4
Zajac, Marcin [7602-11]S3
Zakgeim, Aleksandr L. [7609-16]S4
Zaldivar Huerta, Ignacio E. [7620-08]
S3, [7620-10]S3
Zalevsky, Zeev [7550-10]S2, [7550-
83]SPS1
Zam, Azhar [7555-42]S9
Zamkotsian, Frederic [7594-26]S7,
[7596-13]S3
Zangerl, Gerhard [7564-25]S4
Zanin, Fatima Antonia A. [7552-15]S3
Zanin, Iriana C. J. [7549-17]S
Zanoni, Enrico [7617-23]S4
Zaouter, Yoann [7589-36]S5, [7589-
36]S9
Zappa, Franco [7556-15]S4, 7608
ProgComm, 7608 S18 SessChr,
[7608-84]S18
Zarrabi, Nawid [7569-29]S4, [7571-24]
S7
Zavada, John M. [7578-89]SPS2,
7598 ProgComm, [7598-44]S10,
[7602-13]S3, 7603 S5 SessChr,
7608 S2 SessChr
Zavala, Laura [7583-17]S4
Zavaleta, Cristina [7560-17]S5,
[7560-19]S1, [7574-05]S1
Zavislán, James [7570-24]S5
Zawadzki, Robert J. [7550-36]S7,
[7550-89]SPS1, [7554-105]SPS1
Zawieja, David [7572-20]SPS1
Zawilski, Kevin T. [7582-15]S4, [7582-
44]S10
Zawischa, Ivo [7578-10]S3
Zayat, Marcos [7598-03]S1
Zayats, Anatoly V. [7617-29]S6
Zbiec, Anna [7563-16]S3
Zdobnova, Tatiana A. [7575-34]S10
Zediker, Mark S. 7583 Chr
Zegaoui, Malek [7608-35]S8
Zehnder, Ulrich [7617-23]S4
Zeimer, Ute [7616-52]S12
Zeira, Evelyn [7589-11]S4
Zeldovich, Boris [7598-28]S7
Zeller, Wolfgang [7583-26]S6
Zemp, Roger [7564-03]S1, [7564-14]
S3, [7564-32]S5, [7564-68]S10,
[7564-72]S10
Zeng, Haishan 7548A Chr, 7548A S
SessChr, [7548A-16]S, [7548A-23]
S, [7560-21]S1, [7562-09]S2
Zeng, Linfei [7583-20]S5
Zeng, Qing [7569-20]S3
Zeng, Shaocun [7548G-165]SPS1,
7572 ProgComm
Zeng, Xiaoyan [7584-34]S11
Zeng, Yining [7571-02]S1
Zeni, Luigi [7606-08]S3
Zenidaka, Akira [7584-15]S6, [7584-
15]S10, [7609-58]SPS3
Zentel, Rudolf [7618-28]S7
Zeringue, Clint [7580-53]S12, [7580-
93]SPS2
Zervas, Michalis N. [7598-18]S4,
[7580-92]SPS2
Zeuner, Michael [7591-33]S8
Zeylikovich, Iosif S. [7561-06]S1,
[7582-56]SPS2
Zezell, Denise M. [7549-14]S2
Zhai, Jiahuan [7548E-128]S2
Zhan, Chun [7569-64]S9
Zhan, Qiwen [7580-108]SPS2, [7582-
25]S6, [7604-45]S10
Zhang, Arthur [7591-05]S2, [7608-47]
S10
Zhang, Chunying [7618-27]S7
Zhang, Da [7563-04]S1
Zhang, Edward [7564-29]S5, [7564-
45]S7
Zhang, Fei [7584-34]S11
Zhang, Feng [7575-16]S6
Zhang, Guojin [7548A-22]S
Zhang, Hao F. [7554-29]S5, [7564-64]
S9
Zhang, Huajin [7578-77]SPS2
Zhang, Hui [7571-06]S2
Zhang, Huijing [7584-19]S7, [7584-19]
S11
Zhang, Jane Y. [7567-18]S4
Zhang, Jian [7569-01]S, [7571-23]S6
Zhang, Jian [7576-52]SPS1
Zhang, Jing Bo [7577-21]S5
Zhang, Jingxin [7572-25]SPS1
Zhang, Jun [7554-07]S2, [7554-53]S8,
[7554-102]SPS1
Zhang, Jun [7570-38]S7
Zhang, Junying [7617-72]S10
Zhang, Kai-Yan [7602-71]S11, [7602-
71]SPS3
Zhang, Kaiyin [7548C-100]S5
Zhang, Labao [7611-35]S7
Zhang, Leilei [7550-61]SPS1
Zhang, Limin [7557-20]SPS1, [7557-
23]SPS1
Zhang, Mao Gen [7576-23]S6
Zhang, Nan 7590 ProgComm, 7590
S1 SessChr
Zhang, Peng [7583-45]SPS2
Zhang, Ping [7592-36]SPS2
Zhang, Qi [7575-23]S8
Zhang, Qiang [7583-01]S1
Zhang, Qiang [7564-66]S9
Zhang, Qiang [7611-21]S5
Zhang, Qizhi [7548F-172]S
Zhang, Rong [7602-03]S1, [7602-12]
S3
Zhang, Ruozhen [7548E-130]S3
Zhang, Sasa [7581-10]S3
Zhang, Shaojuan [7576-75]S2
Zhang, Shiguo [7583-01]S1, [7583-04]
S1, [7583-46]SPS2
Zhang, Shiyong [7616-38]S9
Zhang, Shuying [7586-14]S3
Zhang, Weina [7568-30]SPS1
Zhang, Weiwei [7565-19]SPS1
Zhang, Wenfu [7609-52]S11
Zhang, Xiang-Hua [7559-30]S, [7598-
01]S1
Zhang, Xiangxue [7619-12]S3
Zhang, Xianmin [7599-15]S4
Zhang, Xiaofeng [7557-04]S1
Zhang, Xiaoguang [7609-48]S11
Zhang, Xiaojing [7591-11]S3
Zhang, Xi-Cheng SC547 Inst, [7601-
19]S4
Zhang, Xingyu [7581-10]S3
Zhang, Xinpeng [7583-45]SPS2
Zhang, Xiqin [7560-01]SPS1
Zhang, Yang [7562-46]SPS1
Zhang, Yong-Hang [7597-08]S2,
7614 ProgComm, [7614-11]S3,
[7616-07]S2, [7617-11]S3
Zhang, Yuan [7590-29]S
Zhang, Yuhua [7550-72]SPS1
Zhang, Yuhua [7612-14]S3
Zhang, Yun [7599-10]S3
Zhang, Yun [7602-44]S9
Zhang, Yun-Dong [7612-14]S3
Zhang, Zeng [7602-12]S3
Zhang, Zhipeng [7568-50]S3
Zhang, Zhongxing [7548E-128]S2
Zhang, Zhuopeng [7601-02]S1
Zhang, Zichen [7618-46]S10
Zhao, Chengliang [7588-24]S4
Zhao, Chun-Mei [7548B-58]S6
Zhao, Chunnong [7579-42]S10
Zhao, Daomu 7588 ProgComm
Zhao, Futing [7560-27]SPS1
Zhao, Hong [7600-69]SPS3
Zhao, Hongping [7597-17]S4, [7597-
58]S12, [7602-29]S6, [7602-52]
S12, [7617-33]S6
Zhao, Huijun [7557-20]SPS1,
[7557-22]SPS1, [7557-23]SPS1,
[7557-24]SPS1, [7557-25]SPS1,
[7563-20]SPS1, [7566-14]S3,
[7570-45]SPS1
Zhao, Jianhua [7548A-16]S, [7548A-
23]S
Zhao, Ling-Juan [7604-20]S4
Zhao, Lingling [7569-74]SPS1
Zhao, Livia [7615-03]S1
Zhao, Ming [7555-23]S, [7574-16]S3
Zhao, Mingtao [7550-19]S4, [7554-20]
S3
Zhao, Wei [7609-52]S11
Zhao, Weian [7576-07]S2
Zhao, Yan Zhu 7592 ProgComm
Zhao, Youquan [7548D-120]S4
Zhao, Youquan [7557-08]S2
Zhao, Zhiguo [7579-49]SPS2
Zharov, Vladimir P. 7563 ProgComm,
7564 ProgComm, 7564 S8
SessChr, [7564-39]S6, [7564-51]
S8, 7565 ProgComm
Zhdanov, Boris V. [7581-14]S4

Zhen, Q. [7558-22]S5, [7558-22]S1
 Zheng, Bo [7609-05]S2
 Zheng, Changda [7617-48]S10
 Zheng, Dawei [7607-03]S1
 Zheng, Desheng [7574-03]S1
 Zheng, Guoan [7570-08]S2, [7574-10]S1
 Zheng, Huimin [7580-69]SPS2, [7580-96]SPS2
 Zheng, Jia [7556-24]S6
 Zheng, Jie [7576-72]SPS1
 Zheng, Lei Zak [7576-01]S1
 Zheng, Rui [7577-09]S3
 Zheng, TianHang [7599-46]S12
 Zheng, W [7560-11]S1
 Zheng, Wei [7568-33]S1
 Zheng, Wei [7569-61]S9
 Zheng, Wei [7569-76]S9
 Zheng, Wei [7569-126]SPS1
 Zheng, Wenjun [7599-50]SPS3
 Zheng, Xiang [7576-01]S1
 Zheng, Xuezhe [7607-01]S1, [7607-02]S1, [7607-11]S3
 Zheng, Yongtang [7548B-59]S6
 Zheng, Youdou [7602-12]S3
 Zheng, Zhiping [7599-42]S11
 Zhivov, Andrey [7550-49]S10
Zhong, Jingang [7570-07]S2
 Zhong, Zhangyi [7550-34]S7
 Zhong, Zhong [7559-20]S
 Zhou, Anhong [7568-81]SPS1
 Zhou, Chao [7554-08]S2, [7554-49]S8, [7558-20]S4, [7570-19]S4
 Zhou, Fei [7564-111]SPS1
 Zhou, Hailong [7583-04]S1
 Zhou, Jack [7598-37]S9
 Zhou, Lin [7608-21]S5
 Zhou, Ming Zhe [7617-13]S3
 Zhou, Qifa [7557-10]S3, [7564-12]S2
Zhou, Renjie [7580-108]SPS2, [7582-25]S6
 Zhou, Shengming [7602-12]S3
 Zhou, Shuiqin [7575-15]S6
 Zhou, Tiffany [7557-38]SPS1
 Zhou, Ting [7575-15]S6
Zhou, Weidong [7606-29]S8, [7609-12]S3
 Zhou, Xiaoqing [7566-14]S3
 Zhou, Yinhua [7617-48]S10
 Zhou, Yue [7582-27]S6
 Zhou, Yunshen [7585-07]S2, [7585-08]S2, [7585-09]S2
 Zhu, Dan [7562-46]SPS1
Zhu, Quing 7564 ProgComm, [7564-78]S11, [7564-127]SPS1, [7564-130]SPS1
Zhu, Timothy C. [7551-07]S2, [7551-08]S2, [7551-10]S3, [7551-11]S3, [7551-13]S3, [7551-36]SPS1, [7551-37]SPS1, [7551-38]SPS1, [7551-43]SPS1
 Zhu, Xiushan [7579-18]S5, [7599-39]S10, [7599-42]S11
Zhu, Yizheng [7573-18]S4, [7573-24]S6
 Zhuyikov, Serge [7603-51]S11
 Zhuo, Zong Yan [7569-71]SPS1
 Zibik, Evgeny A. [7616-56]S13
 Zibrov, Alexander S. [7582-61]SPS2
 Zich, Inge M. [7548A-31]SPS1
 Ziebarth, Noël M. [7550-86]SPS1
 Ziegler, Johann [7608-69]S15
 Ziegler, Mathias [7597-54]S12, [7616-52]S12
 Zielinski, Rafal [7561-50]SPS1
 Ziemer, Hagen [7583-08]S2
 Ziessel, Raymond [7572-12]S3, [7575-14]S5
 Zih, Hao-Ye [7551-35]SPS1
 Zilberman, Arkadi [7588-07]S2
 Zilian, Simon [7556-31]S8

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Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Zimer, Hagen [7580-92]SPS2
Zimmerley, Maxwell [7569-19]S3
Zimmerman, Joseph W. [7581-01]S1
Zimmermann, Bernhard 7569
ProgComm
Zimmermann, Heiko [7548A-03]S,
[7569-100]SPS1
Zimmermann, Herbert [7551-15]S4
Zimmermann, Lars [7604-17]S4,
[7606-41]S11
Zimnyakov, Dmitry A. 7563
ProgComm, 7572 ProgComm
Zimprich, Martin [7597-18]S4, [7616-
30]S7, [7616-30]S12
Zink, Jeffrey I. [7574-24]S4, [7576-17]
S5
Zinkovich, Joseph [7566-20]S4
Zinman, B. [7564-145]SPS1
Zinnkann, Steffen [7616-30]S7, [7616-
30]S12
Zinovchuk, Andriy V. [7617-22]SPS3
Zipfel, Warren R. [7548B-36]S1, 7569
ProgComm
Zivojinovic, Patrick [7598-16]S4
Zlotnik, Alex [7550-10]S2, [7550-83]
SPS1
Zobdeh, Parviz [7589-47]SPS2
Zoheidi, Mohamad [7598-15]S4
Zolichowski, Paul [7583-14]S3
Zolotovskaya, Svetlana [7564-87]
SPS1
Zolotovskii, Igor [7580-81]SPS2
Zondy, Jean-Jacques [7582-13]S4
Zong, Jie [7582-26]S6, [7582-29]S7
Zorba, Vassilia [7584-24]S9
Zordan, Michael D. [7553-06]S2,
[7593-21]S4
Zorila, Alexandru [7597-11]S3
Zorn, Martin [7583-29]S6
Zotova, Nonna [7597-16]S4
Zou, Fengmei [7559-22]S, [7572-18]
SPS1
Zou, Jun [7572-21]SPS1
Zou, Zhaohui [7548B-59]S6, [7549-10]
S2
Zrenner, Artur [7600-09]S2
Zschiedrich, Lin W. [7604-14]S3,
[7606-35]S9, [7609-62]SPS3
Zubairy, M. Suhail 7611 ProgComm,
7612 ProgComm
Zuck, Andreas [7578-31]S8
Zucker, Erik P. 7583 ProgComm, 7583
S2 SessChr, 7583 S5 SessChr,
[7583-17]S4
Zuclich, Joseph A. BO111 ProgComm
Zudaire Ubani, Enrique [7568-27]S5
Zumbusch, Andreas [7576-34]S9
Zunger, Alex [7597-06]S2
Zurk, Lisa M. [7601-07]S2
Zuzak, Karel J. 7596 ProgComm,
7596 S2 SessChr, [7596-03]S1
Zweiback, Jason S. [7581-15]S4,
[7581-16]S4
Zwick, Harry BO111 ProgComm

General Information

Registration

Onsite Registration and Information Hours

North Lobby

Saturday 23 January	7:00 am to 5:00 pm
Sunday 24 January	7:15 am to 5:00 pm
Monday 25 January	7:00 am to 5:00 pm
Tuesday 26 January	7:30 am to 5:00 pm
Wednesday 27 January	7:30 am to 5:00 pm
Thursday 28 January	7:30 am to 4:00 pm

Multiple facilities in downtown San Francisco may be used for courses, so please allow yourself enough time to register, pick up your materials and possibly walk to a nearby facility before your course begins.

Course Materials Desk

Located in the SPIE Registration Area

Open during Registration hours

If you have registered to attend a course or workshop, please stop by the Course Materials Desk to pick up your course notes and to find out where the class will be located. Pickup the latest Education Services catalog to see the many courses SPIE has available at the symposia, on video, DVD, and CD-ROM; and to discover the opportunities of customized In-Company courses.

Exhibition Hours

BiOS—Biomedical Optics Exhibition

South Hall A

Saturday 23 January	Noon to 5:00 pm
Sunday 24 January	10:00 am to 5:00 pm

Photonics West Exhibition

North Hall, South Hall

Tuesday 26 January	10:00 am to 5:00 pm
Wednesday 27 January	10:00 am to 5:00 pm
Thursday 28 January	10:00 am to 4:00 pm

SPIE Receipts, Badge Corrections, Cashier

North Lobby

Receipts - Preregistered attendees who did not receive a receipt prior to the meeting may obtain a new copy of their registration receipt onsite at the Badge Corrections and Receipts counter in the registration area.

Badge Corrections - Attendees who need a correction to their badge information onsite may do so at the Badge Corrections and Receipts counter in the registration area.

Cashier Station - If you are paying by cash or check as part of your onsite registration, wish to add a short course, workshop, or special event requiring payment, or have questions regarding your registration please see the onsite cashier at the Cashier station in the registration area.

Author/Presenter Information

Speaker Check-In Desk/Preview Station

Esplanade Level

Saturday through Thursday 7:30 am to 5:00 pm

All conference rooms will have a computer workstation, LCD projector, screen, lapel microphone, and laser pointer. All presenters are requested to come to the speaker check-in desk to confirm display settings of their presentations from their memory devices or laptops with the audiovisual equipment being used at this symposium.

Poster Setup Instructions

Room 103 and 104 (Exhibit Level)

Monday 25 January

BiOS conferences

Tuesday 26 January

LASE and MOEMS/MEMS conferences

Wednesday 27 January

OPTO conferences

Poster presenters must set up their posters between **10:00 am** and **5:00 pm** on the day of their assigned presentation.

- Paper numbers will be posted on the poster boards in numerical order; please find your paper number and post your poster in the designated space.
- A poster author or coauthor is required to stand by the poster during the scheduled poster session to answer questions from attendees.
- Presenters who have not placed their papers on their assigned board by 5:00 pm on the day of their presentation will be considered a “no show” and their manuscript will not be published.
- Presenters must remove their posters immediately after the poster session.
- Posters not removed will be considered unwanted and will be discarded.
- SPIE assumes no responsibility for posters left up after the end of each poster session.

General Information

SPIE Onsite Services

SPIE Marketplace & Souvenirs

Outside North Exhibit Hall

Open during Registration hours

The SPIE Marketplace is your source for the latest SPIE Press books, Proceedings, and Educational and Professional Development materials. Become a Member of SPIE, explore the Digital Library, and take home a souvenir.

Press Room

The on-site Press Room provides meeting space, refreshments, access to exhibitor press releases, and high-speed internet connections for the use of registered press covering the event. For more information about SPIE resources for the media, see <http://spie.org/pr>.

Internet Access

Concourse (Exhibit Level)

Saturday – Wednesday 7:30 am to 6:00 pm

Thursday 7:30 am to 4:00 pm

There will be multiple workstations allowing attendees to access their internet e-mail during the conference, and several Ethernet connections to use with your personal laptop. There will be a 10-minute time limit per each person's internet session.

WiFi

Complimentary WiFi access for attendees with 802.11b wireless enabled laptops and PDAs will be available Saturday through Thursday in the South Lobby and in the Concourse (exhibit level) near the SPIE Marketplace.

Business Services

Moscone Business Center

North End, Concourse (Exhibit Level, under main stairs/escalator)

The Moscone Business Center provides full service business needs for your convenience. They provide photocopying, faxing, computer workstations and printing services. Shipping is provided through UPS. Office supplies are also available. Phone 415-974-4080. Saturday through Thursday.

SPIE Message Center

Urgent messages only will be taken during registration hours Saturday through Thursday by calling: 415-905-1000.

Luggage/Package Storage and Coat Check

Room 134 (Exhibit Level)

Saturday through Thursday

Complimentary luggage/package and coat storage will be available to attendees.

Please note hours of operation posted onsite. If you intend to stay later than closing time, you will need to claim your checked items before this station closes.

Child Care Services

Child care services available in San Francisco:

1. **ABC Bay Area Child Care Agency**, 115 Lawton Street, San Francisco, CA 94122, Phone: 1-415-309-5662
2. **American Childcare Services**, 580 California Street, Suite 1600, San Francisco, CA 94104, Phone: 415-285-2300, www.americanchildcare.com

Note: SPIE does not imply an endorsement or recommendation of these services. They are provided on an "information-only" basis for your further analysis and decision. Other services may be available.

Concierge Desk

North Lobby

A Concierge Desk will be open during registration hours for sightseeing, shopping, and restaurant information.

Housing Desk

North Lobby

A housing desk will be open in the North Lobby Saturday through Tuesday; hours are posted at the desk.

Photonics West maps:

Moscone Maps	pp. 2–5
Hilton Hotel Map	p. 3
Area Map	p. 322

Food and Beverage Services

Coffee Breaks

Complimentary coffee will be served at approximately 10:00 am and 3:00 pm in the following locations:

Saturday AM	Esplanade Foyer
Saturday PM	South Hall A
Sunday AM	South Hall A
Sunday PM	South Hall A
Monday AM	Esplanade Foyer
Monday PM	Concourse (near Marketplace)
Tuesday through Thursday	All Exhibition Halls

Desserts

Saturday and Sunday

Served in the BIOS Exhibition, South Hall A

Tuesday through Thursday

Served in the North and South Exhibition Halls

Dessert snacks will be served from 3:00 to 3:30 pm. Complimentary tickets for the dessert will be included in course and conference attendee registration packets.

Meals and Refreshments

Refreshment Purchases

A variety of food outlets will be open Saturday through Thursday, on exhibit level serving breakfast and lunch items.

Policies

Audio/Video/Digital Recording Policy

In the Meeting Rooms and Poster Sessions: For copyright reasons, recordings of any kind are strictly prohibited without prior written consent of the presenter in any conference session, course or of posters presented. Each presenter being taped must file a signed written consent form. Individuals not complying with this policy will be asked to leave a given session and asked to surrender their film or recording media. Consent forms are available at the Speakers Check-In Desk.

In the Exhibition Hall: For security and courtesy reasons, photographing or videotaping individual booths and displays in the exhibit hall is allowed ONLY with explicit permission from onsite company representatives. Individuals not complying with this policy will be asked to surrender their film and to leave the exhibition hall.

Laser Pointer Safety Information

SPIE supplies tested and safety approved laser pointers for all conference meeting rooms, and for short course rooms if instructors request one. For safety reasons, SPIE requests that presenters use our provided laser pointers available in each meeting room.

If using your own laser pointer, have it tested at your facility to make sure it has <5 mW power output. Laser pointers in Class II and IIIa (<5 mW) are eye safe if power output is correct - but don't automatically trust the labeling. Commercially available laser pointers, red or green (or any color), could be incorrectly labeled as to their wavelength and power output.

Presenters intending to use their own laser pointer for presentations are required to come to the Speakers Check-In Desk onsite and test their pointer on our power meter. If the pointer fails the safe power level you may not use the pointer at the conference. You will be required to sign a waiver releasing SPIE of any liability for use of potentially non-safe laser pointers.

Use of a personal laser pointer at an SPIE event represents user's acceptance of liability for use of a non-SPIE supplied laser pointer device. Misuse of any laser pointer could lead to eye damage. In California, it is a criminal misdemeanor to shine a laser pointer at individuals "who perceive they are at risk."

Underage Persons on Show Floor

For safety and insurance reasons, no persons under the age of 16 will be allowed in the exhibition area during move-in and move-out. During open exhibition hours, only children over the age of 12 accompanied by an adult will be allowed in the exhibition area.

Unauthorized Solicitation

Unauthorized solicitation in the Exhibition Hall is prohibited. Any non-exhibiting manufacturer or supplier observed to be soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Unsecured Items

Personal belongings such as briefcases, backpacks, coats, book bags, etc., should not be left unattended in meeting rooms or public areas. These items will be subject to removal by security upon discovery.

General Information

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1. Hilton San Francisco Union Square
 333 O'Farrell Street, San Francisco, CA 94102
 Hotel Phone: 415-771-1400
 Hotel Fax: 415-771-6807



Hertz Car Rental is the official car rental agency for this Symposium. To reserve a car, identify yourself as a Photonics West Conference attendee using the Hertz Meeting Code CV# 029B0014

- In the United States call 1-800-654-2240.

Other Accommodations

2. Handlery Union Square Hotel

351 Geary Street
 San Francisco, CA 94102
 Hotel Phone: 415-781-7800
 Hotel Fax: 415-781-0269

3. Hotel Mark Twain

345 Taylor Street
 San Francisco, CA 94102
 Hotel Phone: 415-673-2332
 Hotel Fax: 415-673-0529

4. Hotel Nikko San Francisco

222 Mason Street
 San Francisco, CA 94102
 Hotel Phone: (415) 394-1111
 Hotel Fax: (415) 394-1173

5. Hotel Palomar

12 Fourth Street
 San Francisco, CA 94102
 Hotel Phone: 415-348-1111
 Hotel Fax: 415-348-0302

6. Intercontinental San Francisco

888 Howard Street
 San Francisco, CA 94103
 Hotel Phone: 415-616-6500
 Hotel Fax: 415-616-6581

7. King George Hotel

334 Mason Street
 San Francisco, CA 94102
 Hotel Phone: 415-781-5050
 Hotel Fax: 415-391-6976

8. Marriott Courtyard San Francisco Downtown

299 Second Street
 San Francisco, CA 94105
 Hotel Phone: 415-947-0700
 Hotel Fax: 415-947-0800

9. Marriott San Francisco

55 Fourth Street
 San Francisco, CA 94103
 Hotel Phone: (415) 896-1600
 Hotel Fax: (415) 486-8101

10. Parc55 Hotel

55 Cyril Magnin Street
 San Francisco, CA 94102
 Hotel Phone: (415) 392-8000
 Hotel Fax: 415-403-6602

11. Pickwick Hotel

85 5th Street
 San Francisco, CA 94103
 Hotel Phone: 415-421-7500
 Hotel Fax: 415-243-8066

12. Powell Hotel

28 Cyril Magnin Street
 San Francisco, CA 94102
 Hotel Phone: 415-398-3200
 Hotel Fax: 415-398-3654

13. Sir Francis Drake Hotel

450 Powell Street
 San Francisco, CA 94102
 Hotel Phone: 415-392-7755
 Hotel Fax: 415-391-8719

14. The Serrano Hotel

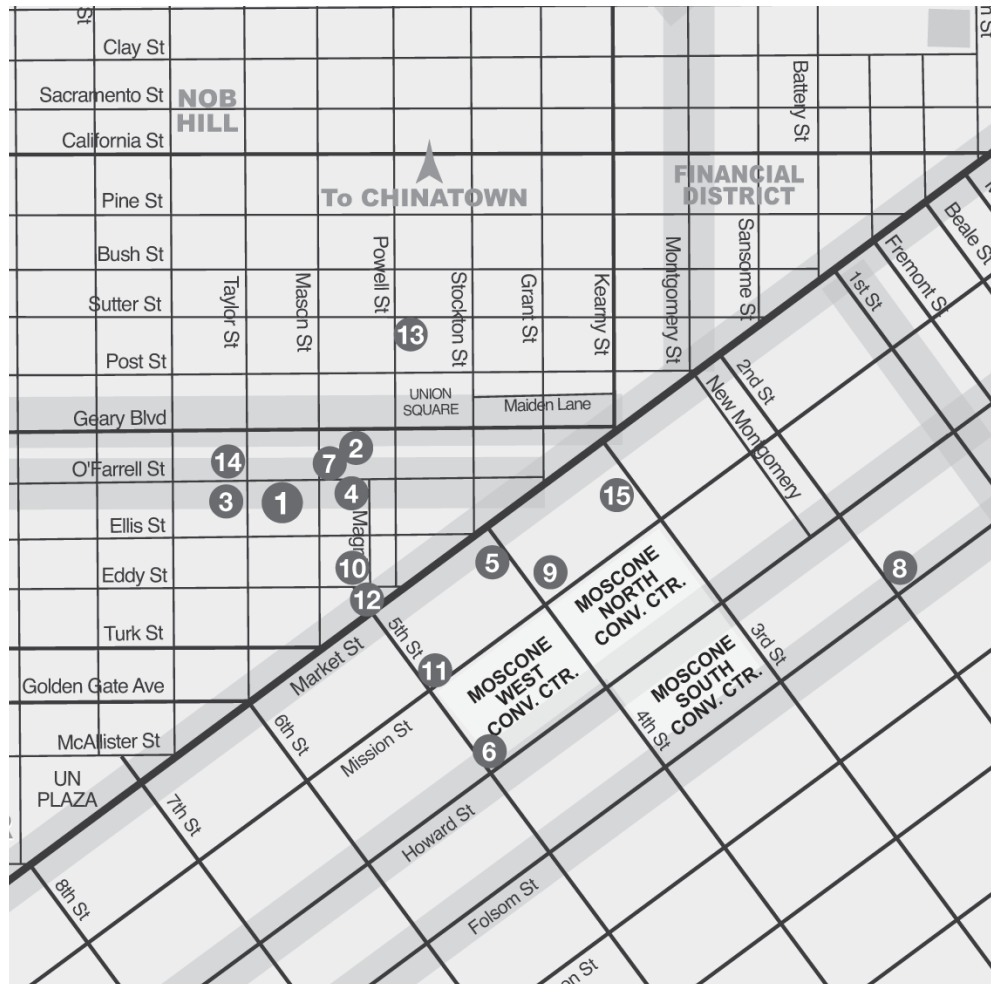
405 Taylor Street
 San Francisco, CA 94102
 Hotel Phone: 415-885-2500
 Hotel Fax: 415-474-4879

15. The Westin San Francisco Market Street Hotel

50 Third Street
 San Francisco, CA 94103
 Hotel Phone: 415-974-6400
 Hotel Fax: 415-543-8268

Parking During Photonics West

For parking information please check the SPIE website <http://spie.org/x24985.xml> or concierge desk located in Registration, North Lobby.



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