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2012 Photonics West[®]

21–26 January 2012

Technical Program
spie.org/pw12

Location

The Moscone Center
San Francisco, California, USA

Conference dates

21–26 January 2012

Exhibition dates

BiOS Expo:
21–22 January

Photonics West:
24–26 January

Technologies

- BiOS
- OPTO
- LASE
- MOEMS-MEMS
- Green Photonics



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2012 PhotonicsWest®

Conferences and Courses: 21–26 January 2012
 BIOS EXPO: 21–22 January 2012
 Photonics West Exhibition: 24–26 January 2012
 The Moscone Center · San Francisco, California, USA



BIOS | **LASE** | **MOEMS-MEMS** | **OPTO**



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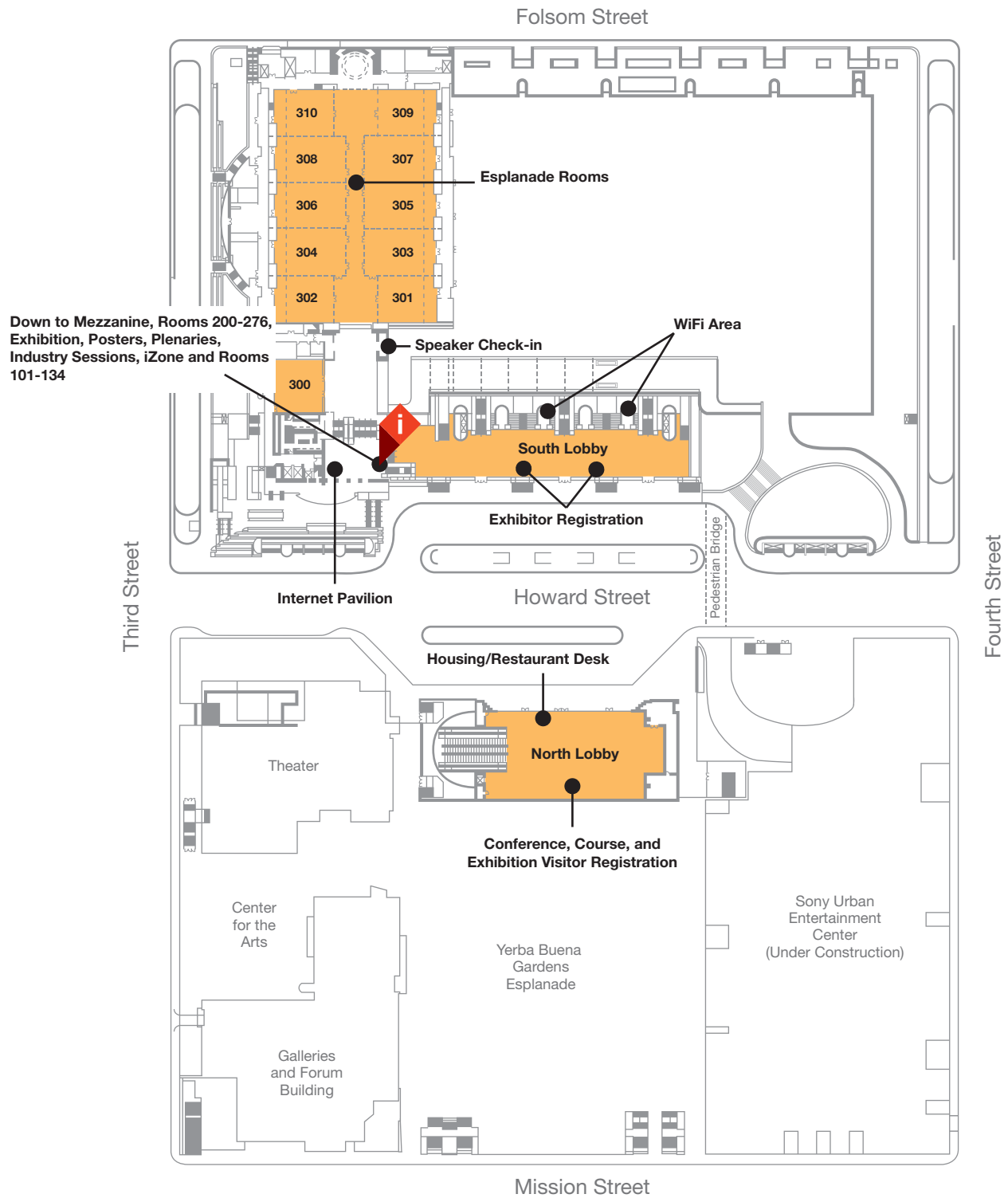
Proceedings of SPIE 394–395



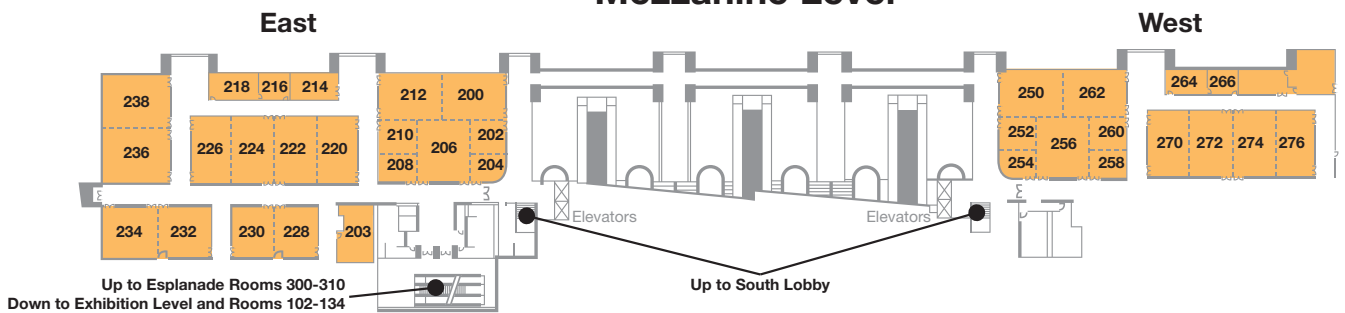
SPIE is the international society for optics and photonics founded in 1955 to advance light-based technologies. Serving approximately 180,000 constituents from more than 170 countries, the Society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent, and career and professional growth.

The Moscone Center

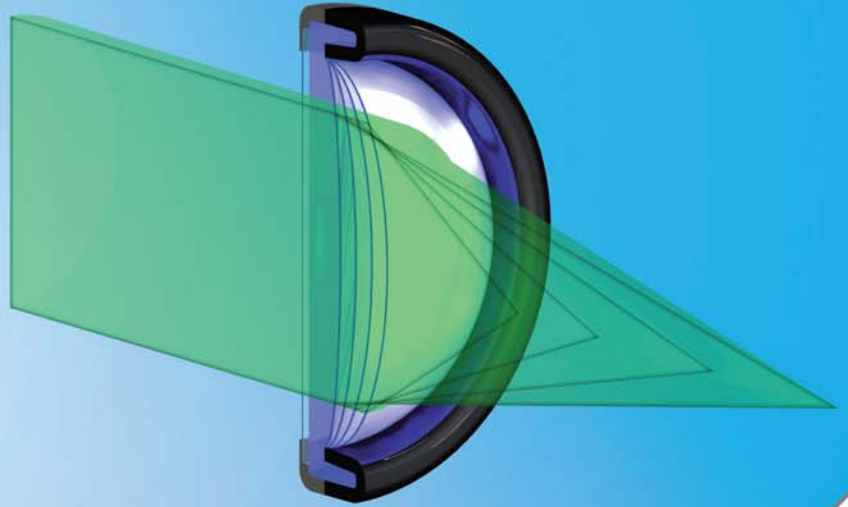
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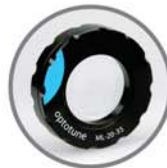
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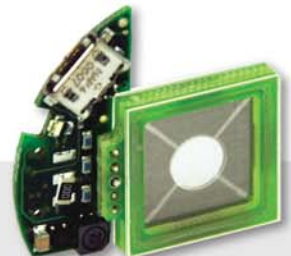
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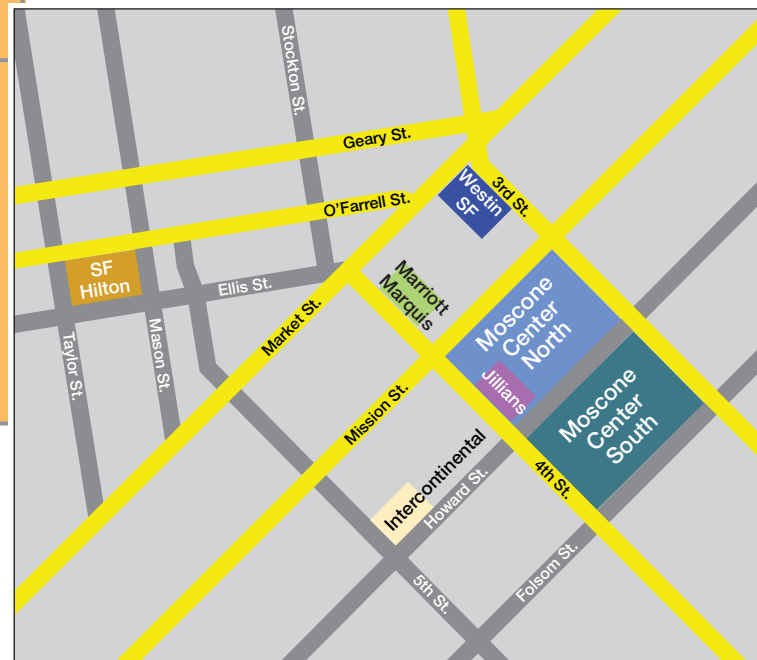
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EXHIBIT LEVEL

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Symposium Chairs



James Fujimoto
Massachusetts Institute of Technology (USA)



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

Photonic Therapeutics and Diagnostics

Program Chair: **Brian Jet-Fei Wong**, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA)

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

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

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LASE

SPIE Photonics West

Symposium Chairs



Friedhelm Dorsch

TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany)



Alberto Piqué

U.S. Naval Research Lab. (USA)

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Bo Gu

IPG Photonics Corp. (China)



Andreas Tünnermann,

Friedrich-Schiller-Univ. Jena (Germany)

Laser Source Engineering

Program Chair: **Gregory J. Quarles**, B.E. Meyers & Co., Inc. (USA)

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

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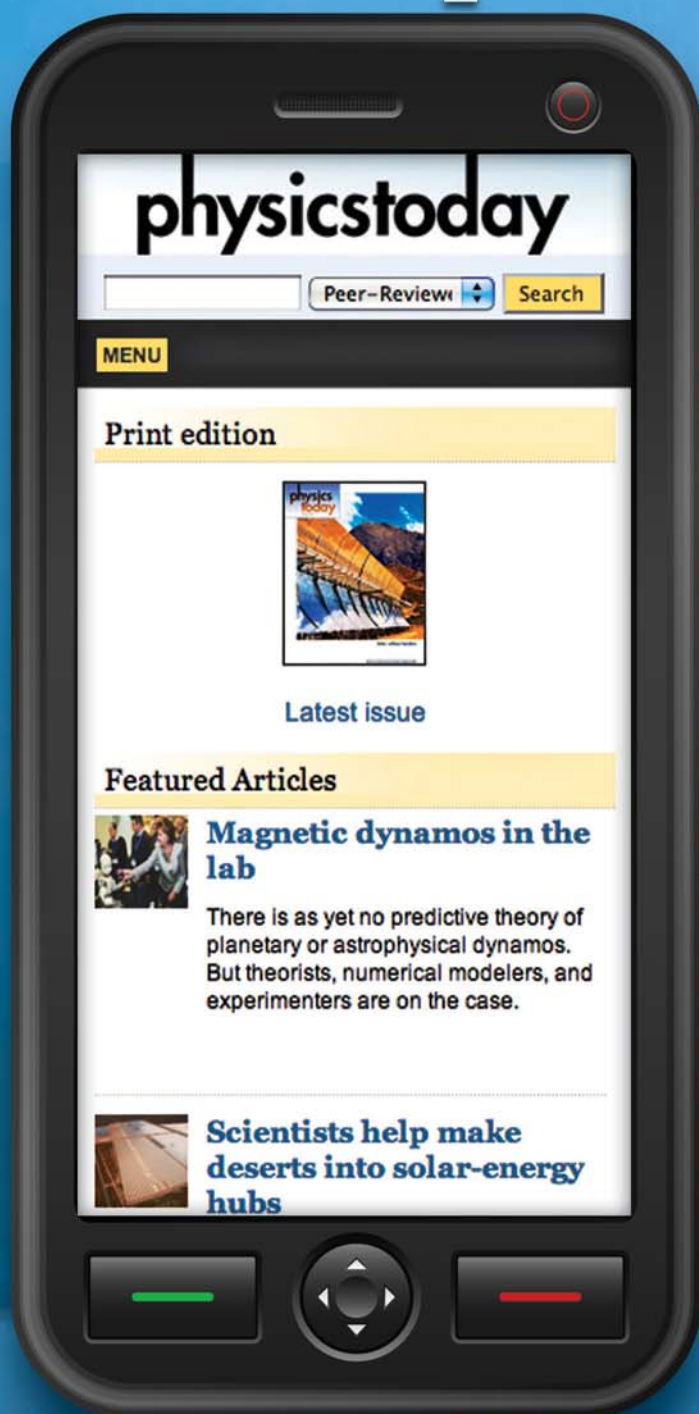
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MOEMS- MEMS

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Symposium Chair



Harald Schenk
Fraunhofer Institute for Photonic Microsystems (Germany)

Symposium Cochair



David L. Dickensheets
Montana State Univ. (USA)

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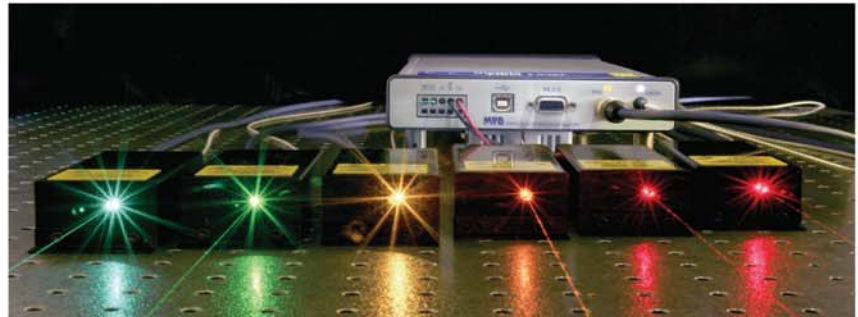
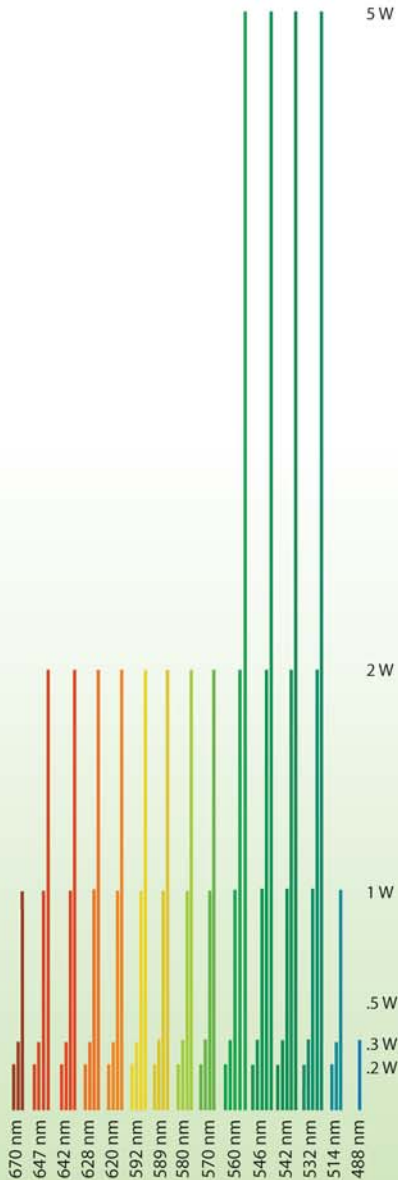
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Technical Conference Index

OPTO

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OSRAM GmbH (Germany)

Symposium Co-chairs



David L. Andrews
Univ. of East Anglia Norwich (United Kingdom)



Liang-Chy Chien
Kent State Univ. (USA)

Optoelectronic Materials and Devices

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

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

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Symposium Chair



Stephen J. Eglash

Precourt Institute for Energy, Stanford Univ. (USA)

Attend the talks in SPIE Green Photonics "Virtual" Conference

Energy, sustainability, and conservation are inherently interdisciplinary. With over 50 papers, the Green Photonics virtual symposium brings together the latest research in a broad range of photonics applications across Photonics West.

Virtual Program on Green Photonics

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Green Photonics Awards

Awards in each of the four areas will be presented at the OPTO Plenary Session on Tuesday morning, and the LASE Plenary Session on Wednesday morning.

Awards presented at the OPTO Plenary Session:

- Green Photonics Award for Solid State Lighting/Displays
- Green Photonics Award for Optical Communications Research
- Green Photonics Award for Renewable Energy Generation: Fusion and Photovoltaics

Award presented at the LASE Plenary Session:

- Green Photonics Award for Laser-assisted Manufacturing or Micro/Nano Fabrication

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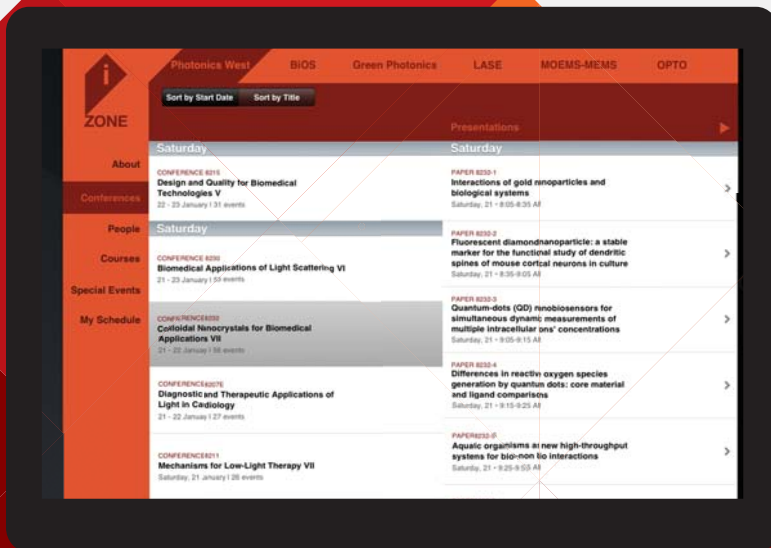
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Photonics
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What's Happening Now

A quick view of what's happening over the next two hours in the conferences and today on the exhibition floor.

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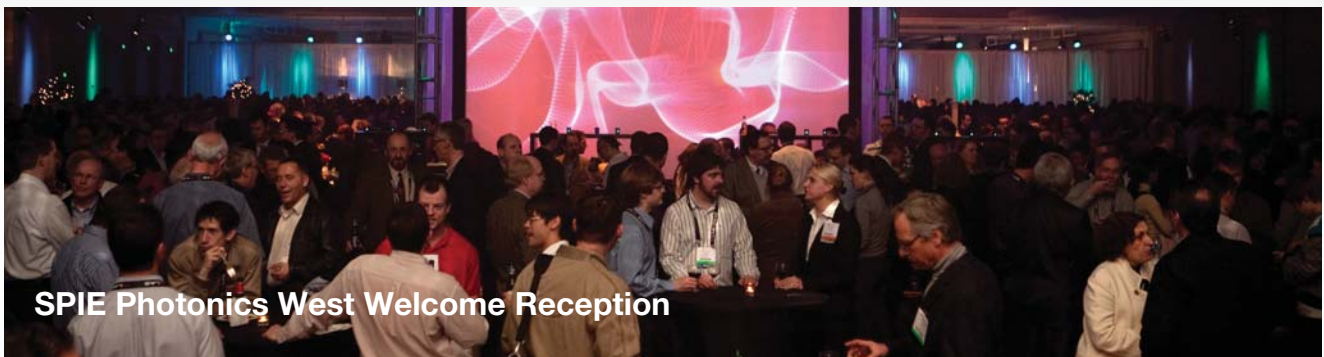
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Special Events Daily Schedule

Saturday 21 January	Sunday 22 January	Monday 23 January	
	<h2 style="margin: 0;">SPIE BIOS EXPO</h2> <p style="margin: 0;">The world's largest biophotonics and biomedical optics show</p> <p style="margin: 0;">Exhibition Dates and Hours: Saturday 21 January . . . 12:00 pm to 5:00 pm Sunday 22 January . . . 10:00 am to 5:00 pm</p>	<p>MOEMS-MEMS PLENARY SESSION, 9:00 am to 12:00 noon, p. 24</p> <ul style="list-style-type: none"> • Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award (<i>Schenk, Dickensheets</i>) • Large-Scale Integration of Nanosystems (<i>Roukes</i>) • Powering the Wireless World with MEMS (<i>Schaevitz</i>) • Developing Diagnostics for the Developing World (<i>Cooper</i>) <p>SPIE Fellows Luncheon, Speaker: Dr. Aydogan Ozcan (Photonics-based Telemedicine Technologies toward Smart Global Health Systems), 12:00 to 1:30 pm, p. 36</p> <p>INDUSTRY WORKSHOP: Basic Optics for Non-Optics Personnel (<i>Harding</i>) 1:30 to 5:30 pm, p. 31</p> <p>PROFESSIONAL DEVELOPMENT WORKSHOP: Resumes to Interviews: Strategies for a Successful Job Search (<i>Krinsky</i>), 1:30 to 5:30 pm, p. 34</p> <p>Biophotonics Start-up Challenge (See the best start-up and product commercialization pitches from BiOS researchers, 4:00 to 5:30 pm, p. 32)</p> <p>WOMEN IN OPTICS PRESENTATION AND RECEPTION (<i>Fishlock</i>), 4:30 to 6:00 pm, p. 37</p> <p>BiOS Interactive Poster Session, 5:30 to 7:30 pm, p. 18</p> <p>PANEL DISCUSSION: Prospects and Future of in Microfluidics (<i>Becker</i>) 5:40 to 7:00 pm, p. 25</p> <p>SPIE Photonics West Welcome Reception, 7:00 to 8:30 pm, p. 37</p> <p style="text-align: center; font-size: 1.2em; font-weight: bold; margin-top: 20px;">Photonics West maps:</p> <p style="text-align: center;">Moscone Center Maps pp. 2–4 Walking Map p. 4</p>	
BiOS Interactive Poster Session, 3:00 to 4:00 pm, p. 18	A BiOS Student Networking Event: Lunch with the Experts, 12:30 to 1:30 pm, p.36		
<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>) • Announcement of Britton Chance Award • Photovoltaic Retinal Prosthesis for Restoring Sight to the Blind (<i>Palanker</i>) • Emerging Applications for Optical Coherence Tomography in the Head, Neck, and Upper Airway (<i>Wong</i>) • Early Cancer Detection with Coherence Imaging (<i>Wax</i>) • Scanning Fiber Optic Nonlinear Endomicroscopy (<i>Li</i>) • Lymphatic Flow Imaging (<i>Sevick</i>) • Coherence Imaging of Cancer with Novel Optical Sources (<i>Boppart</i>) • Advances in Fluorescence and Opto-acoustic Imaging (<i>Ntziachristos</i>) • In-vivo Microscopy: a New Window on the Brain (<i>Hillman</i>) • Bio Laser (<i>Yun</i>) 	Career Paths: Exploring Technical Entrepreneurship, 2:00 to 5:00 pm, p. 32		
	BiOS Interactive Poster Session, 3:00 to 4:00 pm; 5:30 to 7:30 pm, p. 18	Student Chapter Meeting, 6:00 to 8:30 pm, p. 36	
	PicoQuant Young Investigator Award, Single Molecule Spectroscopy and Imaging V (Conf. 8228) 5:35 to 5:45 pm, p. 19	Pascal Rol Award Announcement, Ophthalmic Technologies XXII (Conf. 8209)—5:45 to 6:00 pm, p. 19	



SPIE Photonics West Welcome Reception

Monday 23 January
7:00 to 8:30 pm

“The Art of Optics”

Enjoy a night of photonics-inspired art, conversations with your colleagues, and food tasting from around the world. Please remember to wear your conference registration badges. Dress is casual.

Tuesday	Wednesday	Thursday
24 January	25 January	26 January
	<p>SPIE Photonics West Exhibition</p> <p>Walk the floor of the world's premier lasers and photonics marketplace</p> <p>Exhibition Dates and Hours: Tuesday 24 January 10:00 am to 5:00 pm Wednesday 25 January 10:00 am to 5:00 pm Thursday 26 January 10:00 am to 4:00 pm</p>	
<p>SPIE Senior Members Breakfast, 8:00 to 9:00 am, p. 37</p>	<p>Best Student Paper Competition and Ceremony, Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications XII (Conf. 8247), p. 22 Competition and Award Ceremony, 8:00 to 9:50 am</p>	<p>INDUSTRY EVENT, p. 29 • Changes to Patent Laws (Davis), 8:45 to 9:30 am</p>
<p>OPTO PLENARY SESSION, 8:00 to 10:10 am, p. 26</p> <ul style="list-style-type: none"> Welcome and Opening Remarks (Streubel) Announcement of the Green Photonics Awards (Egash) Spinoptics: Spin Degeneracy Removal in Nanostructures (Hasman) High-Contrast Metastructures for Integrated Optics (Chang-Hasnain) Engaging Spins in Semiconductors for Quantum Information Processing (Awschalom) 	<p>INDUSTRY WORKSHOP: Basic Laser Technology (Sukuta), 8:30 am to 12:30 pm, p. 31</p>	<p>INDUSTRY EVENT, p. 29 Crosslight Software Tutorial on Optoelectronic Device Simulation, 1:30 to 5:30 pm</p>
<p>INDUSTRY WORKSHOP: Magnifying Your IP IQ: Topics for the Savvy Intellectual Property Manager (Gallagher, Yamato, Jankowski, Bayles), 8:30 am to 12:30 pm, p. 30</p>	<p>PROFESSIONAL DEVELOPMENT WORKSHOP: The Craft of Scientific Presentations: A Workshop on Technical Presentations (Alley), 8:30 am to 12:30 pm, p. 34</p>	<p>Best Oral Student Paper Competition and Ceremony, Fiber Lasers IX: Technology Systems, and Applications (Conf. 8237), p. 22 Award Ceremony, 5:40 to 5:50 pm</p>
<p>A Student Networking Event: Lunch with the Experts, 12:30 to 1:30 pm, p. 37</p>	<p>PROFESSIONAL DEVELOPMENT WORKSHOP: The Craft of Scientific Writing: A Workshop on Technical Writing (Alley), 1:30 to 5:30 pm, p. 34</p>	<div style="text-align: center;"> <h2 style="color: red;">Photonics West</h2> <h3 style="color: red;">Visit the Bookstore</h3> </div>  <ul style="list-style-type: none"> ▶ Books ▶ Professional Development ▶ Membership ▶ Souvenirs ▶ Gifts ▶ Information
<p>INDUSTRY WORKSHOP: Commercialization of Photonics Technology (Krohn) 1:30 to 5:30 pm, p. 30</p>	<p>LASE PLENARY SESSION, 10:20 am to 12:30 pm, p. 20</p> <ul style="list-style-type: none"> Welcome and Opening Remarks (Dorsch, Piqué) Presentation of the SPIE Technology Achievement Award to James J. Coleman (Svanberg) Announcement of the Green Photonics Awards (Egash) Impact of Green Technology in Germany (Machnig) Plasmonics for Beam Shaping and Wavefront Engineering (Capasso) The National Ignition Facility and Progress Towards Inertial Fusion Ignition (Moses) Successful Technology Approach for Lasers in Manufacturing (Leibinger) 	
<p>PROFESSIONAL DEVELOPMENT WORKSHOP: Critical Skills for Compelling Research Proposals (Diehl), 1:30 to 5:30 pm, p. 30</p> <p>Nano/Biophotonics Program Track Plenary Session, 1:30 to 2:30 pm, p. 18</p> <ul style="list-style-type: none"> Presentation of Britton Chance Award Single-molecule active control microscopy for nanoscale 3D cell images (Moerner) 	<p>INDUSTRY EVENT, p. 29</p> <ul style="list-style-type: none"> Executive Perspectives on the World of Optics and Photonics (Hausken) 2:00 to 3:00 pm Photonics for Energy and the Environment: an Industry Perspective (Egash) 3:30 to 4:30 pm 	
<p>Student Chapter Info Session, 1:45 to 2:30 pm, p. 37</p>	<p>OPTO Start-up Challengee (See the best start-up and product commercialization pitches from OPTO researchers, 4:30 to 6:00 pm, p. 33</p>	
<p>INDUSTRY EVENT, p. 28</p> <ul style="list-style-type: none"> Silicon Photonics and Photonic Integrated Circuits (Moderator: Hallett) 2:00 to 3:00 pm Diagnostic Opportunities for Nonlinear Optical Microscopy (Anderson) 3:30 to 4:30 pm 	<p>OPTO Interactive Poster Session, 6:00 to 8:00 pm, p. 27</p>	
<p>PANEL DISCUSSION: Getting Hired in 2012 and Beyond, 3:00 to 4:00 pm, p. 33</p>	<p>BiOS Interactive Poster Session, 6:00 to 8:00 pm, p. 18</p>	
<p>Speed Networking Social, 4:30 to 6:00 pm, p. 38</p>	<p>Prism Awards Ceremony and Banquet, 6:30 to 10:30 pm, p. 38</p>	
<p>Photons Plus Ultrasound: Imaging and Sensing Best Oral and Poster Presentation Award (Conf. 8223), 5:45 pm, p. 19</p>	<p>Student Event: "No Ties" Student Social, 8:00 to 10:00 pm, p. 38</p>	
<p>LASE Interactive Poster Session, 6:00 to 8:00 pm, p. 22</p>		
<p>MOEMS-MEMS Interactive Poster Session, 6:00 to 8:00 pm, p. 25</p>		
<p>TECHNICAL EVENT: Laser Communications (Hemmati, Boroson), 7:30 to 9:00 pm, p. 22</p>		
<p>TECHNICAL EVENT: IBOS—International Biomedical Optics Society, 7:30 to 9:00 pm (Barton, Wang), p. 18</p>		
<p>TECHNICAL EVENT: Holography (Bjelkhagen), 7:30 to 9:00 pm, p. 27</p>		
<p>TECHNICAL EVENT: Workshop on the Nature of Light: What Are Photons? (Prasad), 7:30 to 9:00 pm, p. 27</p>		
<p>SPIE Member Reception, 8:00 to 9:30 pm, p. 38</p>	<p>Top employers are coming together to interview and hire candidates at SPIE Photonics West. See p. 12</p> <p>Tuesday 24 January · 10:00 am to 5:00 pm Wednesday 25 January · 10:00 am to 5:00 pm</p>	



BIOS

SPIE Photonics West

HOT TOPICS

Saturday 21 January · 7:00 to 9:00 pm
Room 134 (Exhibit Level)

Hear the latest technical breakthroughs and directions from leading worldwide experts. Access to the BIOS Hot Topics and the Nano/Biophotonics Plenary Session is included with your registration.

7:00 to 7:10 pm

“Welcome and Introduction



James Fujimoto
Massachusetts Institute of Technology (USA)
Symposium Chair



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

7:30 to 7:40 pm



Emerging Applications for Optical Coherence Tomography in the Head, Neck, and Upper Airway

Brian J. Wong
Beckman Laser Institute and Medical Clinic (USA)

8:10 to 8:20 pm



Coherence Imaging of Cancer with Novel Optical Sources

Stephen Boppart
Univ. of Illinois/ Urbana-Champaign (USA)

7:10 to 7:15 pm

Announcement of Britton Chance Award

7:40 to 7:50 pm



Early Cancer Detection with Coherence Imaging

Adam Wax
Duke Univ. (USA)

8:20 to 8:30 pm



Advances in Fluorescence and Opto-acoustic Imaging

Vasilis Ntziachristos
Technical Univ. Munich (Germany)

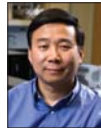
7:15 to 7:20 pm

Hot Topics Moderator



Sergio Fantini
Tufts Univ. (USA)

7:50 to 8:00 pm



Scanning Fiber Optic Nonlinear Endomicroscopy

Xingde Li
Johns Hopkins Univ. (USA)

8:30 to 8:40 pm



In-vivo Microscopy: a New Window on the Brain

Elizabeth Hillman
Columbia Univ. (USA)

7:20 to 7:30 pm

Photovoltaic Retinal Prosthesis for Restoring Sight to the Blind



Daniel Palanker
Stanford Univ. (USA)

8:00 to 8:10 pm



Lymphatic Flow Imaging

Eva M. Sevick
Univ. of Texas Health Ctr. (USA)

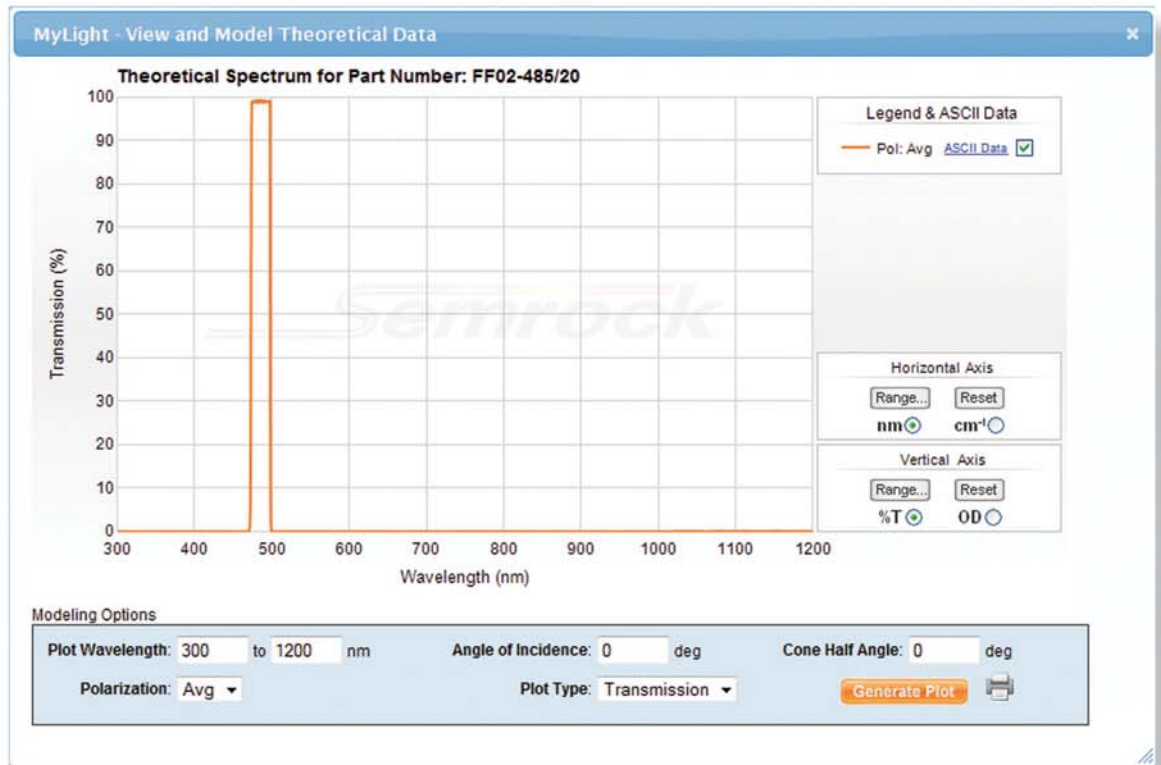
8:40 to 8:50 pm



Bio Laser

Seok Hyun Yun
Harvard Univ./ Massachusetts General Hospital (USA)

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BiOS Special Events

Nano/Biophotonics Program Track Plenary Session

Tuesday 24 January · 1:30 to 2:30 pm
Room 306 (Esplanade Level)

1:30 to 1:35 pm

Presentation of the Britton Chance Award

1:35 to 1:40 pm

Welcome and Introduction

Dan Nicolau, Univ. of Liverpool (United Kingdom)

1:40 to 2:30 pm

Single-molecule active control microscopy for nanoscale 3D cell images



W. E. Moerner, Stanford Univ.

Single-molecule fluorescence imaging enables biophysical measurements in cells without ensemble averaging, but also yields enhanced spatial resolution surpassing the diffraction limit (super-resolution) when combined with active control of the single emitters to maintain sparse concentrations. Using photoinduced blinking and/or photoswitching/photoactivation of fluorescent proteins, a variety of cellular superstructures have been imaged with sub-40 nm resolution. Several approaches lead to 3D imaging; the double-helix point spread function enables quantitative tracking of single mRNA particles in living yeast cells as well as 3D images in bacterial and eukaryotic cells with relatively uniform localization precision over a large depth-of-field (microns).

W. E. Moerner, the Harry S. Mosher Professor of Chemistry and professor, by courtesy, of Applied Physics, conducts research in physical chemistry of single molecules, biophysics, nanoparticle trapping, and nanophotonics. He earned three bachelor's degrees from Washington University in 1975 and master's and doctoral degrees from Cornell University in 1978 and 1982. From 1981 to 1995, he was a research staff member at IBM, receiving two IBM Outstanding Technical Achievement Awards. Moerner was Guest Professor of Physical Chemistry at the Swiss Federal Institute of Technology from 1993 to 1994 and Professor and Distinguished Chair in Physical Chemistry at the University of California-San Diego from 1995 to 1998, the year he joined the Stanford faculty. He spent time as the Robert B. Woodward Visiting Professor at Harvard University in 1997-1998. He was elected Fellow of the American Physical Society in 1992 and received the society's Earle K. Plyler Prize for Molecular Spectroscopy in 2001 and the Irving Langmuir Prize in Chemical Physics in 2009. His other elected fellowships include the Optical Society of America, the American Academy of Arts and Sciences, the Australian Academy of Sciences and the American Association for the Advancement of Science. He is a Member of the National Academy of Sciences, and co-recipient of the Wolf Prize in Chemistry (with Allen Bard) in 2008.

Biophotonics Start-up Challenge

Monday 23 January · 4:00 to 5:30 pm
Room 258 (Mezzanine Level)

Interested in entrepreneurial opportunities in the field of biophotonics? Come to this event to hear research projects that have real commercial potential. This rapid-fire event will feature start-up pitches from students and young professionals as they compete to take their ideas to the next level.

See details page 32.



BiOS Interactive Poster Sessions

South Hall A (with BiOS EXPO)

Saturday 21 January 3:00 to 4:00 pm

Sunday 22 January 3:00 to 4:00 pm

Room 103 (Exhibit Level)

Sunday 22 January 5:30 to 7:30 pm

Monday 23 January 5:30 to 7:30 pm

Wednesday 25 January (with OPTO) 6:00 to 8:00 pm

Conference attendees are invited to attend the BiOS poster sessions throughout the week. Come view the posters, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Please see individual conference programs for poster session location and timing. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors: See setup instructions on page 390.

IBOS—International Biomedical Optics Society

Tuesday 24 January · 7:30 to 9:00 pm
InterContinental Hotel, Howard Room

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 2012 program will include speaker:



Charles Lin

Wellman Center for Photomedicine, Harvard Medical School, and Massachusetts General Hospital (USA)

Optical imaging techniques for in vivo cell tracking and molecular imaging

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

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PicoQuant Young Investigator Award

Part of: Single Molecule Spectroscopy and Imaging V (Conf. 8228)

Sunday 22 January, 5:35 to 5:45 pm · Room 307 (Esplanade Level)

We are pleased to announce that a prize in the amount of \$750.00 will be awarded to the best oral presentation by a presenter under the age of 35 within conference 8228: Single Molecule Spectroscopy and Imaging V. Participants must be both the primary author and presenter of an accepted abstract to be eligible.

Prize donated by **PicoQuant GmbH Berlin (Germany)**

Pascal Rol Award 2012

Part of: Ophthalmic Technologies XXII (Conf. 8209)

Sunday 22 January, 5:45 to 6:00 pm · Room 306 (Esplanade Level)

Outstanding extended abstracts submitted to the Ophthalmic Technologies XXII conference will be nominated for the Pascal Rol Award for Best Paper in Ophthalmic Technologies. The award and prize will be presented after the last scientific session of the conference to recognize the best paper and presentation. The 2011 recipient of the Pascal Rol Award was Dr. James Loudin from Stanford University.

(see www.pascalrolfoundation.org).

Prize donated by **Brien Holden Vision Institute**

JenLab Young Investigator Award

Part of: Multiphoton Microscopy in the Biomedical Sciences XII (Conf. 8226)

Monday 23 January, 3:05 to 3:15 pm · Room 308 (Esplanade Level)

We are pleased to announce that a prize in the amount of \$2000.00 will be awarded to a graduate student, postdoc, or scientist under the age of 32 within conference 8223: Multiphoton Microscopy in the Biomedical Sciences XII. To receive award, participants must 1) be both the primary author and presenter of an accepted abstract, and 2) the associated proceedings paper must be submitted at least 2 weeks prior to the meeting start dates for review by the selection committee.

Prize donated by **JenLab GmbH (Germany)**

Student Poster Session Competition

Part of: Multiphoton Microscopy in the Biomedical Sciences XII (Conf. 8226)

Monday 23 January, 3:05 to 3:15 pm · Room 308 (Esplanade Level)

Graduate students and postdoctoral fellows with accepted posters can participate in the poster session competition of the conference on Multiphoton Microscopy in the Biomedical Sciences. There is a cash award for the winner(s).

Seno Medical Best Paper Awards

Part of: Photons Plus Ultrasound: Imaging and Sensing 2012 (Conf. 8223)

Tuesday 24 January, 5:15 to 5:30 pm · Room 305 (Esplanade Level)

Seno Medical will sponsor two awards for this conference: best paper and best poster presented. Eligible authors have submitted a 3-page summary of their accepted paper, along with the abstract, to the Conference Chairs by 16 January 2012.

Prize donated by **Seno Medical (USA)**



LASE

SPIE Photonics West

LASE PLENARY SESSION

Wednesday 25 January · 10:20 am to 12:30 pm
Room 134 (Exhibit Level)

10:00 am

Welcome and Opening Remarks

Session Chairs:



Friedhelm Dorsch,
TRUMPF
Werkzeugmaschinen
GmbH & Co. KG
(Germany)



Alberto Piqué
U.S. Naval Research
Lab. (USA)

10:25 am

Presentation of the SPIE Technology Achievement Award to James J. Coleman

Presented by: **Katarina Svanberg**
Lund Univ. Hospital (Sweden)



James J. Coleman, University of Illinois, Urbana, Illinois, USA, is the 2011 recipient of the Technology Achievement award in recognition of his seminal contributions to the methods, designs, and demonstrations of selectively grown discrete and monolithically integrated compound semiconductor lasers and photonic devices.

10:30 am

Announcement of the Green Photonics Award



Stephen J. Eglash
Precourt Institute for Energy, Stanford Univ. (USA)

10:35 am

Impact of Green Technology in Germany



Matthias Machnig
Minister of Economy, Labour and Technology, German
Federal State Thüringen (Germany)

Minister Matthias Machnig was born on 15 April 1960 in Wimbern (North Rhine-Westphalia). From 1998 - 1999, he served as the State Secretary of the Federal Ministry of Transport, Building and Urban Development. From 1999 - 2002, he was the Federal Director of the SPD (Socialdemocratic Party Germany). From 2002 - 2005, he was a Management Consultant, amongst others at Booz Allen Hamilton. In 2005, he was the State Secretary of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. Since 11/04/2009, he is the Thuringian Minister of Economy, Labour and Technology.

10:45 am

Plasmonics for Beam Shaping and Wavefront Engineering



Federico Capasso
Harvard Univ. (USA)

Coupled photon-electron oscillations in sub-wavelength metallic structures known as surface plasmons not only enable the manipulation and concentration of light at the nanoscale, leading important near-field applications but also offer unique opportunities to mold light propagation by shaping wavefronts and polarization with unprecedented flexibility. Plasmonic collimators have been successfully used to dramatically reduce beam divergence in mid-ir and THz lasers and to achieve multidirectional/multi-wavelength laser beams. Designer plasmonic interfaces have been used to alter in fundamental ways light propagation by introducing phase discontinuities that generate anomalously reflected and refracted beams leading, to a powerful generalization of the centuries old laws of reflection and refraction, from which new optical components will emerge.

Federico Capasso is the Robert Wallace Professor of Applied Physics at Harvard University, which he joined in 2003 after a 27 years career at Bell Labs where he rose from postdoc to VP of Physical Research. His research has spanned a broad range of topics in the areas of solid-state electronics, photonics, QED and nanotechnology. He is a co-inventor of the quantum cascade laser.

11:20 am

The National Ignition Facility and Progress Towards Inertial Fusion Ignition



Edward I. Moses

Lawrence Livermore National Lab. (USA)

The National Ignition Facility (NIF), built for studying inertial confinement fusion (ICF) and high-energy-density (HED) science, is operational and conducting experiments at Lawrence Livermore National Laboratory (LLNL). A primary goal of the current experimental campaign is to create the conditions necessary to demonstrate laboratory-scale thermonuclear ignition and burn. To date, all of the capabilities needed to conduct implosion experiments and demonstrate ignition and burn at NIF by the end of 2012 are in place. This talk describes the NIF's unprecedented experimental capabilities with a focus on the NIF laser performance, reliability and availability during the experimental campaign phase. The talk will also address the transition of NIF to a national user facility, providing access to researchers from the Department of Energy (DOE) laboratories as well as the national and international academic and fusion energy communities.

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Dr. Edward Moses is the Director for the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL). Dr. Moses was responsible for completing construction and activation of the NIF, the world's largest and most energetic laser system. Experiments on NIF will access high energy density regimes with direct application to strategic security as well as applications for fusion energy research, high energy density science, and astrophysics.

11:55 am

Successful Technology Approach for Lasers in Manufacturing



Peter Leibinger

TRUMPF GmbH & Co. KG (Germany)

The success of the laser as a manufacturing tool in nearly all industry sectors is driven by the increasing availability of different technologies to create and amplify laser light. Different strategies and philosophies are pursued to succeed in the field of laser development for the manufacturing industry. The main approaches are to either focus on as few different technologies as possible to address the demands of many applications or to provide dedicated laser systems for specific applications based on multiple technologies.

This talk will give a comparison of these two different approaches and will point out the core aspects of a long-term successful development road map for laser systems in manufacturing.

Dr.-Ing. E.h. Peter Leibinger is Head of the Laser Technology and Electronics Division and responsible for group-wide research and development and for new business fields. Leibinger serves in several honorary functions. In February 2011 a honorary doctorate was awarded to Leibinger by the Technical University of Dresden.



North Lower Lobby

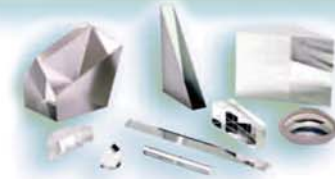
The tools you need to schedule your work: conferences, exhibition, courses, special events. See p. 13.



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LASE Special Events



LASE Interactive Poster Session

Tuesday 24 January · 6:00 to 8:00 pm
Room 103 (Exhibit Level)

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 at <http://spie.org/x27476.xml>.

TECHNICAL EVENT

Laser Communications

Tuesday 24 January · 7:30 to 9:00 pm
InterContinental Hotel, Fremont

Session Chairs: **Hamid Hemmati**, Jet Propulsion Lab. (USA) and **Don Boroson**, MIT Lincoln Lab. (USA)

This technical event on Laser Communications will hold its informal annual meeting in conjunction with the Free-Space Laser Communication Technologies XXIII conference. All professionals involved in theory and applications of free-space 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 XII (Conf. 8247)

Session Chairs: **Alexander Heisterkamp**, Laser Zentrum Hannover e.V. (Germany); **Michel Meunier**, Ecole Polytechnique de Montréal (Canada); **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

Wednesday 25 January · Room 111 (Exhibit Level)

Competition · 8:00 to 9:00 am

Award Ceremony · 9:30 to 9:50 am

For conference 8247: Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XII, we are pleased to announce that a cash prize will be awarded to the best student presentation in this 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.

Following the student competition, the judges will meet and decide on the winner. The winner and runner-up will be announced during the award ceremony and awarded a **cash prize**.

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Best Oral Student Paper Competition

Fiber Lasers IX: Technology, Systems, and Applications (Conf. 8237)

Thursday 26 January · Room 131 (Exhibit Level)

Award Ceremony · 5:40 to 5:50 pm

For conference 8237: Fiber Lasers IX: Technology, Systems, and Applications, we are pleased to announce that a **cash prize** will be awarded to the best student oral presentation in the conference.

Throughout the conference, qualifying student oral presentations will be evaluated by a conference steering committee, led by Craig Robin. 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.

To be eligible for consideration, a student must be listed as an author on an accepted paper, must have conducted the majority of the work being presented, and must make the oral presentation.

Nominations were due 5 December 2011.

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

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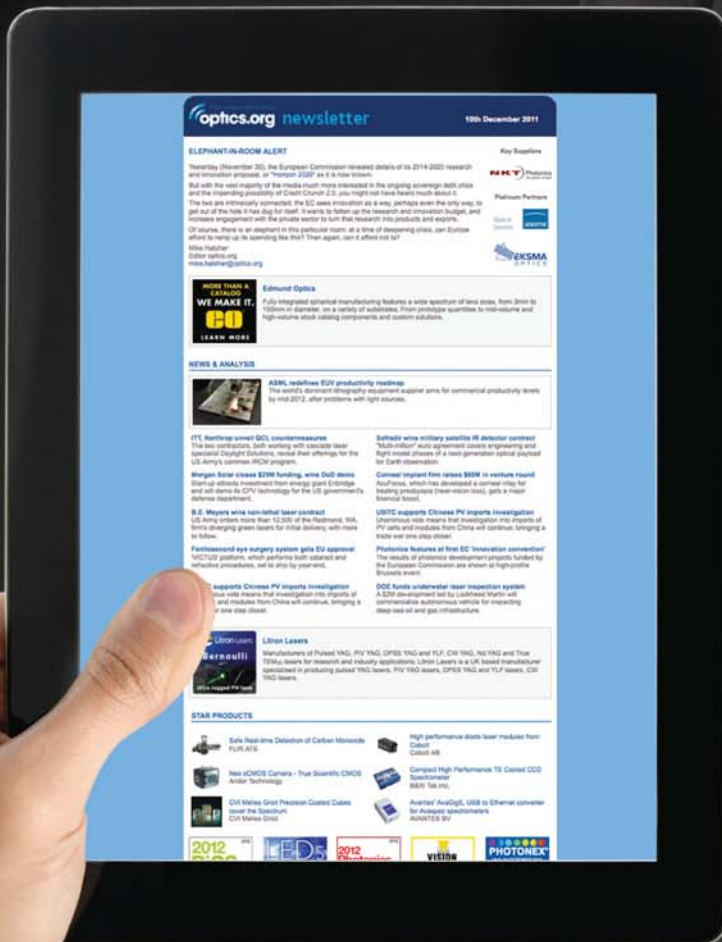


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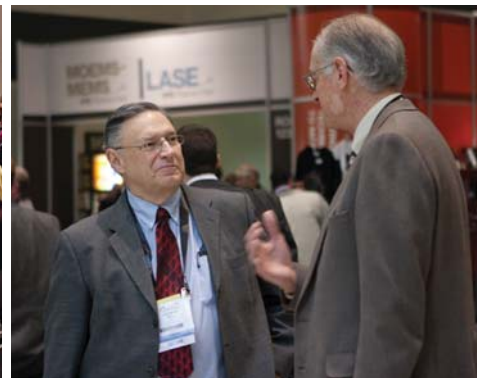
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MOEMS-MEMS Special Events



MOEMS-MEMS

SPIE Photonics West

MOEMS-MEMS PLENARY SESSION

Monday 23 January · 9:00 am to 12:00 pm
Room 132 (Exhibit Level)

9:00 am

Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award

Session Chairs:



Harald Schenk
Fraunhofer Institute for
Photonic Microsystems
(Germany)



David L. Dickensheets
Montana State Univ.
(USA)

9:15 am

Large-Scale Integration of Nanosystems



Michael Roukes
California Institute of Technology

Michael Roukes is the Robert M. Abbey Professor of Physics, Applied Physics, and Bioengineering at the California Institute of Technology. He was founding Director of Caltech's Kavli Nanoscience Institute (KNI), and now serves as its Co-Director. Roukes is co-founder and co-director of the Alliance for Nanosystems VLSI, an international collaboration between Caltech's KNI and CEA/LETI-Minatec/Cinatec in Grenoble, France (www.nanovlsi.org). Concurrently, he holds a Chaire d'Excellence in Nanoscience from the Réseau Thématique de Recherche Avancée.

10:00 to 10:30 am: **Coffee Break**

10:30 am

Powering the Wireless World with MEMS



Samuel B. Schaevitz
Lilliputian Systems, Inc. (USA)

Battery life is horrible. That is a painful consequence of the explosion in features and applications in modern wireless electronics of all types, and is particularly acute in advanced smartphones. Fuel cells have long been touted as the solution to the battery problem, and significant programs have been funded at large companies, start-ups, and within academia. Thus far, none of those efforts have resulted in a commercially successful product for consumer electronics.

Lilliputian Systems has taken a unique approach by leveraging MEMS fabrication methods to enable the use of a fuel cell known as a solid oxide fuel cell (SOFC). SOFCs provide high efficiency and reliable operation and allow the use of high energy density fuels, such as butane. This combination overcomes the barriers which have prevented other fuel cell efforts from being commercialized. But in order to use SOFCs, the MEMS structure must operate at elevated temperatures, typically above 600°C, must do so very efficiently, and must be effectively integrated into a complete system. By overcoming these unusual challenges, Lilliputian has developed a solution with a run-time 5-10X longer than existing batteries and with instant recharge by inserting a new cartridge. The absolute safety of the approach is supported by world-wide approval for carry-on and use on airplanes.

Over the past several years, Lilliputian Systems has created the many innovations required to bring this complex system to high-volume manufacturing. This talk will discuss the unique challenges in system architecture and high-temperature MEMS design which have been overcome, enabling Lilliputian to provide long-lasting portable power for consumer electronics devices.

Samuel Schaevitz received SB ('00), MEng('00), and Eng('01) degrees from MIT in Electrical Engineering, and is a Hertz Fellow. He founded Lilliputian Systems, Inc. in 2001, and is currently serving as CTO, in charge of R&D and Engineering activities.

11:15 am

Developing Diagnostics for the Developing World

Jonathan Cooper

Univ. of Glasgow (United Kingdom)



Infectious diseases cause 10 million deaths each year worldwide, accounting for ~60% of all deaths of children aged 5-14. Although these deaths arise primarily through pneumonia, TB, malaria and HIV, there are also the so called "neglected diseases" such as sleeping sickness and bilharzia, which have a devastating impact on rural communities, in sub-Saharan Africa. Here, the demands for a successful Developing World diagnostic are particularly rigorous, requiring low cost instrumentation with low power consumption (there is often no fixed power infrastructure). In many cases, the levels of infection within individuals are also sufficiently low that instruments must show extraordinary sensitivity, with measurements being made in blood or saliva. In this talk, a description of these demands will be given, together with a review of some of the solutions that have been developed, which include using acoustics, optics and electrotechnologies, and their combinations to manipulate the fluid samples. In one example, we show how to find a single trypanosome, as the causative agent of sleeping sickness.

Jonathan Cooper has pioneered technologies in biosensors (1980s), protein and DNA microarrays (1990s) and Lab-on-a-Chip and Bionanotechnology (2000s). He has published ca. 200 research papers, and is the founder of Mode Diagnostics (www.modedx.com), producing home diagnostics for bowel cancer and other bathroom diagnostic tests. In his recent research, he has focused upon using plasmonics and phononics in the field of medical diagnostics. In one example, using phononics, he has created frequency dependent acoustic lenses and mirrors with phononic crystals to enable generic platforms for low cost Developing World diagnostics. Jon was elected as a Fellow of the Royal Academy of Engineering, a Fellow of the Institute of Physics, a Fellow of the Institute of Electrical Engineering and a Fellow of the Royal Society of Edinburgh. He was appointed to the Wolfson Chair in Biomedical Engineering in 2009 and was awarded a Royal Society Merit Award in 2010.

PANEL DISCUSSION

Prospects and Future of Microfluidics

Monday 23 January · 5:40 to 7:00 pm
Room 276 (Mezzanine Level)

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

The commercialization of microfluidic devices and systems is rapidly progressing. However not all promising approaches have become an economic success and investor's payback often has not met initial expectations. The discussion will look upon experiences made in the product development and market introduction phase of microfluidics enabled devices and will present lessons learned from various perspectives, from device performance to commercial organization. It tries to identify trends and will present case studies from different applications.



MOEMS-MEMS Interactive Poster Session

Tuesday 24 January · 6:00 to 8:00 pm
Room 103 (Exhibit Level)

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 at <http://spie.org/x27476.xml>.

NEW!

MOEMS-MEMS Best Paper Award and Best Student Paper Award

Monday 23 January · 9:00 am · Room 132 (Exhibit Level)

We are pleased to announce that a cash prize will be awarded to the best paper and best student paper in this symposium.

To be eligible for the MOEMS-MEMS Best Paper Award, you must:

- be listed as an author on an accepted paper within MOEMS-MEMS
- submit your manuscript online by 19 December.

Best Paper Award Sponsor:



To be eligible for the MOEMS-MEMS Best Student Paper Award, you must:

- be a student without a doctoral degree
- be listed as an author on an accepted paper within MOEMS-MEMS
- submit your manuscript online by 19 December
- have conducted the majority of the work to be presented
- be the presenter of the paper.

Best Student Paper Award Sponsor:



Qualifying papers will be evaluated by the awards committee. The winners will be announced during the MOEMS-MEMS Plenary Session and awarded a cash prize.



OPTO

SPIE Photonics West

OPTO PLENARY SESSION

Tuesday 24 January · 8:00 to 10:10 am
Room 134 (Exhibit Level)

8:00 am

Welcome and Opening Remarks

Session Chair



Klaus P. Streubel
OSRAM GmbH
(Germany)



David L. Andrews
Univ. of East Anglia
Norwich (United Kingdom)

8:05 am

Announcement of the Green Photonics Award



Stephen J. Eglash
Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am

Spinoptics: Spin Degeneracy Removal in Nanostructures



Erez Hasman
Technion-Israel Institute of Technology (Israel)

Spin-symmetry breaking in nanoscale structures caused by spin-orbit interaction, leading to a new branch in optics - spinoptics is presented. The spin-based effects offer an unprecedented ability to control light and its polarization

state in nanometer-scale optical devices, thereby facilitating a variety of applications related to nano-photonics. The direct observation of optical spin-Hall effect that appears when a wave carrying spin angular momentum (AM) interacts with plasmonic nanostructures is introduced. A plasmonic nanostructure exhibits a crucial role of an AM selection rule in a light-surface plasmon scattering process. A spin-dependent dispersion splitting was obtained in a structure consisting of a coupled thermal antenna array. The observed effects inspire one to investigate other spin-based plasmonic effects and to propose a new generation of optical elements for nano-photonics applications.

Erez Hasman is a Professor of optical sciences and head of Micro and Nanooptics Laboratory, Faculty of Mechanical Engineering and Russell Berrie Nanotechnology Institute, Technion - Israel Inst. of Technology, Haifa, Israel. He has made significant contributions in the field of nanophotonics and radiative heat transfer from nanostructures, and specifically developing a new branch in optics - Spinoptics, opening a new avenue for controlling light in nanometer-scale optical devices. (see: www.technion.ac.il/optics).

8:50 am

High-Contrast Metastructures for Integrated Optics



Connie J. Chang-Hasnain
Univ. of California, Berkeley (USA)

A new concept of dielectric grating has emerged with many extraordinary properties, resulting from a large contrast in refractive index of the grating and its surrounding, and sub-wavelength dimensions. I will discuss various interesting properties by varying grating parameters to yield a very broadband, high-reflectivity mirror for light incident in surface-normal direction or at a glancing angle, or as a high-Q resonator with surface-normal output. I will discuss using high contrast subwavelength metastructures as a platform for many useful applications in lasers, filters, hollow core waveguides, vertical to in-plane waveguide couplers, bio/chemical and gas sensors and detectors.

Connie Chang-Hasnain is the John R. Whinnery Chair Professor in EECS Department at the University of California, Berkeley. Dr. Chang-Hasnain was an MTS at Bellcore (1987-1992) and an Assistant Professor at Stanford University (1992-1996). She received numerous awards for her research contributions, including 2011 IEEE David Sarnoff Award for her pioneering contributions to VCSEL arrays and tunable VCSELS, 2007 Nick Holonyak Jr Award, and 2003 IEEE William Streifer Scientific Achievement Award. Since 2007, she is the Editor-in-Chief of the Journal of Lightwave Technology.

9:30 am

Engaging Spins in Semiconductors for Quantum Information Processing



David Awschalom
Univ. of California, Santa Barbara (USA)

Eighty years since Dirac developed the quantum theory of electron spin, contemporary information technology still relies largely on classical electronic. There is a growing interest in exploiting spins in semiconductor nanostructures for the manipulation and storage of information in emergent technologies based upon spintronics and quantum logic. Localized electronic states of carbon-based systems have appeared as a unique solid state platform for fundamental studies of magnetism and quantum science at the single spin level. In diamond, the spins of individual nitrogen-vacancy color centers can be imaged and manipulated at room temperature and have remarkably long coherence times. We provide an overview of temporally- and spatially-resolved optoelectronic measurements used to generate, manipulate, and read single electron and nuclear spin states in controlled environments. Recent demonstrations including gigahertz quantum control, nondestructive readout, patterned spin arrays, and single nuclear spin quantum memories represent progress toward the control and coupling of spins and photons for technologies beyond electronics.

David Awschalom is a Professor of Physics, Electrical and Computer Engineering at the University of California, Santa Barbara, and serves as the Peter J. Clarke Director of the California NanoSystems Institute. His group pursues research in optical and magnetic interactions in semiconductor quantum structures, spin dynamics and coherence in condensed matter systems, and implementations of quantum information processing in the solid state.

TECHNICAL EVENT

Holography

Tuesday 24 January * 7:30 to 9:00 pm
InterContinental Hotel, Ballroom B

Session Chair: **Hans I. Bjelkhagen**, Glyndŵr Univ. (United Kingdom) and Technium 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. Featured speaker this year will be **Ian Lancaster**, International Hologram Manufacturers' Association, giving a talk titled, "The IHMA Widens its Remit: Why This Matters to You."

WORKSHOP

The Nature of Light: What Are Photons?

Tuesday 24 January · 7:30 to 9:00 pm
InterContinental Hotel, Ballroom A

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

The purpose of this workshop is to stimulate engineers to explore the nature of light much deeper so the new knowledge can open up new fountains of engineering innovations guided by our capacity to emulate light-matter interaction processes, hitherto not explored. Theories of physics have been evolving for centuries based on a methodology of thinking (epistemology) that can be characterized as Measurable Data Modeling Epistemology or MDM-E, effectively a "curve fitting" technique. In fact quantum epistemology categorically tells us not to waste time trying to visualize (or try to map) what the detailed interaction processes the photons and detectors undergo to make detectable transformation become manifest in our instruments. So, we are proposing that engineers independently need to promote their own epistemology for research, Interaction Process Mapping Epistemology, or IPM-E. IPM-E will help accelerate the rate of new technology innovations through emulation of nature's interaction processes.

A presentation will be given by **Prof. Chandrasekhar (Chandra) Roychoudhuri** of the University of Connecticut. He will present the basic optical phenomena (interference, diffraction, polarization, spectrometry, mode locking, and basic photon counting) in view of the hitherto neglected fact that waves do not interact with each other to re-organize their energy distributions to create fringes. Fringes are the manifestation of the changes experienced by detectors as they respond to simultaneous presence of multiple waves propagating through them. We call this phenomenon of Non-Interaction of Waves (NIW) as the NIW-principle.

Chandra is chair of the SPIE conference series, "The Nature of Light: What are Photons?," which has been providing a forum since 2005 to explore better models for the photon and visualization of light-matter interaction processes.

OPTO Start-up Challenge

Wednesday 25 January · 4:30 to 6:00 pm
Room 258 (Mezzanine Level)

Interested in entrepreneurial opportunities in the field of optoelectronics? Come to this event to hear research projects that have real commercial potential. This rapid-fire event will feature start-up pitches from students and young professionals as they compete to take their ideas to the next level.


See details page 33.



OPTO Interactive Poster Session


Wednesday 25 January · 6:00 to 8:00 pm
Room 103 (Exhibit Level)

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 at <http://spie.org/x27476.xml>.




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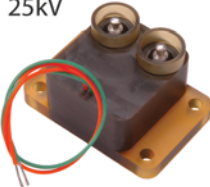
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Industry Events

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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.

Open to All Attendees

EXHIBITION VISITORS, EXHIBITORS, AND TECHNICAL
CONFERENCE ATTENDEES

Silicon Photonics and Photonic Integrated Circuits

Tuesday 24 January · 2:00 to 3:00 pm · Room 130 (Exhibit Level)

Panel Moderator: **Peter Hallett**, SPIE

Invited Panel Members:

LUXTERA

Peter De Dobbelaere, Vice President of Engineering

ONECHIP PHOTONICS

Andy Weirich, Vice President of Product Line Management

INFINERA

Radha Nagarajan, Director of Engineering in the Photonic Integrated Circuits Group

INTEL CORP.

Mario J. Panicia, Director of Photonics Technology Lab., Intel Fellow

SUN-ORACLE

Ashok Krishnamoorthy, Distinguished Engineer

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.

Diagnostic Opportunities for Nonlinear Optical Microscopy

Tuesday 24 January · 3:30 to 4:30 pm · Room 130 (Exhibit Level)

Panel Moderator: **Stephen G. Anderson**, Industry and Market Strategist, SPIE

Panelists:

OLYMPUS AMERICA, INC.

Yiwei (Kevin) Jia, Marketing Manager

TOPTICA PHOTONICS, AG (Germany)

Wilmelm Känders, President

JENLAB GMBH (Germany)

Karsten König, CEO

NEWPORT SPECTRA-PHYSICS

Arnd Krueger, Sr. Director of Strategic Marketing

After it was first reported in 1990, two-photon excited laser scanning fluorescence microscopy was quickly embraced by researchers in cell biology and neuroscience because, compared to conventional confocal microscopy, multiphoton imaging methods offer deeper tissue penetration, less cell damage, and inherent three-dimensional (3D) optical sectioning. Since then the use of multiphoton imaging in biomedical research has seen huge growth, fueled in part by the advent of turnkey solid-state ultrafast lasers. For makers of lasers, optics, and microscopy equipment, his technique represents a notable market opportunity as it expands into clinical diagnostic areas ranging from dental disease to brain tumors to skin cancer detection. Join this session to find out more about current trends and opportunities in multiphoton microscopy.

Executive Perspectives on the World of Optics and Photonics

Wednesday 25 January · 2:00 to 3:00 pm · Room 130 (Exhibit Level)

Panel Moderator: **Tom Hausken**, Director, Components Practice at Strategies Unlimited

Invited Panel Members:

HAMAMATSU CORP.

Kenneth Kaufmann, Vice President

TRUMPF INC.

Timothy Morris, Managing Director

IDEX OPTICS & PHOTONICS

Michael J. Cumbo, President

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

QIOPTIQ PHOTONICS LTD.

David Marks, CEO

JENOPTIK | OPTICAL SYSTEMS

Dirk Rothweiler, Executive Vice-President

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 2010 and 2011 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.

Photonics for Energy and the Environment: an Industry Perspective

Wednesday 25 January · 3:30 to 4:30 pm · Room 130 (Exhibit Level)

Panel Moderator: **Stephen J. Eglash**, Director, Precourt Institute for Energy, Stanford Univ.

Panel Members:

David H. Abbott, Additive Mfg. Lean Lab., GE Aviation

Thomas M. Baer, Executive Director, Stanford Photonics Research Ctr.

Jyoti Bhardway, R&D Manager, Philips Lighting Lumileds

Patricia Glaza, Arsenal Venture Partners

Michael Hochberg, Director, Institute for Photonic Integration, Univ. of Washington

Eric Wesoff, Senior Analyst, Greentech Media, Inc.

Top industry executives will present their views on technologies that have great potential to reduce our collective energy consumption and offer alternate energy sources—all within five to ten years. Topics to be discussed include the following:

- **Solid State Lighting and Displays**
- **Laser-assisted Manufacturing and Micro/Nano Fabrication**
- **Silicon for Communications and Computing**
- **Renewable Energy Generation: Fusion and Photovoltaics**

Changes to Patent Laws

Thursday 26 January · 8:45 to 9:30 am · Room 134 (Exhibit Level)

Speaker: **Paul Davis**, Goodwin Procter

The long awaited change to US patent laws to bring the US into line with Europe and Japan (changing from first-to-invent to first-to file) seems destined to be signed into law by end of 2011. Come learn what these changes will mean for your company's strategy and innovation efforts. Open to all Photonics West attendees.

Paul Davis is a partner in the Goodwin Procter's Business Law Department and a member of its Intellectual Property and Technology Companies Groups. Mr. Davis has a strong patent background in the medical device, electrical engineering, photonics, networking, e-commerce and telecommunication industries, focusing primarily on U.S., international and national phase patent prosecution and strategic counseling services. He has significant experience in litigating intellectual property issues for information technology companies.

Crosslight Software Tutorial on Optoelectronic Device Simulation

Thursday 26 January · 1:30 to 5:30 pm

This hands-on tutorial is free of charge, however, seating is limited and pre-registration is required. Participants are encouraged to bring a laptop PC with pre-installed Crosslight software. To register for the tutorial and the free software trial license, please e-mail your contact information to [piprek\(at\)nusod.org](mailto:piprek(at)nusod.org). You will receive detailed instructions on how to install the software on your laptop in the week before the conference.

The tutorial gives a hands-on introduction to high-end simulation tools for electronic and optoelectronic devices (APSYS, LASTIP, PICS3D by Crosslight Software Inc., see below). 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.

LASTIP: Two-dimensional (2D) simulation of laser diodes. Considers competition of multiple optical laser modes. Includes optical gain function for quantum well or bulk material with different models of spectral broadening, Coulomb interaction, and inter-band optical transitions integrated over $k \cdot p$ non-parabolic subbands. Import of externally generated data possible. Physical models of various laser effects and a material data base for many III-V semiconductor compounds are available.

APSYS: 2D/3D simulation of non-lasing devices. Features include: hot carrier transport, quantum mechanical tunneling, multi-quantum well structures, $k \cdot p$ band structure calculation, self-consistent Poisson and Schroedinger equations solving, wave guiding in media with arbitrary complex refractive index distribution, transient models, small ac-signal analysis, interface and bulk charge trapping, piezoelectric effect, impact ionization, optical absorption and emission with exciton, and other many-body phenomena, LED ray tracing model to optimize device structure and packaging for light extraction efficiency, photon recycling effect, different relaxation models. Broad range of semiconductor devices, including classical or quantum-mechanical resonant tunneling diodes, bipolar and field effect transistors, LEDs, solar cells, detectors, semiconductor optical amplifiers, electro-absorption modulators.

PICS3D: Three-dimensional (3D) simulation of edge-emitting lasers (FP, DFB, DBR) and vertical-cavity laser diodes (VCSELs). It can also be used for waveguide photodetectors, semiconductor optical amplifiers, photo-pumping, and coupling to external passive optical components, i.e. external gratings (1st and 2nd order). It can calculate longitudinal distribution of carrier density, gain, optical field, and surface emission modes for 2nd order grading DFB. In addition to steady (dc) L-I, or I-V characteristics, it can be used for ac, and transient analysis of laser diodes, mode emission power, spectrum and chirp analysis, AM and FM small signal modulation response, and second harmonic analysis. It may include 3D current flow, vectorial waves, Poisson and Schroedinger Equations self-consistent solution in complex MQW with piezo-electric fields, and quantum-mechanical tunneling.

Further information is available at www.crosslight.com

Commercialization of Photonics Technology

NEW

WS1056 · Course level: Introductory
CEU .35 \$350 Member / \$405 Non-member USD
Tuesday 1:30 to 5:30 pm

The course outlines the approach to move advanced technology into successful commercial products. The elements of commercialization will be defined including: Identification of market opportunities and potential; competitive environment related to both technology and companies; manufacturing encompassing discussion of source, quality, cost, cost reduction, and standards; barriers to entry; value proposition including product differentiation; strategy and funding.

David Krohn is Managing Partner of Light Wave Venture LLC. He has been in photonics development and commercialization for over 40 years. He has now assisted over 100 companies and organizations in developing photonic-based opportunities.

Magnifying Your IP IQ: Topics for the Savvy Intellectual Property Manager

NEW

WS1057 · Course level: Intermediate
CEU .35 \$350 Member / \$405 Non-member USD
Tuesday 8:30 am to 12:30 pm

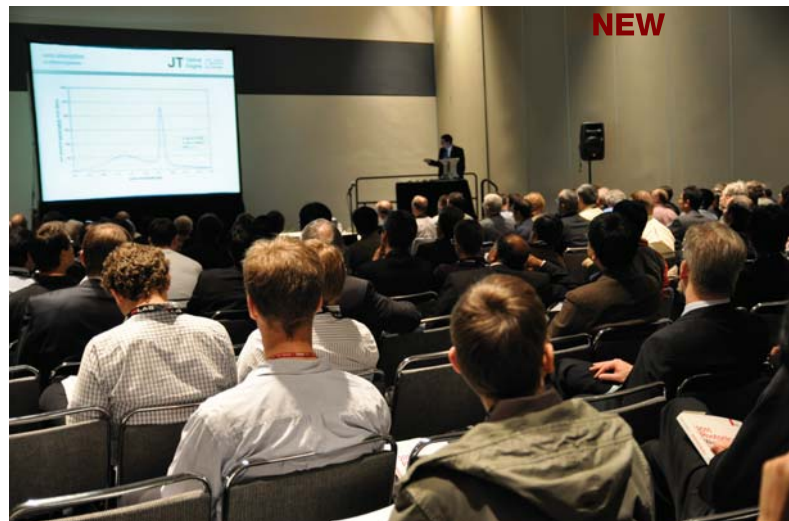
This course covers a variety of topics of interest to those with responsibilities for overseeing an intellectual property portfolio. The topics include the key provisions of non-disclosure and licensing agreements, what to know when dealing with venture capitalists and other prospective investors, methods of accelerating the passage of applications through the U.S. Patent and Trademark Office, selection and protection of trademarks, and how to prepare for offensive or defensive patent litigation.

Mark Gallagher is a partner at Knobbe Martens, an intellectual property law firm. Mr. Gallagher specializes in assisting clients in the optical sciences with preparation and prosecution of patents before the U.S. Patent Office. Mr. Gallagher also represents clients through phases of IP due diligence by prospective investors. Mr. Gallagher holds a J.D. degree and a Ph.D. in optical sciences, both from the University of Arizona.

Lori Yamato is also a partner at the Knobbe Martens law firm and specializes in representing clients in intellectual property deals, including preparation and negotiation of license agreements. Ms. Yamato's practice also includes trademark clearance, prosecution and enforcement. Ms. Yamato holds a J.D. degree from the University of Michigan and a B.S. degree in electrical engineering from the University of Southern California.

David Jankowski is a partner at the Knobbe Martens law firm who specializes in patent infringement litigation, representing both plaintiffs and defendants in federal district court and proceedings before the International Trade Commission. Mr. Jankowski holds a J.D. degree from Stanford University and a Ph.D in Astronomy from Cornell University.

Derek Bayles is an associate at the Knobbe Martens law firm and specializes in assisting clients in the optical sciences with preparation and prosecution of patents before the U.S. Patent Office. Mr. Bayles holds a J.D. degree and a B.S. degree in electrical engineering, both from Brigham Young University.



NEW

Critical Skills for Compelling Research Proposals

NEW

WS1058 · Course level: Introductory
CEU .35 \$150 Member / \$200 Non-member USD
Tuesday 1:30 to 5:30 pm

Research costs money. The good news is that there are thousands of avenues of financial support. The bad news is that hundreds of thousands of proposals are competing for those funds. This class will teach you to craft high-quality proposals that stand out from the masses. We will focus on five fundamental skills that will bolster the substance, structure, and appearance of your proposals. Adhering to these practices will dramatically increase your odds of winning funding for your research.

Damon Diehl is founder and owner of Diehl Research Grant Services. He has a Ph.D. in optical engineering from the University of Rochester Institute of Optics and a B.A. in physics from the University of Chicago. His class is based on fifteen years of academic and industrial research experience.

Registration Required

See SPIE Cashier, North Lobby.

Industry Workshops

Fundamental Optics

Basic Optics for Non-Optics Personnel

WS609 · Course level: Introductory
CEU .20 \$150 Member / \$200 Non-member 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. The material will be presented with a minimal amount of math, rather emphasizing working concepts, definitions, rules of thumb, and visual interpretation of specifications. Specific applications will include defining basic imaging needs such as magnification and depth-of-field, understanding MTF curves and interferograms, and interpreting radiometric terms.

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. He has been recognized for his leadership in optics and machine vision by the Society of Manufacturing Engineers, Automated Imaging Association, and Engineering Society of Detroit. Kevin is a Fellow of SPIE and was the 2008 President of the Society.

Basic Laser Technology

WS972 · Course level: Introductory
CEU .35 \$350 Member / \$405 Non-member 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, nonlinear crystals, and Q-switches. The properties of laser beams will be described in terms of some of their common performance specifications such as longitudinal modes and monochromaticity, transverse electromagnetic (TEM) modes and focusability, continuous wave (CW) power, peak power and power stability. Laser slope and wall-plug efficiencies will also be discussed.

Sydney Sukuta is currently a Laser Technology professor at San Jose City College. He also has industry experience working for some of the world's leading laser manufacturers in Silicon Valley where he saw first-hand the issues they encounter on a daily basis. In response, Dr. Sukuta developed prescriptive short courses to help absolve most of these issues.



Held in conjunction with
SPIE Photonics West

Lasers & Photonics Marketplace
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Based on the Laser Focus World Annual Market Review and Forecast, the Lasers & Photonics Marketplace Seminar provides business leaders, investors, and technology analysts with a detailed review of worldwide laser markets, coupled with discussions of key business and technology trends for the laser and optoelectronics markets.

The Lasers & Photonics Marketplace Seminar is the only event anywhere in the world that focuses on the entire laser marketplace and presents information and analysis of market trends segmented by applications and laser technology. It provides investors, photonics manufacturers, and their suppliers with a comprehensive market perspective that is unobtainable elsewhere.

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Register Now



Career Paths: Exploring Technical Entrepreneurship

Sunday 22 January · 2:00 to 5:00 pm
 Room 121 (Exhibit Level)
 Open to All Attendees

Students and Early Career Professionals - attend this series of talks, discussions, and practical experiences that explore topics in innovation and entrepreneurship.

2:00 to 4:00 pm

Put Your Science to WORK! :: Practical Career Development (and Entrepreneurship)

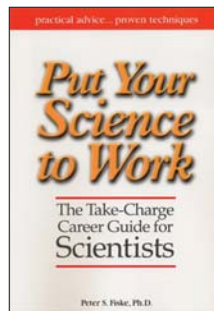
Advice for Young Scientists



Peter S. Fiske, Ph.D.,
 PAX Water Technologies, INC.

- Young scientists and engineers in nearly every field are finding today's job market a confusing and frustrating place. More new PhDs, postdocs and master's degree holders are considering a wider range of careers in and out of science, but feel ill-prepared and uninformed about their options. Yet, scientists and engineers have some of the most valuable skills and best options for rewarding careers. This talk will cover: Current and future employment trends and your options
- Overview of effective career planning and job hunting
- The TRUE breadth of career opportunities for Ph.D.s
- Sought-after skills and experience

Peter S. Fiske, Ph.D. is the co-founder and former VP for Business Development of RAPT Industries, a spin-out from Lawrence Livermore National Laboratory and presently the CEO of PAX Water Technologies, Inc.. Formerly, Fiske was an experimental physicist at Lawrence Livermore National Laboratory where he ran a hypervelocity impact experimental facility and carried out research in the areas of condensed matter physics, high pressure science and high strain-rate deformation. He has organized and led panel discussions and workshops on alternative careers and career development for scientists at national and international meetings, universities, and national laboratories. He has been featured on NPR's Talk of the Nation - Science Friday. Fiske received his Ph.D. in Geochemistry and Materials Science 1993 from Stanford University and is the author of the book *To Boldly Go: A Practical Career Guide for Scientists*, published by AGU and the upcoming second edition *Put Your Science to WORK: The Take-Charge Career Guide for Scientists and Engineers*. He is also a co-author of the biweekly column *Opportunities* on AAAS's Career website ScienceCareers.org



4:00 to 5:00 pm

Starting Up

Blue Ocean Grant Winners

Bill Parker, Creative Microsystems

Scott Rowe, Ocular Prognostics

Dominic Murphy, Fusion Photonics

Nadia Pervez, Chromation Partners LLC

This panel discussion will feature the winners of OceanOptics' Blue Ocean Grant program. Panelists will discuss their experience in fulfilling the many roles of the entrepreneur and provide insights into the next steps for their projects. Learn from the successes and missteps of others before embarking on your quest for commercialization.

Biophotonics Start-up Challenge

Monday 23 January · 4:00 to 5:30 pm
 Room 258 (Mezzanine Level)

*Does your research project have commercial potential?
 Can you convince others?*

Interested in entrepreneurial opportunities in the field of biophotonics? Come to this event to hear research projects that have real commercial potential. This rapid-fire event will feature start-up pitches from students and young professionals as they compete to take their ideas to the next level.

The top three winners of the Start-up challenge will be sponsored to attend the UC-Davis Biomedical Engineering Entrepreneurship Academy courtesy of JENOPTIK. This 5-day academy will help winners construct a business case, analyze markets, and develop a network of connections to help drive their new venture.

Sponsored by



SPIE Job Fair

Top employers are coming together to interview and hire candidates at Photonics West!

Tuesday 24 January · 10:00 am - 5:00 pm

Wednesday 25 January · 10:00 am - 5:00 pm

See details on page 35

PANEL DISCUSSION:

Getting Hired in 2012 and Beyond

Tuesday 24 January · 3:00 to 4:00 pm

Exhibit Hall Southth - Job Fair Area

Open to all attendees

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.

OPTO Start-up Challenge

Wednesday 25 January · 4:30 to 6:00 pm
Room 258 (Mezzanine Level)

*Does your research project have commercial potential?
Can you convince others?*

Interested in entrepreneurial opportunities in the field of optoelectronics? Come to this event to hear research projects that have real commercial potential. This rapid-fire event will feature start-up pitches from students and young professionals as they compete to take their ideas to the next level.

The top three winners of the Start-up challenge will be sponsored to attend the UC-Davis Entrepreneurship Academy courtesy of JENOPTIK. This 5-day academy will help winners construct a business case, analyze markets, and develop a network of connections to help drive their new venture.

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Workshops

These workshops are FREE to SPIE Student Members, but REGISTRATION IS REQUIRED. See SPIE Cashier, North Lobby.

Critical Skills for Compelling Research Proposals

NEW

WS1058 · Course level: Introductory
CEU .35 \$150 Member / \$200 Non-member USD
Tuesday 1:30 to 5:30 pm

This course is free to SPIE Student Members, but you must register to attend.

Research costs money. The good news is that there are thousands of avenues of financial support. The bad news is that hundreds of thousands of proposals are competing for those funds. This class will teach you to craft high-quality proposals that stand out from the masses. We will focus on five fundamental skills that will bolster the substance, structure, and appearance of your proposals. Adhering to these practices will dramatically increase your odds of winning funding for your research.

Damon Diehl is founder and owner of Diehl Research Grant Services. He has a Ph.D. in optical engineering from the University of Rochester Institute of Optics and a B.A. in physics from the University of Chicago. His class is based on fifteen years of academic and industrial research experience.

Resumes to Interviews: Strategies for a Successful Job Search

NEW

WS1059 · Course level: Introductory
CEU .25 \$125 Member / \$175 Non-member USD
Monday 1:30 to 5:30 pm

This course reviews effective strategies and techniques for a successful job search, including writing your cover letter and resume, as well as interviewing tips. The primary goal of the course is to provide creative and proven techniques for new college graduates and professionals to make sense of their job search, have a plan, successfully get the interview, and ultimately land the job.

Creative and comprehensive job search techniques will be discussed as well as actual resume and interviewing examples and tips. Anyone who is getting ready to enter the work force who wants to answer questions such as, "when and how do I start my job search?," "what kind of cover letter and resume gets noticed?" or "how do I sell myself in an interview?" will benefit from taking this course.

Suzanne Krinsky has been in human resources and corporate recruiting for more than 15 years. She has extensive experience with both in-house corporate environments as well as outside agency/consulting environments. Suzanne is currently the Human Resource Director for Daylight Solutions in San Diego, and also a long-time Board member for the Biotech Human Resource Development Coalition (BEDC) and Human Resource Roundtable member.

The Craft of Scientific Presentations: A Workshop on Technical Presentations

WS667 · Course level: Introductory
CEU .35 \$125 Member / \$175 Non-member USD
Wednesday 8:30 am to 12:30 pm

This course provides attendees with an overview of what distinguishes the best scientific presentations. The course introduces a new design for presentation slides that is both more memorable and persuasive from what is typically shown at conferences.

Michael Alley teaches writing and speaking to engineering students at Penn State. Alley has taught this workshop to researchers at the Army Research Laboratory, Lawrence Livermore National Laboratory, United Technologies, the University of Illinois, the University of Oslo, and Virginia Tech.

The Craft of Scientific Writing: A Workshop on Technical Writing

WS668 · Course level: Introductory
CEU .35 \$125 Member / \$175 Non-member USD
Wednesday 1:30 to 5:30 pm

This course provides an overview on writing a scientific paper. The course focuses on the structure, language, and illustration of scientific papers.

Michael Alley teaches writing and speaking to engineering students at Penn State. Alley has taught this workshop to researchers at the Army Research Laboratory, Lawrence Livermore National Laboratory, United Technologies, the University of Illinois, the University of Oslo, and Virginia Tech.

JOB FAIR

SPIE PhotonicsWest

Sponsored by SPIE Career Center

Meet. Discuss. Impress.

Talk with representatives from nearly 50 companies currently looking to hire.

See us in the South Exhibition Hall

Moscone Center, San Francisco, USA

Tuesday 24 January, 10:00 am to 5:00 pm

Wednesday 25 January, 10:00 am to 5:00 pm

spie.org/pwjobfair

Meet with representatives from companies like these:

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SEMI-CONDUCTOR ELECTRONICS TECHNOLOGY, INC.

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A Teledyne Technologies Company

 **ZEISS**

 **DSI** Deposition Sciences CORPORATION
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 **Ocean Optics**

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Network

Networking Receptions · Student Social Events · SPIE Member Events



Join your colleagues and develop new relationships at these relaxed-atmosphere networking events.



Lunch with the Experts - A BiOS Student Networking Event

Sunday 22 January · 12:30 to 1:30 pm · Room 131 (Exhibit Level)
Open to BiOS Student Attendees

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. Seating is limited and will be granted on a first-come, first-served basis.

Student Chapter Leadership Meeting

Sunday 22 January · 6:00 to 8:30 pm
Location: Intercontinental Hotel - Telegraph Hill Room

Open to All Student Chapter Members

Get the latest news on the Student Chapter program direct from SPIE Student Services. Learn what's coming up and discuss new directions for student chapters. This interactive session will provide time for student leaders to network and share their experience with other chapter officers.



Guest speaker:

Thomas Tongue
CEO - Zomega Terahertz Corp.

Covering topics like efficient ways to build consensus, decision-making models, and group management, learn from a successful CEO what motivates people and how to better manage your chapter.

SPIE Fellows Lunch

Monday 23 January · 12:00 to 1:30 pm
InterContinental Hotel, InterContinental Ballroom

All Fellows of SPIE are invited to join your colleagues for an SPIE hosted lunch. The new SPIE Fellows attending Photonics West will be introduced and recognized. Please join us for this informal gathering and a chance to interact with other Fellows. Fellows planning to attend are asked to RSVP to Brent Johnson (brentj@spie.org).



Dr. Aydogan Ozcan

University of California Los Angeles

Photonics based Telemedicine Technologies toward Smart Global Health Systems

In this talk Dr. Ozcan will introduce new imaging and detection architectures that can compensate in the digital domain for the lack of complexity of optical components by use of novel theories and numerical algorithms to address the immediate needs and requirements of Telemedicine for Global Health Problems. Applications of a lensfree on-chip microscopy platform to high-throughput imaging and automated counting of whole blood cells, monitoring of HIV+ patients (through CD4 and CD8 T cell counting) and detection of waterborne parasites towards rapid screening of water quality will also be demonstrated.

Dr. Aydogan Ozcan received his Ph.D. degree at Stanford University Electrical Engineering Department in 2005. After a short post-doctoral fellowship at Stanford University, he is appointed as a Research Faculty Member at Harvard Medical School, Wellman Center for Photomedicine in 2006. Dr. Ozcan joined UCLA in the summer of 2007, where he is currently an Associate Professor leading the Bio-Photonics Laboratory at the Electrical Engineering and Bioengineering Departments. This year, Dr. Ozcan was among those being honored by U.S. President Barack Obama with the *Presidential Early Career Award for Scientists and Engineers*.

Social and Networking Events

Women in Optics Presentation and Reception

Monday 23 January · 4:30 to 6:00 pm
InterContinental Hotel, InterContinental Ballroom C

Open to all conference attendees.

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



Leslie Fishlock
Founder of Geek Girl Camp

Empowering Women in Tech: Mentor, Give Back, Pay it Forward

Leslie is best known as the CEO, founder and Geek Girl #1 of Geek Girl, whose mission is to educate and empower every girl and woman (and dude) at every age level, on every skill level, at every income level on computer technology. Leslie's vision for education, evangelism, entrepreneurialism, and empowering women is apparent when you meet her. Leslie prides herself on being "the resource", and will share everything she knows about entrepreneurialism, starting a business and tech with anyone who asks.

Her most recent success has been to launch the first Geek Girl Educational Training Center (GGETC) in Hyannis, MA. The Geek Girl ETC offers workshops, personal consultation, drop-in classes, and all forms of group learning, onsite and offsite, and online. Included in this educational endeavor is their famous Help Desk services and Geek Girl for Hire.



SPIE Photonics West Welcome Reception

Monday 23 January · 7:00 to 8:30 pm
Marriott Marquis Hotel, Golden Gate Ballroom

"The Art of Optics"

Enjoy a night of photonics-inspired art, conversations with your colleagues, and food tasting from around the world. Please remember to wear your conference registration badges. Dress is casual.

Photonics West maps:

Moscone Center Maps pp. 2-4
Walking Map p. 4

SPIE Senior Member Breakfast

Tuesday 24 January · 8:00 to 9:00 am
InterContinental Hotel, Ballroom C

All SPIE Senior Members are invited to join your colleagues for this first annual SPIE-hosted buffet breakfast. Please join us for this informal gathering and a chance to interact with other Senior Members. Please plan to wear your yellow Senior Member ribbon for entry into this event.

Senior Members planning to attend are asked to RSVP to Brent Johnson (brentj@spie.org).

Student Chapter Info Session

Tuesday 24 January · 1:45 to 2:30 pm
Location: Marriott Marquis Hotel, Sierra K
Open to All Attendees

Interested in starting a Student Chapter or just want to learn more about the program and its benefits? Get your questions answered at this informal information session hosted by SPIE Student Services.



A Student Networking Event

Tuesday 24 January · 12:30 to 1:30 pm
Location: Marriott Marquis Hotel, Golden Gate Room C
Open to Student Attendees

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. Seating is limited and will be granted on a first-come, first-served basis.

Sponsored by:



Newport 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 Photonics West or 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

Speed Networking Social

Tuesday 24 January · 4:30 to 6:00 pm
Open to All Attendees

Join us for the next generation of networking. Add a new contact to your network every three minutes while enjoying appetizers at an off-site venue. Bring plenty of business cards, practice your pitch, and prepare to expand your network.

ThirstyBear Brewing Co.

661 Howard Street

From the Moscone Center:
Head Northwest on 3rd Street
Turn right on Howard Street
ThirstyBear is just up the block on your right.

SPIE Member Reception

Hilton San Francisco Union Square Hotel,
333 O'Farrell Street

Tuesday 24 January · 8:00 to 9:30 pm
Cityscape (46th Floor)

For 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. Please note: this reception is limited to SPIE Members only. Membership cards or invitations will be requested at the entrance. If you join SPIE on-site, please bring your registration receipt. Dress is casual or business attire.

“No Ties” Student Social

Wednesday 25 January · 8:00 to 10:00 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 Street toward 4th Street
Turn right on 4th Street
Jillian's is on the right



Prism Awards Ceremony and Banquet

Wednesday 25 January · 6:30 to 10:30 pm
Hilton Hotel, Grand A Ballroom

Seating Limited. Ticket Required.

Join this gala event in which SPIE and Photonics Media recognize the most innovative new photonic products on the market. Network with industry leaders at this VIP event. The evening begins with a reception, followed by an elegant dinner and award ceremony. Please bring tickets to the door. Dress is business or formal attire. Email innovation@spie.org for ticket information.

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PRISM AWARDS

Winners Announced
at Photonics West

Award Ceremony

Wednesday 25 January

6:30 pm

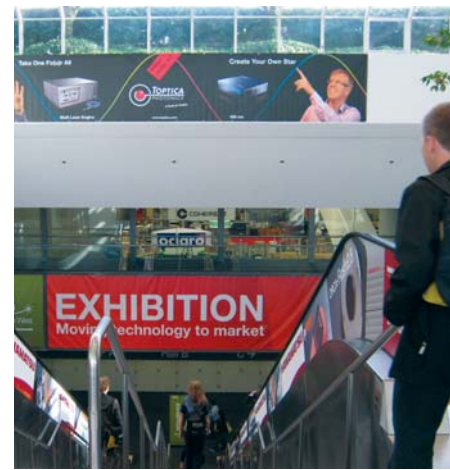
Tickets: \$80

Formal or business attire

For ticket information,
go to the SPIE Cashier
or for more information

prismaward.org

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Experience the impact of SPIE Photonics West

Walk the floor of two technology-packed free exhibitions

Photonics West

24–26 January 2012

The Moscone Center
San Francisco, California, USA

Exhibition Hours

The Moscone Center,
South Hall ABC and North Hall D

Tuesday 24 January
10:00 am to 5:00 pm

Wednesday 25 January
10:00 am to 5:00 pm

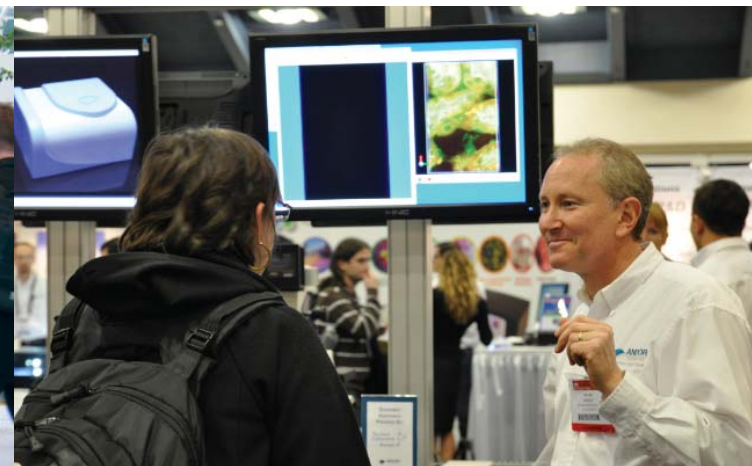
Thursday 26 January
10:00 am to 4:00 pm

There is absolutely no other photonics and laser exhibition in North America with the size and prestige of SPIE Photonics West. You will see the latest products, top companies, and industry leaders at Photonics West.

Exhibition Technologies

Laser sources and systems · Optical components and materials · IR sources and detectors · Cameras and sensors · Electronic imaging components · Fiber optic systems · Optical coatings · Lenses and filters · Positioning and mounts · Metrology

Photonics West – 1,185 Companies · 150 New Products being launched



If you work in biomedical optics you can't afford to miss the **BiOS Exhibition**

BiOS EXPO

21–22 January 2012

The Moscone Center
San Francisco, California, USA

Take advantage of this focused exhibition. SPIE BiOS is the ideal place to interact with the developers and early adopters of the newest biophotonics technologies, as well as the best venue to see the latest technologies and instrumentation for imaging, diagnostics, and therapeutics.

Exhibition Technologies

Molecular imaging · Lasers · Biomedical optics components and instrumentation · Nano/biophotonics · Biosensors · Spectroscopy
Microscopic imaging · Life sciences

Exhibition Hours

The Moscone Center,
South Hall A

Saturday 21 January
12:00 to 5:00 pm

Sunday 22 January
10:00 am to 5:00 pm

BiOS EXPO — 215 Companies


Exhibitor Product Demonstrations

Product Demonstrations are free and open to all attendees. Various exhibiting companies will be showcasing new and successful products in half-hour demonstration/question and answer sessions.

	Saturday, 21 January	Sunday, 22 January
	Demo Area South Hall A	Demo Area South Hall A
11:30 am	Fiber Optic Probes for Medical Sensing and OCT Applications Baishi Wang, Vytran	
12:30 pm	Ever Smaller Optics Enable More Compact, Capable Biomedical Devices Randal Chinnoek, Optimum Technologies Incorporated	
1:30 pm	State-of-the-Art Dispersion Management with Broadband Multilayer Reflectors Gabriel Tempea, FEMTOLASERS	
2:30 pm	OFS Composite Cables and Assemblies Steve Allen, OFS SPD	
3:30 pm		OEM Miniature Spectrometers and CCD Detectors Rich Meinecke, HORIBA Scientific

Tuesday, 24 January

	Demo Area 1 South Hall A	Demo Area 2 North Hall D
10:30 am	New climatic resistant BG60/BG61 blue filter glass for IR cut filter used in digital cameras Steffen Reichel, SCHOTT North America, Inc.	SCHOTT is introducing PURAVIS™ eco-friendly glass optical fibers Karin Holst, SCHOTT North America, Inc.
11:30 am	Chalcogenite Components for short to long wave infrared applications: SCHOTT now produces materials and components in the US Nathan Carlie, SCHOTT North America, Inc.	Polyimide coated Bend-Insensitive Singlemode Fibers for Harsh Environments of Embedded and High Temperature Applications Andy Gillooly, Fibercore Ltd.
12:30 pm	Laser Optics for printing and annealing and for free space communication Rainer Schuhmann, Berliner Glas KGaA and Herbert Kubatz, GmbH & Co.	New developments on ZERODUR Thomas Westerhoff, SCHOTT North America, Inc.
1:30 pm	High Power 2 micron Q-switched and Mode Locked Fiber Lasers Shibin Jiang, AdValue Photonics	Robust Adiabatic Fiber Tapering Equipment for Production Lines Wenxin Zheng, AFL
2:30 pm	Getting Hired in 2012 and Beyond Join the SPIE Career Center for a panel discussion with hiring managers from leading optics companies. Learn how to be successful in your job search.	USPM Spectral Reflectivity Measurement System Mario Gislao, Olympus America Inc.
3:30 pm	Getting Hired in 2012 and Beyond Join the SPIE Career Center for a panel discussion with hiring managers from leading optics companies. Learn how to be successful in your job search.	New LG940 Laser Glass Nathan Carlie, SCHOTT North America
4:30 pm	Optikos LensCheck™ Optikos Corporation	Optical Fibers for RGB-UV Applications Andy Gillooly, Fibercore Ltd.

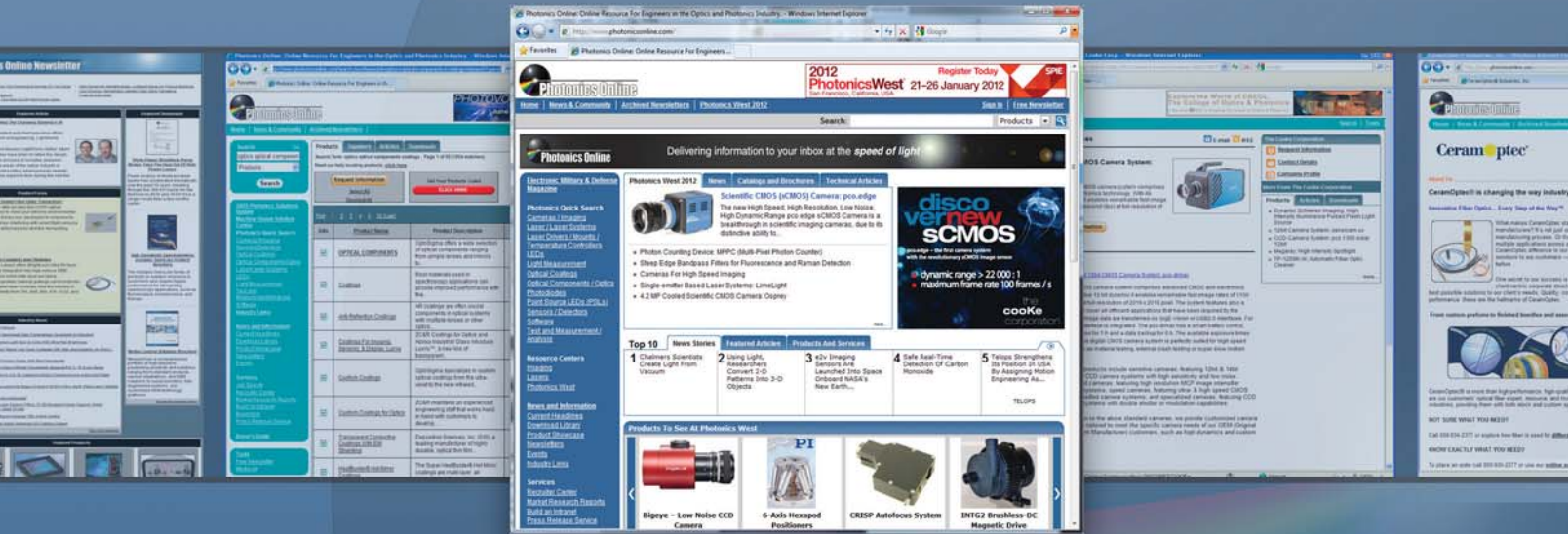


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North Lower Lobby



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Photronics Online is the leading Web site for the optics and photonics industry, serving the needs of industry professionals since 1997. We are your information source for everything related to optics and photonics technology, whether you are searching for product overviews, technical articles, or industry news ... or looking to market your products and services in this space. Visit us at www.photronicsonline.com.

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Stay engaged with your peers in the industry through our active online community.

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Get technical articles, product overviews, case studies, white papers, and news delivered directly to your inbox.



Visit Photronics West Booth 4231 for a chance to WIN an iPad 2.



Exhibitor Product Demonstrations continued

Product Demonstrations are free and open to all attendees. Various exhibiting companies will be showcasing new and successful products in half-hour demonstration/question and answer sessions.

Wednesday, 25 January

	Demo Area 1 South Hall A	Demo Area 2 North Hall D
10:30 am	SUltra: A Compact OEM Laser Solution Kendra Gallup, Laser Operations LLC / QPC Lasers	Fiber Optic Switch – Multimode Demo (SM Available) Stefan Gropp & Matt Webb, LEONI Fiber Optics, Inc.
11:30 am	Structural & Chemical Nanocharacterization: Integrated AFM & Raman Aaron Lewis, Nanonics Imaging Ltd.	New Generation SR-5000N Spectroradiometer Ilya Koshkin, CI Systems, Inc.
12:30 pm	LED Utility RSoft Design Group	SiMOST™: Silicon integrated Micro Optical Systems Technology Bassam Saadany & Ahmed Korayem, Si-Ware Systems
1:30 pm	Ready-to-use optical components and glass filters with anti-reflective and highly reflective coatings Steffen Reichel, SCHOTT North America, Inc.	ePM: PMT Replacement with Photodiodes Ed Weiss, First Sensor AG
2:30 pm	Rigorous and approximate analysis and optimization of diffractive and microoptical components with LightTrans VirtualLab™ 5 Michael Kuhn, LightTrans, Inc.	Miniature camera solution: elements of a high-resolution, auto-focusing camera system for biometrics, medical and more Dan Viggiano III, New Scale Technologies
3:30 pm	DLP LightCrafter Demonstration Gina Park, Texas Instruments	OEM Miniature Spectrometers and CCD Detectors Rich Meinecke, HORIBA Scientific
4:30 pm	Hardest Coating from SCHOTT Steffen Reichel, SCHOTT North America, Inc.	500mW Pico-Green Laser Module Chang-Qing Xu, CQ Laser Technologies Co., Ltd

Thursday, 26 January

	Demo Area 1 South Hall A	Demo Area 2 North Hall D
10:30 am	ZEMAX 12 Akash Arora, RadiantZEMA	Discover Acktar Ltd.'s New Ultra Black Coating for Stray Light Elimination David Alster, Acktar Ltd
11:30 am	Nanocharacterization Workstation for Silicon & Plasmonic Photonics Aaron Lewis, Nanonics Imaging Ltd	Electro-optical liquid crystal multiplexer Florenta Costache, Fraunhofer IPMS
12:30 am	Fourier Analysis Method for Asymmetric Polarization-Maintaining Fiber Alignment Wenxin Zhen, AF	Ultra Compact High Power Diode Laser Drivers Hans-Dieter Gehlen, Amtron Gmb
1:30 pm	CAS-4100: New Generation Compact Automated Splicer for Optical Fiber Device Production Baishi Wang, Vytran	Scratch and Dig measurements using the SavvyInspector™ Dave Aikens, Savvy Optics Corp.
2:30 pm	New Generation Optical Fiber Recoaters for Flexible Applications Johan Gribbe, AFL & NYFORS	Advances in Ultrafast Laser Technology DI Andreas Stingl, FEMTOLASERS
3:30 pm	POPSUD-OPTITEC: Photonics Cluster in South of France Marie Lhoutellier, POPSUD-OPTITEC	Progress in PPLN Wavelength Conversion Christian Rahlf, Covesion Ltd.



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Date: April 25 (Wed.) – 27 (Fri.), 2012

Place: Pacifico Yokohama (Yokohama, Japan)

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- Laser Display Conference '12 (LDC'12)**
The Japan Society of Applied Physics
- Conference on Laser Surgery and Medicine (CLSM 2012)**
Japan Society for Laser Surgery and Medicine
- International Conference on High Energy Density Science 2012 (HEDS 2012)**
The Laser Society of Japan
- Conference on Laser Inertial Fusion Energy (CLIFE '12)**
Institute of Laser Engineering, Osaka University
- International Symposium on Laser Processing for CFRP and Composite Materials 2012 (LPCC '12)**
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For further information **The Optronics Co., Ltd. International Dept.**

E-mail: intl@optronics.co.jp <http://www.optronicsjp.com/>

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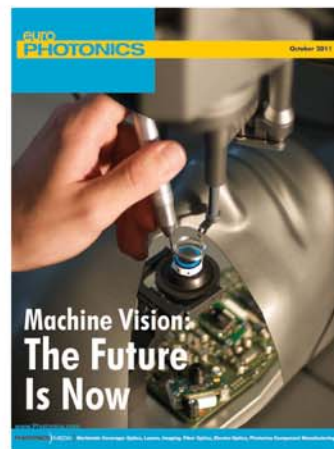
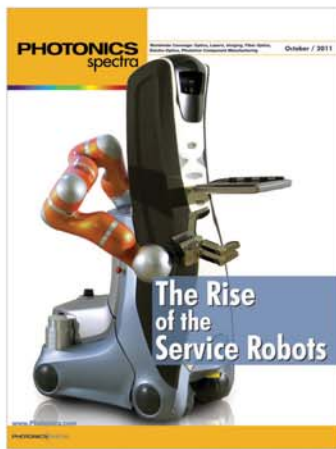
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- SC978 **Light Microscopy** (Tkaczyk)
Sun. 1:30 to 5:30 pm, \$385 / \$440
- SC981 **Biomedical Fiber Optic Sensors and Applications**
(Mendez, McLaughlin)
Mon. 8:30 am to 12:30 pm, \$405 / \$440
- SC868 **Optical Design for Biomedical Imaging** (Liang)
Tues. 1:30 to 5:30 pm, \$430 / \$485
- SC1013 **Choosing the Correct Optical Filter for Your Application** (Reichel) 1:30 to 5:30 pm, \$350 / \$405
- SC1053 **Ultrafast Laser Pulse Shaping and Adaptive Pulse Compression** (Dantus) **NEW**
Tues. 1:30 to 5:30 pm, \$350 / \$405
- SC1051 **Fundamentals of Microscope Design** (Seward) **NEW**
Wed. 8:30 am to 12:30 pm, \$350 / \$405

Clinical Technologies and Systems

- SC312 **Principles and Applications of Optical Coherence Tomography** (Fujimoto)
Sun. 1:30 to 5:30 pm, \$350 / \$405
- SC981 **Biomedical Fiber Optic Sensors and Applications**
(Mendez, McLaughlin)
Mon. 8:30 am to 12:30 pm, \$350 / \$405

Displays and Holography

- SC011 **Design of Efficient Illumination Systems** (Cassarly)
Mon. 1:30 to 5:30 pm, \$350 / \$405

Laser Applications

- SC746 **Introduction to Ultrafast Technology** (Trebino)
Tues. 1:30 to 5:30 pm, \$350 / \$405
- SC188 **Laser Beam Propagation for Applications in Laser Communications, Laser Radar, and Active Imaging**
(Phillips, Andrews) 8:30 am to 5:30 pm, \$705 / \$815

Laser Micro-/Nanoengineering

- SC743 **Micromachining with Femtosecond Lasers** (Nolte, Schaffer)
Mon. 1:30 to 5:30 pm, \$350 / \$405
- SC689 **Precision Laser Micromachining** (Schaeffer)
Wed. 1:30 to 5:30 pm, \$350 / \$405

Laser Source Engineering

- SC752 **Solid State Laser Technology** (Hodgson)
Sat. 8:30 am to 5:30 pm, \$690 / \$800
- SC748 **High-Power Fiber Sources** (Nilsson)
Sun. 8:30 am to 5:30 pm, \$575 / \$685
- SC818 **Laser Beam Quality** (Paschotta)
Sun. 8:30 am to 12:30 pm, \$350 / \$405
- SC1020 **Splicing of Specialty Fibers and Glass Processing of Fused Fiber Components for Fiber Lasers** (Wang)
Sun. 8:30 am to 12:30 pm, \$350 / \$405
- SC1012 **Coherent Mid-Infrared Sources and Applications** (Vodopyanov)
Sun. 1:30 to 5:30 pm, \$350 / \$405
- SC744 **Ultrafast Fiber Lasers** (Fermann)
Sun. 1:30 to 5:30 pm, \$350 / \$405
- SC931 **Applied Nonlinear Frequency Conversion** (Paschotta)
Mon. 8:30 am to 5:30 pm, \$575 / \$685
- SC974 **Interconnection and Splicing of High-Power Optical Fibers**
(Yablon) 8:30 am to 12:30 pm, \$350 / \$405
- SC977 **Fundamentals of Laser Beam Profile Measurements**
(Rypma) 8:30 am to 12:30 pm, \$350 / \$405
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- SC1053 **Ultrafast Laser Pulse Shaping and Adaptive Pulse Compression** (Dantus) 1:30 to 5:30 pm, \$350 / \$405
- WS972 **Basic Laser Technology** (Sukuta)
Wed. 8:30 am to 12:30 pm, \$350 / \$405
- SC860 **Resonator Design for Solid State Lasers** (Paschotta)
Wed. 8:30 am to 5:30 pm, \$575 / \$685

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Metrology & Standards

- SC212 **Modern Optical Testing** (*Wyant*)
Sun. 8:30 am to 12:30 pm, \$385 / \$440
- SC211 **Practical Interferometry and Fringe Analysis** **NEW**
Mon. (*Creath*) 8:30 am to 5:30 pm, \$575 / \$685
- SC1003 **Optical Scatter Metrology for Industry** (*Stover*) **NEW**
Mon. 8:30 am to 12:30 pm, \$410 / \$465
- SC1011 **Understanding Waviness and Roughness**
Tues. **Specifications for Optics** (*Aikens*) 1:30 to 5:30 pm, \$350 / \$385
- SC700 **Understanding Scratch and Dig Specifications** (*Aikens*)
Wed. 8:30 am to 12:30 pm, \$420 / \$475
- SC1017 **Optics Surface Inspection Workshop** (*Aikens*)
Wed. 1:30 to 5:30 pm, \$430 / \$485

Micro/Nanofabrication

- SC454 **Fabrication Technologies for Micro- and Nano-Optics**
Mon. (*Suleski*) 8:30 am to 12:30 pm, \$350 / \$405
- SC743 **Micromachining with Femtosecond Lasers** (*Nolte, Schaffer*)
Mon. 1:30 to 5:30 pm, \$350 / \$405
- SC532 **Micro- and Nanofluidics - Technology and Applications**
Wed. (*Gärtner*) 8:30 am to 12:30 pm, \$350 / \$405
- SC689 **Precision Laser Micromachining** (*Schaeffer*)
Wed. 1:30 to 5:30 pm, \$350 / \$405

Nano/Biophotonics

- SC463 **Biophotonics** (*Prasad*)
Sun. 8:30 am to 5:30 pm, \$655 / \$765
- SC1013 **Choosing the Correct Optical Filter for Your Application**
Tues. (*Reichel*) 1:30 to 5:30 pm, \$350 / \$405
- SC727 **Nanoplasmonics** (*Stockman*)
Wed. 8:30 am to 5:30 pm, \$575 / \$685

Nanotechnologies in Photonics

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

Nonlinear Optics

- SC1060 **Fundamentals of Nonlinear Optics** (*Powers*) **NEW**
Sun. 8:30 am to 12:30 pm, \$350 / \$405
- SC1020 **Splicing of Specialty Fibers and Glass Processing of Fused Fiber Components for Fiber Lasers** (*Wang*)
Sun. 8:30 am to 12:30 pm, \$350 / \$405
- SC1012 **Coherent Mid-Infrared Sources and Applications**
Sun. (*Vodopyanov*) 1:30 to 5:30 pm, \$350 / \$405
- SC931 **Applied Nonlinear Frequency Conversion** (*Paschotta*)
Mon. 8:30 am to 5:30 pm, \$575 / \$685
- SC974 **Interconnection and Splicing of High-Power Optical Fibers**
Mon. (*Yablon*) 8:30 am to 12:30 pm, \$350 / \$405

Optical Communications: Devices to Systems

- SC188 **Laser Beam Propagation for Applications in Laser Communications, Laser Radar, and Active Imaging**
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Optics and Optical Engineering

- SC1060 **Fundamentals of Nonlinear Optics** (*Powers*) **NEW**
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Sun. 8:30 am to 5:30 pm, \$575 / \$685
- SC156 **Basic Optics for Engineers** (*Ducharme*)
Mon. 8:30 am to 5:30 pm, \$615 / \$725
- SC690 **Optical System Design: Layout Principles and Practice**
Mon. (*Greivenkamp*) 8:30 am to 5:30 pm, \$685 / \$795
- SC321 **Thin Film Optical Coatings** (*Macleod*)
Mon. 8:30 am to 5:30 pm, \$575 / \$685
- SC011 **Design of Efficient Illumination Systems** (*Cassarly*)
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- SC206 **Polarized Light: A Practical Hands-on Introduction** (*Fisher*)
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- SC003 **Practical Optical System Design** (*Youngworth*)
Tues. 8:30 am to 5:30 pm, \$660 / \$770
- SC017 **Principles of Fourier Optics and Diffraction** (*Gaskill*)
Tues. 8:30 am to 5:30 pm, \$680 / \$790
- SC915 **Radiometry Revealed** (*Shaw*) **NEW**
Tues. 8:30 am to 12:30 pm, \$350 / \$405
- SC1011 **Understanding Waviness and Roughness Specifications for Optics** (*Aikens*) 1:30 to 5:30 pm, \$350 / \$405
- SC1013 **Choosing the Correct Optical Filter for Your Application**
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- SC1055 **Applied Diffractive Optics** (*Soskind*)
Wed. 8:30 am to 12:30 pm, \$385 / \$440
- SC1061 **Designing Optical Systems with Manufacturable Aspheres** (*Bentley*) **NEW**
Wed. 8:30 am to 12:30 pm, \$350 / \$405
- SC1039 **Evaluating Aspheres for Manufacturability** **NEW**
Wed. (*Forbs, Murphy, Dumas*) 1:30 to 5:30 pm, \$350 / \$405
- SC1052 **Optical Systems Engineering: A Practical Approach** **NEW**
Wed. (*Kasunic*) 8:30 am to 5:30 pm, \$575 / \$685
- SC700 **Understanding Scratch and Dig Specifications** (*Aikens*)
Wed. 8:30 am to 12:30 pm, \$420 / \$475
- SC1017 **Optics Surface Inspection Workshop** (*Aikens*)
Wed. 1:30 to 5:30 pm, \$430 / \$485
- WS972 **Basic Laser Technology** (*Sukuta*)
Wed. 8:30 am to 12:30 pm, \$350 / \$405

Optoelectronic Materials and Devices

- SC1060 **Fundamentals of Nonlinear Optics** (*Powers*) **NEW**
Sun. 8:30 am to 12:30 pm, \$350 / \$405
- SC547 **Terahertz Wave Technology and Applications** (*Zhang*)
Sun. 1:30 to 5:30 pm, \$350 / \$405
- SC931 **Applied Nonlinear Frequency Conversion** (*Paschotta*)
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- SC747 **Semiconductor Photonic Device Fundamentals** (*Linden*)
Mon. 8:30 am to 5:30 pm, \$575 / \$685
- SC817 **Silicon Photonics** (*Michel, Saini*)
Tues. 8:30 am to 12:30 pm, \$350 / \$405

Optomechanics

- SC010 **Introduction to Optical Alignment Techniques** (*Ruda*)
Tues-Wed. 8:30 am to 5:30 pm, \$1050 / \$1305
- SC781 **Optomechanical Analysis** (*Hatheway*)
Tues. 8:30 am to 5:30 pm, \$575 / \$685
- SC015 **Structural Adhesives for Optical Bonding** (*Daly*)
Tues. 8:30 am to 12:30 pm, \$350 / \$405

Photonic Integration

- SC747 **Semiconductor Photonic Device Fundamentals** (*Linden*)
 Mon. 8:30 am to 5:30 pm, \$575 / \$685
 SC817 **Silicon Photonics** (*Michel, Saini*)
 Tues. 8:30 am to 12:30 pm, \$350 / \$385

Semiconductor Lasers and LEDs

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 SC974 **Interconnection and Splicing of High-Power Optical Fibers** (*Yablon*) 8:30 am to 12:30 pm, \$350 / \$405
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 Mon. 8:30 am to 12:30 pm, \$420 / \$475
 SC747 **Semiconductor Photonic Device Fundamentals** (*Linden*)
 Mon. 8:30 am to 5:30 pm, \$575 / \$685
 SC011 **Design of Efficient Illumination Systems** (*Cassarly*)
 Mon. 1:30 to 5:30 pm, \$350 / \$405
 SC977 **Fundamentals of Laser Beam Profile Measurements** (*Rypma*)
 Tues. 8:30 am to 12:30 pm, \$350 / \$405

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

- SC029 **Tissue Optics** (*Jacques*) 1:30 to 5:30 pm, \$350 / \$405
 Sun.

Industry Workshops

Business & Intellectual Property

- WS1057 **Magnifying Your IP IQ: Topics for the Savvy Intellectual Property Manager** (*Gallagher, Yamato, Jankowski, Bayles*) **NEW**
 Tues. 8:30 am to 12:30 pm, \$350 / \$405
 WS1056 **Commercialization of Photonics Technology** (*Krohn*) **NEW**
 Tues. 1:30 to 5:30 pm, \$350 / \$405
 WS1058 **Critical Skills for Compelling Research Proposals** **NEW** (*Diehl*) 1:30 to 5:30 pm, \$150 / \$200

Fundamental Optics

- WS609 **Basic Optics for Non-Optics Personnel** (*Harding*)
 Mon. 1:30 to 4:00 pm, \$150 / \$200
 WS972 **Basic Laser Technology** (*Sukuta*)
 Wed. 8:30 am to 12:30 pm, \$350 / \$405

Professional Development Workshops

- WS1059 **Resumes to Interviews: Strategies for a Successful Job Search** (*Krinsky*) 1:30 to 5:30 pm, \$125 / \$175
 WS1058 **Critical Skills for Compelling Research Proposals** **NEW** (*Diehl*) 1:30 to 5:30 pm, \$150 / \$200
 WS667 **The Craft of Scientific Presentations: A Workshop on Technical Presentations** (*Alley*)
 Wed. 8:30 am to 12:30 pm, \$125 / \$175
 WS668 **The Craft of Scientific Writing: A Workshop on Technical Writing** (*Alley*) Wed. 1:30 to 5:30 pm, \$125 / \$175

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Photonic Therapeutics and Diagnostics

Program Chair: **Brian Jet-Fei Wong**,
Beckman Laser Institute and Medical Clinic,
Univ. of California, Irvine (USA)

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Nano/Biophotonics

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- Robert Alfano**, The City College of New York (USA)
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- Haishan Zeng**, The BC Cancer Agency Research Ctr. (Canada)

BiOS Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Photonic Therapeutics and Diagnostics			Program Chair: Brian Jet-Fei Wong , Beckman Laser Institute and Medical Clinic, University of California, Irvine (USA)		
8207A Photonics in Dermatology and Plastic Surgery (<i>Kollias, Choi, Zeng</i>) p. 63		8207G Photons and Neurons IV (<i>Mahadevan-Jansen, Jansen</i>) p. 76			
8207B Therapeutics and Diagnostics in Urology: Lasers, Robotics, Minimally Invasive, and Advanced Biomedical Devices (<i>Kang, Knudsen</i>) p. 65		8208 Lasers in Dentistry XVIII (<i>Rechmann, Fried</i>) p. 79			
8207C Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology (<i>Wong, Ilgner, Izdebski</i>) p. 67					
8207D Optical Techniques in Pulmonary Medicine (<i>Suter, Lam, Brenner</i>) p. 70					
8207E Diagnostic and Therapeutic Applications of Light in Cardiology (<i>Gregory, Tearney, Marcu</i>) p. 72					
8207F Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology (<i>Hirschberg, Madsen</i>) p. 74					
8207H Optics in Bone Surgery and Diagnostics (<i>Mandelis</i>) p. 78					
8209 Ophthalmic Technologies XXII (<i>Manns, Söderberg, Ho</i>) p. 81					
8210 Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXI (<i>Kessel, Hasan</i>) p. 85					
8211 Mechanisms for Low-Light Therapy VII (<i>Hamblin, Anders, Carroll</i>) p. 88					
8212 Frontiers in Biological Detection: From Nanosensors to Systems (<i>Miller, Fauchet</i>) p. 90					

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21–22 January 2012
SOUTH HALL A

Saturday · 12:00 pm to 5:00 pm
Sunday · 10:00 am to 5:00 pm

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
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Clinical Technologies and Systems

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

		8213 Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVI (<i>Izatt, Fujimoto, Tuchin</i>) p. 92			
	8214 Advanced Biomedical and Clinical Diagnostic Systems X (<i>Vo-Dinh, Mahadevan-Jansen, Grundfest</i>) p. 98				
	8215 Design and Quality for Biomedical Technologies V (<i>Raghavachari, Liang</i>) p. 101		8220 Optical Biopsy X (<i>Alfano</i>) p. 111		
8216 Multimodal Biomedical Imaging VII (<i>Azar, Intes</i>) p. 103					
	8217 Endoscopic Microscopy VII (<i>Tearney, Wang</i>) p. 105				
8219 Biomedical Vibrational Spectroscopy VII: Advances in Research and Industry (<i>Mahadevan-Jansen, Petrich</i>) p. 109					
8218 Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XII (<i>Gannot</i>) p. 107					

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: **Steven L. Jacques**, Oregon Health & Science Univ. (USA) and **William P. Roach**, U.S. Air Force (USA)

8229B Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue IV (<i>Nordstrom</i>) p. 147		8207G Photons and Neurons IV (<i>Mahadevan-Jansen, Jansen</i>) p. 76			
		8221 Optical Interactions with Tissue and Cells XXIII (<i>Jansen, Thomas</i>) p. 114			
8222 Dynamics and Fluctuations in Biomedical Photonics VII (<i>Tuchin, Duncan, Larin, Leahy, Wang</i>) p. 117					
	8223 Photons Plus Ultrasound: Imaging and Sensing 2012 (<i>Oraevsky, Wang</i>) p. 120				
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BiOS Daily Conference Schedule

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Nano/Biophotonics			Program Chairs: Paras Prasad , SUNY/Buffalo (USA) and Dan V. Nicolau , The Univ. of Liverpool (United Kingdom)		
8232 Colloidal Nanocrystals for Biomedical Applications VII (<i>Parak, Yamamoto, Osirski</i>) p. 154		8233 Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications (<i>Achilefu, Raghavachari</i>) p. 157		8231 Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VIII (<i>Cartwright, Nicolau</i>) p. 152	
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<p>Photonics West maps: Moscone Center Maps pp. 2–4 Walking Map p. 4</p>					

Photonics in Dermatology and Plastic Surgery

Conference Chairs: **Nikiforos Kollias**, Johnson & Johnson CPPW (USA); **Bernard Choi**, Beckman Laser Institute and Medical Clinic (USA); **Huishan Zeng**, The BC Cancer Agency Research Ctr. (Canada)

Program Committee: **Anthony J. Durkin**, Beckman Laser Institute and Medical Clinic (USA); **Iltefat Hamzavi**, Henry Ford Hospital (USA); **Jessica C. Ramella-Roman**, The Catholic Univ. of America (USA)

Saturday 21 January

SESSION 1

Room: 303 (Esplanade) Sat. 8:30 to 10:15 am

Session I

Session Chair: **Jessica C.**

Ramella-Roman, The Catholic Univ. of America (USA)

8:30 am: **Validation study of automated dermal/epidermal junction localization algorithm in reflectance confocal microscopy images of skin**, Sila Kurugol, Jennifer Dy, Northeastern Univ. (USA); Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA); Dana H. Brooks, Northeastern Univ. (USA) [8207A-01]

8:50 am: **Collagen crosslink status analysed in vitro using second-harmonic generation (SHG) and fluorescence lifetime imaging (FLIM)**, Vivien Lutz, Stefan Puschmann, Stefan Gallinat, Horst Wenck, Klaus-Peter Wittern, Frank F. Fischer, Beiersdorf AG (Germany) [8207A-02]

9:10 am: **The characterisation of skin lesions using two-photon excited multispectral fluorescence lifetime imaging**, Clifford B. Talbot, Imperial College London (United Kingdom); Rakesh Patalay, Imperial College London (United Kingdom) and Imperial College Healthcare NHS Trust (United Kingdom); Yuriy Alexandrov, Sean Warren, Ian Munro, Imperial College London (United Kingdom); Hans G. Breunig, Karsten König, JenLab GmbH (Germany); Mark A. A. Neil, Paul M. W. French, Imperial College London (United Kingdom); Gordon W. Stamp, Imperial College Healthcare NHS Trust (United Kingdom) and The Royal Marsden Hospital NHS Trust (United Kingdom); Anthony Chu, Imperial College Healthcare NHS Trust (United Kingdom); Christopher W. Dunsby, Imperial College London (United Kingdom) [8207A-03]

9:30 am: **Simultaneous dual-wavelength OCT for dermatological applications**, Aneesh Alex, Jessika Weingast, Boris Pova?ay, Bernd Hofer, Michael Binder, Hubert Pehamberger, Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8207A-04]

9:50 am: **Modeling of skin cooling, blood flow, and optical properties in wounds created by electrical shock (Invited Paper)**, Thu A. Nguyen, The Catholic Univ. of America (USA); Jeffrey W. Shupp M.D., Lauren T. Moffatt, James C. Jeng, Marion H. Jordan M.D., The Burn Ctr. at Washington Hospital Ctr. (USA); Jessica C. Ramella-Roman, The Catholic Univ. of America (USA) [8207A-05]

Coffee Break 10:15 to 10:45 am

SESSION 2

Room: 303 (Esplanade) Sat. 10:45 am to 12:10 pm

Session II

Session Chair: **Bernard Choi**,

Beckman Laser Institute and Medical Clinic (USA)

10:45 am: **Intelligent image analysis for image-guided hair removal and skin therapy**, Thomas T. Lu, Tien-Hsin Chao, Jet Propulsion Lab. (USA) [8207A-06]

11:05 am: **Dermal reflectivity determined by optical coherence tomography is an indicator of epidermal hyperplasia and dermal edema within inflamed skin**, Kevin G. Phillips, Yun Wang, Oregon Health & Science Univ. (USA); David Levitz, Tel Aviv Univ. (Israel); Niloy Choudhury, Michigan Technological Univ. (USA); Emily Swanzey, James Lagowski, Molly Kulesz-Martin, Steven L. Jacques, Oregon Health & Science Univ. (USA) [8207A-07]

11:25 am: **Reduction of OCT image artifacts for improved imaging of skin**, Yih M. Liew, Robert A. McLaughlin, Fiona Wood, David D. Sampson, The Univ. of Western Australia (Australia) [8207A-08]

11:45 am: **Preclinical in-vivo evaluation of NPe6-mediated photodynamic therapy on normal vasculature (Invited Paper)**, Wesley Moy, Shreyas Patel, Ben Lertsakdadet, Rajan Arora, Katherine Nielsen, Beckman Laser Institute and Medical Clinic (USA); Kristen M. Kelly M.D., Univ. of California, Irvine School of Medicine (USA); Bernard Choi, Beckman Laser Institute and Medical Clinic (USA) [8207A-09]

Lunch Break 12:10 to 1:40 pm

SESSION 3

Room: 303 (Esplanade) Sat. 1:40 to 3:25 pm

Session III

Session Chair: **Anthony J. Durkin**,

Beckman Laser Institute and Medical Clinic (USA)

1:40 pm: **Deep skin structural and microcirculation imaging with extended-focus OCT**, Cedric Blatter, Branislav Grajciar, Medizinische Univ. Wien (Austria); Robert Huber, Ludwig-Maximilians-Univ. München (Germany); Rainer Leitgeb, Medizinische Univ. Wien (Austria) [8207A-10]

2:00 pm: **Evaluation of port-wine stain treatment outcomes using multispectral imaging**, Ravikant Samatham, Steven Jacques, Alfons L. Krol, Oregon Health & Science Univ. (USA) [8207A-11]

2:20 pm: **In vivo multiphoton microscopy assessment of topical corticosteroid-induced skin modifications and depigmentation**, Emmanuelle Tancrède, Hassan Ait El Madani, L'Oréal Recherche & Innovation (France) and Hôpital Saint-Louis (France); Armand Bensussan, Hôpital Saint-Louis (France); Anne Colonna, L'Oréal Recherche & Innovation (France); Alain Dupuy, l'Hôpital Pontchaillou (France); Martine Bagot, Hôpital Saint-Louis (France); Ana-Maria Pena, L'Oréal Recherche et Innovation (France) [8207A-12]

2:40 pm: **Combined fluorescence-Raman spectroscopy measurements with an optical fiber probe for the diagnosis of melanocytic lesions**, Alessandro Cosci, Riccardo Cicchi, European Lab. for Non-linear Spectroscopy (LENS) (Italy); Susanna Rossari, Vincenzo De Giorgi, Daniela Massi, Univ. degli Studi di Firenze (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (LENS) (Italy) [8207A-13]

3:00 pm: **Imaging immune response of skin mast cells in vivo with two-photon microscopy (Invited Paper)**, Chunqiang Li, The Univ. of Texas at El Paso (USA); Riikka K. Pastila, Radiation and Nuclear Safety Authority (Finland); Charles P. Lin, Wellman Ctr. for Photomedicine (USA) [8207A-14]

Coffee Break 3:25 to 3:55 pm

SESSION 4

Room: 303 (Esplanade) Sat. 3:55 to 5:20 pm

Session IV

Session Chair: **Iltefat Hamzavi**, Henry Ford Hospital (USA)

3:55 pm: **Pulsed photothermal depth profiling of tattoos undergoing laser removal treatment (Invited Paper)**, Matija Milanic, Boris Majaron, Jožef Stefan Institute (Slovenia) [8207A-15]

4:20 pm: **Combination of Stokes polarized light imaging, roughness metrics, and morphological features for the detection of melanoma**, Pejman Ghassemi, The Catholic Univ. of America (USA); Thomas A. Germer, National Institute of Standards and Technology (USA); Jeffrey W. Shupp M.D., The Burn Center at Washington Hospital Ctr. (USA); Suraj S. Venna, Marc E. Boisvert M.D., Washington Hospital Ctr. (USA); Katherine Flanagan, The Burn Center at Washington Hospital Ctr. (USA); Marion H. Jordan M.D., The Burn Ctr. at Washington Hospital Ctr. (USA); Jessica C. Ramella-Roman, The Catholic Univ. of America (USA) [8207A-16]

4:40 pm: **Intense high-frequency pressure waves produced with low laser fluences**, Carlos Serpa, Gonçalo F. F. Sá, Luis G. Arnaut, Univ. de Coimbra (Portugal) [8207A-17]

5:00 pm: **Determination of optimal glycerol concentration for optical tissue clearing effects**, Eungjun Youn, Taeyoon Son, Han Sung Kim, Byungjo Jung, Yonsei Univ. (Korea, Republic of) [8207A-18]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 5

Room: 303 (Esplanade) Sun. 8:30 to 10:15 am

Session V

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

8:30 am: **Evaluation of facial hyperpigmentation: comparison of fluorescence and polarization images**, Eunji Kim, Han Sung Kim, Byungjo Jung, Yonsei Univ. (Korea, Republic of) [8207A-20]

8:50 am: **Investigation of line scanning for confocal microscopy in tissue**, Bjorg A. Larson, Sanjeewa Abeytunge, Christopher Glazowski, Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA) [8207A-21]

9:10 am: **In vivo video rate multiphoton microscopy imaging of human skin**, Hequn Wang, Anthony M. D. Lee, Zack Frehlick, Yingqiu Yu, The BC Cancer Agency Research Ctr. (Canada); Shuo Tang, The Univ. of British Columbia (Canada); Jianhua Zhao, The BC Cancer Agency Research Ctr. (Canada); Harvey Lui M.D., David I. McLean M.D., The Univ. of British Columbia (Canada); Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada) [8207A-22]

9:30 am: **Hyperspectral imaging of bruises in the SWIR spectral region**, Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway); Julio E. Hernandez-Palacios, Norsk Elektro Optikk AS (Norway) [8207A-23]

9:50 am: **Polarization imaging for non-invasive detection of skin cancer margins (Invited Paper)**, Ravikant Samatham, Steven L. Jacques, Ken Lee, Oregon Health & Science Univ. (USA) [8207A-24]

Coffee Break 10:15 to 10:45 am

SESSION 6

Room: 303 (Esplanade) Sun. 10:45 am to 12:35 pm

Session VI

Session Chair: Nikiforos Kollias, Johnson & Johnson CPPW (USA)

10:45 am: **Assessing human skin with diffuse reflectance spectroscopy and colorimetry (Invited Paper)**, InSeok Seo, Yang Liu, Paulo R. Bargo, Nikiforos Kollias, Johnson & Johnson CPPW (USA) [8207A-25]

11:10 am: **Ex vivo and in vivo full-field optical coherence tomography on skin**, Fabrice Harms, Eugénie Dalimier, Bertrand de Poly, LLTECH SAS (France); Anne Latrive, ESPCI - Institut Langevin (France); Denis Salomon, Univ. Hospital of Geneva (Switzerland); A. Claude Boccara, ESPCI - Institut Langevin (France) and LLTech SAS (France) [8207A-26]

11:30 am: **Real-time Raman spectroscopy for in vivo evaluation of skin cancers (Invited Paper)**, Jianhua Zhao, Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada) and The Univ. of British Columbia (Canada); David I. McLean M.D., Harvey Lui M.D., The Univ. of British Columbia (Canada) and The BC Cancer Agency Research Ctr. (Canada) [8207A-27]

11:55 am: **Multiphoton tomography of tattoos**, Karsten König, JenLab GmbH (Germany) [8207A-28]

12:15 pm: **In vivo Raman spectroscopy of the skin: advances and issues for clinical implementation**, Isaac J. Pence, Elizabeth Vargis, Quyen Nguyen, Chetan Patil, Vanderbilt Univ. (USA); Darrel Ellis, Vanderbilt Univ. Medical Ctr. (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [8207A-29]

POSTER SESSION AND COFFEE BREAK

Room: South Hall A (with BiOS Expo) . Sun. 3:00 to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday am. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Sunday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday or 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

In vivo assessment of the structure of skin microcirculation by reflectance confocal-laser-scanning microscopy, Keiichi Sugata, Osamu Osanai, Hiromitsu Kawada, Kao Corp. (Japan) [8207A-30]

Modeling and analytical treatment of FTIR spectra of nucleic acids and proteins in the patients with Bowen's disease, Natalja S. Eikje M.D., MC Professional Ltd. (Estonia) [8207A-31]

OCT monitoring of cosmetic creams in human skin in vivo, Seung Hee Han, Sogang Univ. (Korea, Republic of) and Univ. of Toronto (Canada) and Univ. Health Network (Canada); Changhan Yoon, Sogang Univ. (Canada); Leigh Conroy, Alex I. Vitkin, Univ. of Toronto (Canada) and Univ. Health Network (Canada) [8207A-32]

Diagnosing basal-cell carcinoma in vivo by near-infrared Raman spectroscopy: a principal components analysis discrimination algorithm, Landulfo Silveira, Jr., Fabrício L. Silveira, Univ. Camilo Castelo Branco (Brazil); Benito Bodanese, Univ. Comunitária da Região de Chapecó (Brazil); Marcos T. T. Pacheco, Renato A. Zângaro, Univ. Camilo Castelo Branco (Brazil) [8207A-33]

Therapeutics and Diagnostics in Urology: Lasers, Robotics, Minimally Invasive, and Advanced Biomedical Devices

Conference Chairs: **Hyun Wook Kang**, American Medical Systems, Inc. (USA); **Bodo E. Knudsen**, The Ohio State Univ. (USA)

Program Committee: **Nathaniel M. Fried**, The Univ. of North Carolina at Charlotte (USA); **Matthew T. Gettman**, Mayo Clinic (USA); **Ed Koulick**, American Medical Systems Holdings, Inc. (USA); **Unyime O. Nseyo**, North Florida Foundation for Research and Education, Inc. (USA); **Joel M. Teichman**, Univ. British Columbia (Canada) and St. Paul's Hospital (Canada); **Rudolf M. Verdaasdonk**, Vrije Univ. Medical Ctr. (Netherlands)

Saturday 21 January

SESSION 1

Room: 305 (Esplanade) Sat. 9:00 to 10:20 am

Laser-Tissue Interaction

Session Chair: **Nathaniel M. Fried**,
The Univ. of North Carolina at Charlotte (USA)

9:00 am: **Subsurface optical stimulation of the rat prostate nerves using a continuous-wave, 1550-nm single-mode diode laser**, Serhat Tozburun, The Univ. of North Carolina at Charlotte (USA); Gwen Lagoda, Arthur Burnett M.D., The Johns Hopkins Univ. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8207B-34]

9:20 am: **Interstitial laser coagulation of localized kidney tumor by Nd:YAG laser**, Oleg Teodorovich, Central Clinical Hospital (Russian Federation); David G. Kochiev, A. M. Prokhorov General Physics Institute (Russian Federation); Andrei V. Ivanov, N. N. Blokhin Russian Cancer Research Ctr. (Russian Federation); Stanislav Naryshkin, Central Clinical Hospital (Russian Federation); Alexei Lukashov, Astelia Technologies (USA) [8207B-35]

9:40 am: **Photoselective vaporization of prolene mesh used in female stress urinary incontinence procedures: preliminary studies using a compact, high-power red diode laser**, Sarah B. Rosenbury, David Burks, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8207B-36]

10:00 am: **In vitro testing of dual-mode thulium microsurgical laser**, Matthew D. Keller, Jonathon D. Wells, Lockheed Martin Aculight (USA) [8207B-37]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 305 (Esplanade) Sat. 10:50 to 11:50 am

Surgical Therapy

Session Chair: **Rudolf M. Verdaasdonk**,
Vrije Univ. Medical Ctr. (Netherlands)

10:50 am: **Prospective study on laser-assisted laparoscopic partial nephrectomy**, Ronald Sroka, Georg Hennig, Katja Zilinberg, Wael Khoder, Ludwig-Maximilians-Univ. München (Germany) [8207B-38]

11:10 am: **Tissue ablation after 120W greenlight laser vaporisation and bipolar plasma vaporisation of the prostate: a comparison using transrectal three-dimensional ultrasound volumetry**, Benedikt Kranzbühler, Christian Fankhauser, Oliver Gross, Lukas J. Hefermehl, Cédric Poyet, Remo Largo, Daniel Eberli, Michael Müntener, Hans-Helge Seifert, Matthias Zimmermann, Tullio Sulser, Alexander Müller, Thomas Hermanns, Univ. Hospital Zürich (Switzerland) [8207B-39]

11:30 am: **Electrosurgical injuries during robot assisted surgery: insights from the FDA MAUDE database**, Andrew Fuller, George Vilos, Stephen E. Pautler M.D., The Univ. of Western Ontario (Canada) [8207B-40]

Lunch/Exhibition Break 11:50 am to 1:10 pm

SESSION 3

Room: 305 (Esplanade) Sat. 1:10 to 3:10 pm

Optical Imaging

Session Chair: **Unyime O. Nseyo**,

North Florida Foundation for Research and Education, Inc. (USA)

1:10 pm: **Imaging of the canine vas deferens for non-invasive laser vasectomy: comparison of optical coherence tomography and ultrasound**, Christopher Cilip, The Univ. of North Carolina at Charlotte (USA); Mohamad Allaf M.D., The Johns Hopkins Univ. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8207B-41]

1:30 pm: **Next generation of optical diagnostics for bladder cancer using probe-based confocal laser endomicroscopy**, Jen-Jane Liu, Ying Pan, Stanford Univ. School of Medicine (USA); Shelly T. Hsiao, Veterans Affairs Palo Alto Health Care System (USA); Timothy Chang, Katherine E. Mach, Stanford Univ. School of Medicine (USA); Kristin C. Jensen, Veterans Affairs Palo Alto Health Care System (USA); Joseph C. Liao, Stanford Univ. School of Medicine (USA) [8207B-42]

1:50 pm: **Monitoring of lower urinary tract function in patients with spinal cord injury using near-infrared spectroscopy (NIRS)**, Babak Shadgan M.D., The Univ. of British Columbia (Canada); Lynn Stothers, UBC Hospital Bladder Care Ctr. (Canada); Andrew J. Macnab, Mark Nigro, The Univ. of British Columbia (Canada) [8207B-43]

2:10 pm: **Real-time bladder navigation using an advanced stereotactic system**, Michelle Agenant M.D., Univ. Medical Ctr. Utrecht (Netherlands); Arjen van Rhijn, Wim Koomen, Personal Space Technologies, Inc. (Netherlands); Froukje Euwe, Herke Jan Noordmans, Stefan Been, Ruud Bosch M.D., Univ. Medical Ctr. Utrecht (Netherlands) [8207B-44]

2:30 pm: **Functional optical coherence tomography of renal cancer**, Dirk J. Faber, Univ. van Amsterdam (Netherlands); Daniel M. de Bruin, Academisch Medisch Ctr. (Netherlands); Kurdo Barwari, Jean J. de la Rosette, M. Laguna, Univ. van Amsterdam (Netherlands); Ton G. van Leeuwen, Academisch Medisch Ctr. (Netherlands) [8207B-45]

2:50 pm: **Multimodal flexible cystoscopy for creating co-registered panoramas of the bladder urothelium**, Timothy D. Soper, Matthew R. Burkhardt, Michael P. Porter M.D., Eric J. Seibel, Univ. of Washington (USA) [8207B-46]

Conference 8207B · Room: 305 (Esplanade)

POSTER SESSION AND COFFEE BREAK

Room: South Hall A (with BIOS Expo) · Sat. 3:10 to 4:10 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:10 to 4:10 PM on Saturday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:10 to 4:10 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Could Raman spectroscopy discriminate the biochemical alterations among prostate carcinoma and benign prostate tissue? an in vitro study, Landulfo Silveira, Jr., Camilo Castelo Branco Univ. (Brazil); Kátia Ramos Moreira Leite M.D., Miguel Srougi M.D., Univ. de São Paulo (Brazil); Fabrício L. Silveira, Marcos T. T. Pacheco, Camilo Castelo Branco Univ. (Brazil); Carlos A. Pasqualucci M.D., Univ. de São Paulo (Brazil)[8207B-52]

A systematic study of cancerous and normal prostate tissues: fractal dimensional parameter, absorption and scattering coefficients, Yang Pu, Wubao Wang, Mohammad Alrubaiee, Swapan K. Gayen, The City College of New York (USA); Min Xu, Fairfield Univ. (USA)[8207B-53]

Design of catheter-based diffusing optical device for endometrial coagulation, Danop Rajabhandharaks, Hyun Wook Kang, American Medical Systems, Inc. (USA)[8207B-54]

SESSION 4

Room: 305 (Esplanade) Sat. 4:10 to 5:50 pm

Laser Lithotripsy

Session Chair: Joel M. Teichman, St. Paul's Hospital (Canada)

4:10 pm: **Short-pulsed Tm:YAG laser lithotripsy: comparative study on ablation performance with conventional Ho:YAG laser,** Danop Rajabhandharaks, Hyun Wook Kang, American Medical Systems, Inc. (USA)[8207B-47]

4:30 pm: **Thulium fiber laser lithotripsy using bursts of pulse trains for enhanced stone ablation,** Richard Blackmon, The Univ. of North Carolina at Charlotte (USA); Pierce Irby M.D., Carolinas Medical Ctr. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA)[8207B-48]

4:50 pm: **3D numerical reproduction of crack patterns, in a cylindrical sample, observed in shock wave lithotripsy,** Maddegedara L. Wijerathne, Muneo Hori, The Univ. of Tokyo (Japan); Hide Sakaguchi, Japan Agency for Marine-Earth Science and Technology (Japan)[8207B-49]

5:10 pm: **Effects of Holmium:YAG energy on BackStop anti-retropulsion polymer,** Jinze Qiu, The Univ. of Texas at Austin (USA); Joel M. Teichman M.D., The Univ. of British Columbia (Canada); Bingqing Wang, Thomas E. Milner, The Univ. of Texas at Austin (USA)[8207B-50]

5:30 pm: **Endoscopic identification of calcium oxalate monohydrate calculi during Ho:YAG lithotripsy,** Reza Hamidizedah, Joel M. Teichman M.D., St. Paul's Hospital (Canada)[8207B-51]

BIOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology

Conference Chairs: **Brian Jet-Fei Wong**, Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA); **Justus F. Ilgner**, Univ. Hospital Aachen (Germany); **Krzysztof Izdebski**, Pacific Voice and Speech Foundation (USA)

Program Committee: **James A. Burns**, Massachusetts General Hospital (USA); **Henricus J. C. M. Sterenberg**, Erasmus MC (Netherlands); **Waseem K. Jerjes**, UCL Medical School and Leeds Teaching Hospitals NHS Trust (United Kingdom); **Milind Rajadhyaksha**, Memorial Sloan-Kettering Cancer Ctr. (USA); **Chung-Ku Rhee**, Dankook Univ. Hospital (Korea, Republic of); **Yuling Yan**, Santa Clara Univ. (USA)

In conjunction with:



Saturday 21 January

SESSION 1

Room: Room 200 (Mezzanine) Sat. 8:20 to 10:00 am

Head and Neck Cancer Diagnostics and Therapy I

Session Chair: **Milind Rajadhyaksha**,
Memorial Sloan-Kettering Cancer Ctr. (USA)

8:20 am: **Longitudinal evaluation of patients with oral potentially malignant disorders using optical imaging and spectroscopy**, Richard A. Schwarz, Mark C. Pierce, Sharon Mondrik, Wen Gao, Mary K. Quinn, Rice Univ. (USA); Vijayashree S. Bhattar, Michelle D. Williams M.D., The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Nadarajah Vigneswaran, The Univ. of Texas Dental Branch at Houston (USA); Ann M. Gillenwater M.D., The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Rebecca R. Richards-Kortum, Rice Univ. (USA) [8207C-300]

8:40 am: **mTHPC mediated interstitial photodynamic therapy of recurrent nonmetastatic base-of-tongue cancers: development of a new method**, I. B. Tan, Het Nederlands Kanker Instituut - Antoni van Leeuwenhoek Ziekenhuis (Netherlands); Baris Karakullukcu, The Netherlands Cancer Institute (Netherlands); Robert L. van Veen, Erasmus MC (Netherlands); Max Witjes M.D., Univ. Medical Ctr. Groningen (Netherlands); P. C. Levendag, Henricus J. Sterenberg, Erasmus MC (Netherlands) [8207C-301]

9:00 am: **Gold nanorods for treatment of oral cancer**, Ivan H. El-Sayed, Univ. of California, San Francisco (USA) [8207C-302]

9:20 am: **Early results of an in vivo trial of ESS in thyroid cancer**, Jennifer E. Rosen, Ilona D. Goukassian, Ousama M. A'Amar, Irving J. Bigio, Stephanie L. Lee, Boston Univ. (USA) [8207C-303]

9:40 am: **In vivo monitoring method for traumatic brain injury of mouse based on near-infrared light**, Weitao Li, Zhiyu Qian, Xuena Wang, Xing Liu, Nanjing Univ. of Aeronautics and Astronautics (China) [8207C-304]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Room 200 (Mezzanine) . . Sat. 10:30 am to 12:10 pm

Laryngeal and Airway Imaging, Diagnostics, and Therapeutics I

Session Chairs: **Justus F. Ilgner**, Univ. Hospital Aachen (Germany); **Krzysztof Izdebski**, Pacific Voice and Speech Foundation (USA)

10:30 am: **High-speed digital phonoscopy images analyzed with Nyquist plots**, Yuling Yan, Santa Clara Univ. (USA) [8207C-305]

10:50 am: **Laser cordectomy for early glottic carcinoma**, Phil-Sang Chung M.D., Dankook Univ. Hospital (Korea, Republic of) [8207C-306]

11:10 am: **Analysis of high-speed digital phonoscopy pediatric images**, Rita R. Patel, Univ. of Kentucky (USA) [8207C-307]

11:30 am: **Snake based automatic tracing of vocal-fold motion from high-speed glottic images**, Gan Du, Yuling Yan, Santa Clara Univ. (USA) [8207C-308]

11:50 am: **Endoscopic laser scalpel for head and neck cancer surgery**, Ricardo Toledo-Crow, Snehal Patel, Milind Rajadhyaksha, Stefan Kirov, Yongbiao Li, Memorial Sloan-Kettering Cancer Ctr. (USA) [8207C-309]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 3

Room: Room 200 (Mezzanine) Sat. 1:40 to 4:50 pm

Head and Neck Cancer Diagnostics and Therapy II

Session Chair: **Waseem K. Jerjes**, UCL Medical School and Leeds Teaching Hospitals NHS Trust (United Kingdom)

1:40 pm: **Management of superficial tissue disease using PDT: non-melanomatous skin cancer**, Waseem K. Jerjes, Colin Hopper, Univ. College London (United Kingdom) [8207C-310]

2:00 pm: **Real-time line-scanning reflectance confocal endoscope to enhance sectioning and reduce speckle for intraoral imaging**, Christopher Glazowski, Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA) [8207C-311]

2:20 pm: **Reflectance confocal microscope for imaging oral tissues in vivo, potentially with line scanning as a low-cost approach for clinical use**, Gary Peterson, Sanjeeva Abeytunge, Memorial Sloan-Kettering Cancer Ctr. (USA); Zach Eastman, Lucid Inc. (USA); Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA) [8207C-312]

2:40 pm: **Prospective evaluation of 110 patients following ultrasound-guided photodynamic therapy for deep seated pathologies**, Waseem K. Jerjes, Univ. of Leeds (United Kingdom) and Leeds Teaching Hospitals NHS Trust (United Kingdom) and Univ. College London Medical School (United Kingdom); Tahwinder Upile, Univ. College Hospital (United Kingdom); Charles A. Mosse, Univ. College London (United Kingdom); Zaid Hamdoon, Univ. College Hospital (United Kingdom); Marc Morcos, Univ. College Hospital (Canada); Simon Morley, Univ. College Hospital (United Kingdom); Colin Hopper, Univ. College London Hospitals NHS Foundation Trust (United Kingdom) . [8207C-313]

Coffee Break 3:00 to 3:30 pm

Conference 8207C · Room: 200 (Mezzanine)

3:30 pm: **5-aminolevulinic acid photodynamic therapy for head and neck dysplasia**, Harry Quon M.D., Johns Hopkins Univ. (USA); Mary E. Putt, Timothy C. Zhu, Jarod C. Finlay, Andrea Dimofte, Michael Mehler, Kelly M. Malloy, The Univ. of Pennsylvania Health System (USA); Craig E. Grossman M.D., Shannon Gallagher-Colombo, Univ. of Pennsylvania (USA); Gregory S. Weinstein M.D., Bert W. O'Malley, Jr. M.D., Carmen E. Rodriguez, Theresa M. Busch, The Univ. of Pennsylvania Health System (USA) [8207C-314]

3:50 pm: **Quality of life of patients undergoing photodynamic therapy**, Waseem K. Jerjes, Colin Hopper, Univ. College London (United Kingdom) [8207C-315]

4:10 pm: **Quantifying the effects of HPV infection in the autofluorescence in the oral cavity**, Andres F. Zuluaga, Remicalm LLC (USA) [8207C-316]

4:30 pm: **Optimization of targeted two-photon PDT triads for the treatment of head and neck cancers**, Charles W. Spangler, Jean R. Starkey, Galyna Dubinina, SensoPath Technologies Inc. (USA); Carl Fahlstrom, Montana State Univ. (USA); Joyce Shepard, SensoPath Technologies Inc. (USA) . . . [8207C-317]

12:10 pm: **Cellular-level imaging of the functional mammalian inner ear**, Shelly Batts, Eunice L. M. Cheung, Nikolas H. Blevins, Gerald R. Popelka, Stanford Univ. (USA); Mark J. Schnitzer, Stanford Univ. School of Medicine (USA) [8207C-327]

12:30 pm: **Methodology for assessment of structural vibrations in the mouse cochlea by spectral domain optical coherence tomography**, Simon S. Gao, Stanford Univ. School of Medicine (USA); Patrick Raphael, Baylor College of Medicine (USA); Anping Xia, Stanford Univ. (USA); Jesung Park, Texas A&M Univ. (USA); Esteban F. Carbajal, Univ. of Houston (USA); Brian E. Applegate, Texas A&M Univ. (USA); John S. Oghalai M.D., Stanford Univ. (USA) [8207C-328]

12:50 pm: **Simultaneous depth-resolved imaging of sub-nanometer scale ossicular vibrations and morphological features of the human-cadaver middle ear with spectral-domain phase-sensitive optical coherence tomography**, Hrebesh M. Subhash, Anh T. Nguyen-Huynh, Oregon Health & Science Univ. (USA); Ruikang K. Wang, Univ. of Washington (USA); Steven L. Jacques, Alfred L. Nuttall, Oregon Health & Science Univ. (USA) . . . [8207C-329]

Lunch/Exhibition Break 1:10 to 2:40 pm

Sunday 22 January

SESSION 4

Room: Room 200 (Mezzanine) Sun. 8:40 to 10:00 am

Laryngeal and Airway Imaging, Diagnostics, and Therapeutics II

Session Chair: Krzysztof Izdebski, Pacific Voice and Speech Foundation (USA)

8:40 am: **Ultrafast laser microsurgery, simultaneous multiphoton, and SHG imaging of healthy and scarred vocal folds**, Murat Yildirim, Onur Ferhanoglu, Christopher L. Hoy, The Univ. of Texas at Austin (USA); James B. Kobler, Massachusetts General Hospital (USA); Adela Ben-Yakar, The Univ. of Texas at Austin (USA) [8207C-318]

9:00 am: **Correlations of HSDI with other clinical voice measurements**, Mette Pedersen, Martin Eeg, The Medical Ctr. (Denmark) [8207C-319]

9:20 am: **Analysis of mucosal wave by HSDIS and Kymography in papilloma treated with Avastin**, Raul M. Cruz, Santa Clara Univ. (USA); Krzysztof Izdebski, Pacific Voice and Speech Foundation (USA); Yuling Yan, Santa Clara Univ. (USA) [8207C-320]

9:40 am: **High speed examination of the vocal fold activity using ultra high speed filming: presentation of 1956 archival recordings by Paul Moore and Hans von Ledem**, Krzysztof Izdebski, Pacific Voice and Speech Foundation (USA) [8207C-321]

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Room 200 (Mezzanine) . . . Sun. 10:30 am to 1:10 pm

Middle Ear, Cochlea, and Advanced Devices

Session Chairs: Chung-Ku Rhee, Dankook Univ. Hospital (Korea, Republic of); Justus F. Ilgner, Univ. Hospital Aachen (Germany)

10:30 am: **Microsurgery near critical structures: evaluation of temperature profile and functional outcomes following use of a flexible CO₂ laser fiber**, Alan M. Robinson, Andrew J. Fishman, B. R. Bendok, C.-P. Richter, Northwestern Univ. (USA) [8207C-322]

10:50 am: **In vivo measurement of differential motion inside the organ of Corti using a low-coherence interferometer system**, Fangyi Chen, Dingjun Zha, Oregon Health & Science Univ. (USA); Anders Fridberger, Karolinska Institutet (Sweden); Jiefu Zheng, Niloy Choudhury, Steven L. Jacques, Oregon Health & Science Univ. (USA); Ruikang Wang, Univ. of Washington (USA); Alfred L. Nuttall, Oregon Health & Science Univ. (USA) [8207C-323]

11:10 am: **The optimal time to treat noise-induced hearing loss (NIHL) with low level laser therapy (LLLT)**, Chung-Ku Rhee M.D., Jin-Chul Ahn M.D., Phil-Sang Chung M.D., Myung-Whan Suh M.D., Dankook Univ. Hospital (Korea, Republic of) [8207C-324]

11:30 am: **Office-based optical coherence tomography for pre-operative assessment of middle ear pathology**, Justus F. Ilgner M.D., Univ. Hospital Aachen (Germany); Csaba Farkas, European Laser Institute (Germany); Achim Lenenbach, Fraunhofer-Institut für Lasertechnik (Germany); Martin Westhofen M.D., Univ. Hospital Aachen (Germany) [8207C-325]

11:50 am: **Three-dimensional vibration measurements of the human eardrum and middle ear ossicles**, Ryan P. Jackson, Hongxue Cai, Stanford Univ. (USA); Sunil Puria, EarLens Corp. (USA) [8207C-326]

SESSION 6

Room: Room 200 (Mezzanine) Sun. 2:40 to 4:50 pm

Laryngeal and Airway Imaging, Diagnostics, and Therapeutics III

Session Chair: Yuling Yan, Santa Clara Univ. (USA)

2:40 pm: **Vocal register switch as seen by high speed digital imaging, EGG, kymography, and acoustics**, Krzysztof Izdebski, Pacific Voice and Speech Foundation (USA); Yuling Yan, Santa Clara Univ. (USA); G. Rust, Pacific Voice and Speech Foundation (USA); C. Cook, Pacific Voice and Speech Foundation (USA) and Santa Clara Univ. (USA) and San Francisco Conservatory of Music (USA) [8207C-330]

3:00 pm: **Improvement of clinical assessment of selected mucosal vocal folds lesions using high speed digital imaging, kymography with simultaneous electroglottography and acoustics signals**, Krzysztof Izdebski, Pacific Voice and Speech Foundation (USA); Yuling Yan, Santa Clara Univ. (USA); R. M. Cruz, Santa Clara Univ. (USA) and Pacific Voice and Speech Foundation (USA) and Kaiser Permanente Medical Ctr. (USA) [8207C-331]

Coffee Break 3:20 to 3:50 pm

3:50 pm: **Long range Fourier domain OCT for real time anatomic imaging of human upper airway**, Jun Zhang, Joe Jing, Brian J. F. Wong M.D., Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8207C-332]

4:10 pm: **Asynchrony of mucosal wave in normal subjects investigated by HSDI, Kymography, stroboscopy and processed with Nyquist plots**, Yuling Yan, Santa Clara Univ. (USA); Krzysztof Izdebski, Pacific Voice and Speech Foundation (USA); R. Ward, Santa Clara Univ. (USA) and Pacific Voice and Speech Foundation (USA) [8207C-333]

4:30 pm: **Confocal endomicroscopy of the larynx**, Tino Just M.D., Univ. Rostock (Germany) [8207C-334]

Monday 23 January

SESSION 7

Room: Room 200 (Mezzanine) Mon. 8:30 to 10:30 am

Laryngeal and Airway Imaging, Diagnostics, and Therapeutics IV

Session Chairs: Krzysztof Izdebski,

Pacific Voice and Speech Foundation (USA); Brian Jet-Fei Wong, Beckman Laser Institute and Medical Clinic (USA)

- 8:30 am: **Virtual optical laryngoscopy**, S. Luo, Yuling Yan, Santa Clara Univ. (USA) [8207C-335]
- 8:50 am: **Preliminary subglottic stenosis imaging in a rabbit model using OCT**, Jennifer L. Lin, Jonathon W. Boyd, Brian J. F. Wong, Univ. of California, Irvine (USA) [8207C-336]
- 9:10 am: **Role of the mucosal wave in voice production**, Daryush D. Mehta, Massachusetts General Hospital (USA) [8207C-337]
- 9:30 am: **Miniature OCT endoscopic probe for in vivo human vocal folds imaging**, Gangjun Liu, Brian J. F. Wong M.D., Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8207C-338]
- 9:50 am: **Visualizations by acoustics of voice stress. Is there an optical mucosal wave correlate?**, G. Demenko, M. Jastrzebska, Poznan Computing Ctr. (Poland); Krzysztof Izdebski, Pacific Voice and Speech Foundation (USA); Yuling Yan, Santa Clara Univ. (USA) [8207C-339]
- 10:10 am: **What are we learning about neoglottic phonation from HSDI**, Leah Skladany, Univ. of Nevada, Reno (USA) [8207C-340]
- Coffee Break 10:30 to 11:00 am

SESSION 8

Room: Room 200 (Mezzanine) . Mon. 11:00 am to 12:40 pm

Laryngeal and Airway Imaging, Diagnostics, and Therapeutics IV

Session Chair: Yuling Yan, Santa Clara Univ. (USA)

- 11:00 am: **Advanced micro scanning in laryngology: implications of new advanced scanning in relation to HSDI acquired signals**, Mette Pedersen, The Medical Ctr. (Denmark) [8207C-341]
- 11:20 am: **A silent speech interface based on real time imaging of the vocal tract**, Lise Crevier-Buchman, Lab. Phonétique et Phonologie (France); Bruce Denby, Ecole Supérieure de Physique et de Chimie Industrielles (France); Thomas Hueber, Gipsa-lab (France); Michael Cai, Sotiris Manitsaris, Ecole Supérieure de Physique et de Chimie Industrielles (France); Gerard Chollet, Telecom ParisTech (France); Maureen Stone, Univ. of Maryland, Baltimore (USA); Claire Pillot-Loiseau, Lab. Phonétique et Phonologie (France); Gerard Dreyfus, Pierre Roussel, Ecole Supérieure de Physique et de Chimie Industrielles (France) [8207C-342]
- 11:40 am: **Comparison of laryngeal examination visualized by fiber-optic, video-chip and high definition video chip endoscopy**, James P. Thomas M.D., Laryngology Practice and Pacific Voice and Speech Foundation (USA) [8207C-343]
- 12:00 pm: **Integration of flexible fiberoptic high-speed videoendoscopy with time-synchronized measures of vocal function**, Daryush D. Mehta, Dimitar D. Deliyiski, Steven M. Zeitels M.D., Massachusetts General Hospital (USA); Matias Zañartu, Univ. Técnica Federico Santa María (Chile); Robert E. Hillman, Massachusetts General Hospital (USA) [8207C-345]
- 12:20 pm: **Visual HSDI analysis of laryngeal tremor: acoustic correlates?**, Julie Barkmeier-Kraemer, Univ. of California, Davis (USA); Krzysztof Izdebski, Pacific Voice and Speech Foundation (USA) [8207C-346]
- Lunch Break 12:40 to 1:40 pm

SESSION 9

Room: Room 200 (Mezzanine) Mon. 1:40 to 3:20 pm

Laryngeal and Airway Imaging, Diagnostics, and Therapeutics V

Session Chair: Yuling Yan, Santa Clara Univ. (USA)

- 1:40 pm: **What we can learn about hereditary dystonia from HSDI of the glottis**, Mette Pedersen, Martin Eeg, The Medical Ctr. (Denmark) . . . [8207C-347]
- 2:00 pm: **Visual observations of synchronized circular breathing and glottic activity in didgeridoo performer**, Lydia Hyde, Krzysztof Izdebski, Joel C. Ross, Pacific Voice and Speech Foundation (USA) [8207C-348]
- 2:20 pm: **Enhancement of diagnoses of allergic laryngitis using stroboscopic visual images of the vocal folds**, E. Chavez, [8207C-349]
- 2:40 pm: **Stroboscopic visualization of laryngeal mucosal wave before and after treatment for reflux: is there objective visual evidence?**, Josef Schloemicher-Thier, Matthias Weikert M.D., Austrian Voice Institute (Austria) [8207C-350]
- 3:00 pm: **Visualization of non-laryngeal phonation modes: a physiologic and acoustic model of alternative phonatory patterns**, Franco Fussi, Consultant (Italy) [8207C-351]
- Coffee Break 3:20 to 3:40 pm

SESSION 10

Room: Room 200 (Mezzanine) Mon. 3:40 to 6:00 pm

The Nose and Upper Airway

Session Chair: Brian Jet-Fei Wong, Beckman Laser Institute and Medical Clinic (USA)

- 3:40 pm: **Double-blind, randomized, intra-individual controlled feasibility trial comparing the use of 1,470 and 940 nm diode laser for the treatment of hyperplastic inferior nasal turbinates**, Ronald Sroka, Miriam Havel, Andreas Leunig, Ludwig-Maximilians-Univ. München (Germany); Parak Patel, The Univ. of Queensland School of Medicine (Australia); Christian S. Betz, Ludwig-Maximilians-Univ. München (Germany) [8207C-352]
- 4:00 pm: **Human airway structure modeling using long rang OCT**, Joseph Jing, Jun Zhang, Beckman Laser Institute and Medical Clinic (USA); Marc Rubinstein, Anthony E. Chin Loy, Brian J. F. Wong M.D., Univ. of California, Irvine School of Medicine (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8207C-353]
- 4:20 pm: **Thermal and mechanical processes in laser reshaping of costal cartilage for ENT**, Olga I. Baum, Yulia M. Soshnikova, Emil N. Sobol, Institute on Laser and Information Technologies (Russian Federation) [8207C-354]
- 4:40 pm: **Imaging of the internal nasal valve using optical coherence tomography**, Anthony E. Chin Loy M.D., Brian J. F. Wong, Zhongping Chen, Joseph Jing, Beckman Laser Institute and Medical Clinic (USA); Ermon Heidari, OCT Medical Imaging, Inc. (USA) [8207C-355]
- 5:00 pm: **Viability of electromechanically reshaped cartilage**, Karam Badran, Syed Hussain, Cyrus Manuel, Univ. of California, Irvine (USA); Dmitry E. Protsenko, Brian J. Wong, Beckman Laser Institute and Medical Clinic (USA) [8207C-356]
- 5:20 pm: **Integration of flexible fiberoptic high-speed videoendoscopy with time-synchronized measures of vocal function**, Daryush D. Mehta, Dimitar D. Deliyiski, Steven M. Zeitels M.D., Matias Zañartu, Robert E. Hillman, Massachusetts General Hospital (USA) [8207C-357]
- 5:40 pm: **Software for the analysis of laryngeal imaging recordings**, Shouhua Luo, Tao Jiang, Nin Gu, Southeast Univ. (China); Yuling Yan, Santa Clara Univ. (USA) [8207C-358]

Optical Techniques in Pulmonary Medicine

Conference Chairs: **Melissa J. Suter**, Massachusetts General Hospital (USA); **Stephen Lam**, The BC Cancer Agency Research Ctr. (Canada); **Matthew Brenner**, Univ. of California, Irvine (USA)

Program Committee: **David D. Sampson**, The Univ. of Western Australia (Australia); **Luc Thiberville**, Rouen Univ. Hospital (France); **Edmund Koch**, Universitätsklinikum Carl Gustav Carus Dresden (Germany); **Victor X. D. Yang**, Ryerson Univ. (Canada); **Johannes F. de Boer**, Vrije Univ. Amsterdam (Netherlands)

Saturday 21 January

SESSION 1

Room: 232 (Mezzanine) Sat. 8:30 to 10:20 am

Diagnostic Imaging

Session Chair: **Stephen Lam**,
The BC Cancer Agency Research Ctr. (Canada)

8:30 am: **Optical techniques in pulmonary medicine** (*Invited Paper, Presentation Only*), Stephen Lam, The BC Cancer Agency Research Ctr. (Canada) [8207D-55]

9:00 am: **Limitations of commercial time-domain optical coherence tomography in the airways**, Septimiu D. Murgu M.D., Henri G. Colt, David S. Mukai, Matthew Brenner, Univ. of California, Irvine (USA) [8207D-56]

9:20 am: **Improvements to a laser Raman spectroscopy system for reducing the false positives of autofluorescence bronchoscopies**, Hanna C. Pawluk, Michael A. Short, Stephen Lam, Annette McWilliams, Diana Ionescuc, Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada) [8207D-57]

9:40 am: **Measurements of airway wall structure by OCT: correlations with histology**, Pierre M. Lane, Anthony M. D. Lee, The BC Cancer Agency Research Ctr. (Canada); Tara Candido, The Univ. of British Columbia (Canada); Keishi Ohtani, The BC Cancer Agency Research Ctr. (Canada); Rebecca Shalansky, The Univ. of British Columbia (Canada); Annette McWilliams, Tawimas Shaipanich, The BC Cancer Agency Research Ctr. (Canada); Harvey O. Coxson, The Univ. of British Columbia (Canada); Calum E. MacAulay, Stephen Lam, The BC Cancer Agency Research Ctr. (Canada) [8207D-58]

10:00 am: **Volumetric optical frequency domain imaging of pulmonary pathology**, Lida P. Hariri, Matthew B. Applegate, Mari Mino-Kenudson, Eugene J. Mark, Brett E. Bouma, Guillermo J. Tearney M.D., Melissa J. Suter, Massachusetts General Hospital (USA) [8207D-59]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 232 (Mezzanine) Sat. 10:50 am to 12:10 pm

Structure and Function of Alveoli

Session Chair: **Melissa J. Suter**, Massachusetts General Hospital (USA)

10:50 am: **Quantitative investigation of alveolar structures with OCT using total liquid ventilation during mechanical ventilation**, Christian Schnabel, Sven Meissner, Edmund Koch, Universitätsklinikum Carl Gustav Carus Dresden (Germany) [8207D-60]

11:10 am: **Modeling of light refraction to investigate the validity of alveolar shape and volume visualized by optical frequency domain imaging**, Carolin I. Unglert, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Air Liquide R&D Medical Gases (France); William C. Warger II, Eman Namati, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Brett Bouma, Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts Institute of Technology (USA) [8207D-61]

11:30 am: **Multimodal imaging of lung tissue using optical coherence tomography and two-photon microscopy**, Maria Gaertner, Peter Cimalla, Stefan Geissler, Sven Meissner, Christian Schnabel, Universitätsklinikum Carl Gustav Carus Dresden (Germany); Wolfgang M. Kuebler, Charité Universitätsmedizin Berlin (Germany) and Univ. of Toronto (Canada); Edmund Koch, Universitätsklinikum Carl Gustav Carus Dresden (Germany) [8207D-62]

11:50 am: **Four-dimensional visualization of peripheral alveolar dynamics during uninterrupted ventilation in vivo**, William C. Warger II, Eman Namati, Carolin I. Unglert, Jocelyn E. Eckert, Brett E. Bouma, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) [8207D-63]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 3

Room: 232 (Mezzanine) Sat. 1:30 to 3:30 pm

Novel Catheters and Microscopy Techniques

Session Chair: **Johannes F. de Boer**,
Vrije Univ. Amsterdam (Netherlands)

1:30 pm: **Optical detection and diagnosis of peripheral pulmonary lesions**, Alex C. Chee M.D., Massachusetts General Hospital (USA) and Foothills Medical Ctr, Univ. of Calgary (Canada); Lida P. Hariri, Matthew B. Applegate, Colleen Channick, Guillermo J. Tearney M.D., Brett E. Bouma, Melissa J. Suter, Massachusetts General Hospital (USA) [8207D-64]

1:50 pm: **In situ 3D imaging of alveoli with a 30-gauge side-facing OCT needle probe**, Xiaojie Yang, Dirk Lorenser, Rodney W. Kirk, Bryden C. Quirk, Peter B. Noble, Robert A. McLaughlin, David D. Sampson, The Univ. of Western Australia (Australia) [8207D-65]

2:10 pm: **High-speed three-dimensional endoscopic optical frequency domain imaging with external k-clock sampling**, Jianan Li, Jianhua Mo, Frank Helderma, Mattijs de Groot, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) [8207D-66]

2:30 pm: **Development and testing of a fiber-based rotational monocoil OCT probe for airway imaging**, Andrew E. Heidari, OCT Medical Imaging, Inc. (USA); Danny Chou, OCT Medical Imaging, Inc. (USA) and Beckman Laser Institute (USA); David S. Mukai, Univ. of California, Irvine (USA); Sari B. Mahon, Beckman Laser Institute and Medical Clinic (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA); Matthew Brenner, Univ. of California, Irvine (USA) and Beckman Laser Institute, University of California, Irvine (USA); Ram S. Ramalingam, OCT Medical Imaging, Inc. (USA) [8207D-67]

2:50 pm: **Three-dimensional high-resolution imaging of lung preparations using ultramicroscopy**, David Schwenninger, Constanze Dassow, Josef Guttman, Univ. Hospital Freiburg (Germany) [8207D-68]

3:10 pm: **Ultra-high-resolution optical coherence tomography imaging of diseased rat lung using Gaussian-shaped super-continuum sources**, Norihiko Nishizawa, Shutaro Ishida, Nagoya Univ. (Japan); Masashi Kitatsuiji, Hiroyoshi Ohshima, HOYA Corp. (Japan); Yoshinori Hasegawa, Miyoko Matsushima, Tsutomu Kawabe, Nagoya Univ. (Japan) [8207D-69]

POSTER SESSION AND COFFEE BREAK

Room: South Hall A (with BiOS Expo) . Sat. 3:30 to 4:30 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:30 to 4:30 PM on Saturday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:30 to 4:30 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Lung vasculature imaging using speckle variance optical coherence tomography, Anthony M. D. Lee, Michelle Cua, Pierre M. Lane, Annette McWilliams, Tawimas Shaipanich, Calum E. MacAulay, The BC Cancer Agency Research Ctr. (Canada); Victor X. D. Yang M.D., Ryerson Univ. (Canada); Stephen Lam, The BC Cancer Agency Research Ctr. (Canada) [8207D-75]

Optical studies of tissue mitochondrial redox in isolated perfused rat lungs, Reyhaneh Sepehr, Kevin Staniszewski, Sepideh Maleki, Univ. of Wisconsin-Milwaukee (USA); Said Audi, Marquette Univ. (USA); Mahsa Ranji, Univ. of Wisconsin-Milwaukee (USA) [8207D-77]

SESSION 4

Room: 232 (Mezzanine) Sat. 4:30 to 6:10 pm

Models of Human Lung Disease

Session Chair: Matthew Brenner, Univ. of California, Irvine (USA)

4:30 pm: **Entropy-based measures of in vivo cilia-driven microfluidic mixing derived from quantitative optical imaging**, Kenny Chandrasekera, Stephan Jonas, Dipankar Bhattacharya, Mustafa K. Khokha, Michael A. Choma M.D., Yale School of Medicine (USA) [8207D-70]

4:50 pm: **Diffuse optical spectroscopy measurements of pulmonary physiological and metabolic effects in a lethal rabbit cyanide model**, Jangwoen Lee, Sari B. Mahon, David Yoon, David S. Mukai, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA); Matthew Brenner, Beckman Laser Institute and Medical Clinic (USA) and Pulmonary and Critical Care Medicine Div. (USA) [8207D-71]

5:10 pm: **Functional anatomic imaging by micro-optical coherence tomography reveals autoregulatory mechanisms governing mucociliary transport in mammalian respiratory epithelium**, Linbo Liu, Wellman Ctr. for Photomedicine (USA); Marina Mazur, Suzanne B. Parker, Shastry Suresh, The Univ. of Alabama at Birmingham (USA); Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) and Harvard-MIT Health Sciences and Technology (USA); Steven M. Rowe, The Univ. of Alabama at Birmingham (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) and Harvard-MIT Health Sciences and Technology (USA) [8207D-72]


5:30 pm: **Assessment of smoke inhalation injury using volumetric optical frequency domain imaging in sheep models**, Lida P. Hariri, Matthew B. Applegate, John L. Beagle, Guillermo J. Tearney M.D., Charles A. Hales, Melissa J. Suter, Massachusetts General Hospital (USA) [8207D-73]

5:50 pm: **Dynamic optical imaging of methacholine-induced bronchoconstriction and the response to deep inhalations in sheep**, Melissa J. Suter, Matthew B. Applegate, Anja Braune, Vanessa J. Kelly, Guillermo J. Tearney M.D., Guido Musch, Tilo Winkler, Massachusetts General Hospital (USA) [8207D-74]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.



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Diagnostic and Therapeutic Applications of Light in Cardiology

Conference Chairs: **Kenton W. Gregory**, Oregon Medical Laser Ctr. (USA); **Guillermo J. Tearney**, Wellman Ctr. for Photomedicine (USA); **Laura Marcu**, Univ. of California, Davis (USA)

Saturday 21 January

Room: 309 (Esplanade) Sat. 8:00 to 10:00 am

Keynote Session: Trends and Updates in Cardiology

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

8:00 am: **Cardiovascular pathology**, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) [8207E-78]

8:40 am: **Cardiovascular imaging**, Farouc A. Jaffer, Massachusetts General Hospital (USA) [8207E-79]

9:20 am: **Cardiovascular therapy**, Kenton W. Gregory M.D., Oregon Medical Laser Ctr. (USA) [8207E-80]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 309 (Esplanade) Sat. 10:30 to 11:30 am

Cardiovascular Microscopy

Session Chair: **Andrew M. Rollins**, Case Western Reserve Univ. (USA)

10:30 am: **Label-free nonlinear optical microscopic comparison and quantification of type-I collagen fibrils in infarcted and adipose-derived stem-cell treated myocardium tissues**, Alex C. T. Ko, Leila Mostaçõ-Guidolin, Fei Wang, Bo Xiang, Michael S. D. Smith, National Research Council Canada (Canada); Arkady Major, Univ. of Manitoba (Canada); Ganghong Tian, Michael G. Sowa, National Research Council Canada (Canada) [8207E-81]

10:50 am: **4D imaging of embryonic chick hearts by streak-mode Fourier domain optical coherence tomography**, Rui Wang, Julie X. Yun, Clemson Univ. (USA); Richard L. Goodwin, Univ. of South Carolina (USA); Roger R. Markwald, Medical Univ. of South Carolina (USA); Thomas K. Borg, Univ. of South Carolina (USA); Raymond B. Runyan, The Univ. of Arizona (USA); Bruce Z. Gao, Clemson Univ. (USA) [8207E-83]

11:10 am: **Macrophage imaging in intact atherosclerotic plaques using OCT and two-channel two-photon luminescence microscopy**, Tianyi Wang, Biwei Yin, M. Shams Kazmi, Jordan Dwellle, The Univ. of Texas at Austin (USA); Veronika Sapozhnikova, Jacob Mancuso, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Brian Willsey, 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); Andrew K. Dunn, Thomas E. Milner, The Univ. of Texas at Austin (USA) [8207E-84]

Lunch/Exhibition Break 11:30 am to 1:20 pm

SESSION 3

Room: 309 (Esplanade) Sat. 1:20 to 2:40 pm

Multimodality Imaging

Session Chair: **Guillermo J. Tearney**, Massachusetts General Hospital (USA)

1:20 pm: **Miniature integrated optical coherence tomography: ultrasound probe for intravascular imaging**, Jiawen Li, Univ. of California, Irvine (USA); Xiang Li, The Univ. of Southern California (USA); Jiechen Yin, Univ. of California, Irvine (USA); Joe Jing, David S. Mukai, Sari B. Mahon, Beckman Laser Institute and Medical Clinic (USA); Ahmad Edris, Khiet Hoang M.D., Univ. of California, Irvine (USA); K. Kirk Shung, The Univ. of Southern California (USA); Matthew Brenner, Univ. of California, Irvine (USA) and Univ. of California, Irvine (USA); Jagat Narula, Univ. of California, Irvine (USA); Qifa Zhou, The Univ. of Southern California (USA); Pranav M. Patel, Univ. of California, Irvine (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA) [8207E-85]

1:40 pm: **Combining OCT and a fluorescence intensity imaging method for atherosclerosis detection**, Shanshan Liang, Beckman Laser Institute and Medical Clinic (USA) and Dalian Univ. of Technology (China); Arya Saidi, Joe Jing, Gangjun Liu, Beckman Laser Institute and Medical Clinic (USA); Jiechen Yin, Jagat Narula, Univ. of California, Irvine (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8207E-86]

2:00 pm: **Translation to intravascular detection of atherosclerotic plaques using combined fluorescence lifetime and ultrasound imaging**, Yang Sun, Jing Liu, Matthew Lam, Hongtao Xie, Julien Bec, Univ. of California, Davis (USA); Michael C. Fishbein, Univ. of California, Los Angeles (USA); Jonathan M. Cannata, K. Kirk Shung, The Univ. of Southern California (USA); Laura Marcu, Univ. of California, Davis (USA) [8207E-87]

2:20 pm: **Dual-modality intra-arterial imaging catheter**, Hongki Yoo, Jin Won Kim, Massachusetts General Hospital (USA); Milen Shishkov, Wellman Ctr. for Photomedicine (USA); Theodore Morse, The Boston Univ. Photonics Ctr. (USA); Roman Shubochkin, Boston Univ. (USA); Jason R. McCarthy, Massachusetts General Hospital (USA); Brett E. Bouma, Wellman Ctr. for Photomedicine (USA); Farouc A. Jaffer, Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) [8207E-88]

Coffee Break 2:40 to 3:10 pm

SESSION 4

Room: 309 (Esplanade) Sat. 3:10 to 4:30 pm

OCT

Session Chair: **Atsushi Tanaka**, Wellman Ctr. for Photomedicine (USA)

3:10 pm: **Mechanical stress on vascular wall enhances neointimal hyperplasia following stent implantation: serial explorations using optical frequency domain imaging in vivo**, Atsushi Tanaka, Brett E. Bouma, Melissa J. Suter, Benjamin Greenberger, Kevin Gallagher, Wellman Ctr. for Photomedicine (USA); Dawn Winsor-Hines, Boston Scientific Corp. (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) [8207E-89]

3:30 pm: **3D optical coherence tomography tissue type imaging**, Gijs van Soest, Evelyn Regar, Erasmus MC (Netherlands); Brett Bouma, Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA); Giovanni Ughi, Jan D'Hooghe, Katholieke Univ. Leuven (Belgium); Antonius F. W. van der Steen, Erasmus MC (Netherlands) and Interuniversity Cardiology Institute of the Netherlands (Netherlands) [8207E-90]

3:50 pm: **Simulation of the sunflower artifact in IV-OCT imaging of bare metal stents**, Sahar Elahi, Jessica Maisano, The Univ. of Texas at Austin (USA); Jouke Dijkstra, Leids Univ. Medisch Ctr. (Netherlands); Jacob Mancuso, Marc D. Feldman, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Thomas E. Milner, The Univ. of Texas at Austin (USA) [8207E-91]

4:10 pm: **Conformational change in coronary artery structure assessed by optical coherence tomography in patients with vasospastic angina**, Atsushi Tanaka, Brett E. Bouma, Wellman Ctr. for Photomedicine (USA); Kenei Shimada, Osaka City Univ. (Japan); Manabu Kashiwagi, Takashi Akasaka, Junichi Yoshikawa, Wakayama Medical Ctr. (Japan); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) [8207E-92]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 5

Room: 309 (Esplanade) Sun. 8:40 to 10:00 am

Photoacoustic Imaging

Session Chair: Gijs van Soest, Erasmus MC (Netherlands)

8:40 am: **Automatic lipid detection in human coronary atherosclerosis using spectroscopic intravascular photoacoustic imaging**, Krista Jansen, Antonius F. W. van der Steen, Erasmus MC (Netherlands) and Interuniversity Cardiology Institute of The Netherlands - Netherlands Heart Institute (Netherlands); Heleen M. M. van Beusekom, J. Wolter Oosterhuis, Geert Springeling, Frits Mastik, Gijs van Soest, Erasmus MC (Netherlands) [8207E-93]

9:00 am: **High-frequency intravascular photoacoustic (IVPA) imaging for differentiating arterial wall layered structures**, Xiang Li, The Univ. of Southern California (USA); Wei Wei, Univ. of California, Irvine (USA); K. Kirk Shung, Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8207E-94]

9:20 am: **Combined intravascular ultrasound and spectroscopic photoacoustic imaging for detecting morphology and composition of atherosclerotic plaques**, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Bo Wang, Andrei B. Karpouk, Jimmy L. Su, Douglas E. Yeager, The Univ. of Texas at Austin (USA); Pratixa Joshi, James H. Amirian, The Univ. of Texas Health Science Ctr. at Houston (USA); Silvio Litovsky, The Univ. of Alabama at Birmingham (USA); Konstantin Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) and The Univ. of Texas at Austin (USA); Richard W. Smalling, The Univ. of Texas Health Science Ctr. at Houston (USA) [8207E-95]

9:40 am: **Intracoronary Laser Speckle Imaging (ILSI) for the mechanical characterization of coronary plaques in living swine**, Seemantini K. Nadkarni, Jimmy Toussaint, Guillermo J. Tearney M.D., Zeinab Hajjarian Kashany, Harvard Medical School (USA) [8207E-96]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 309 (Esplanade) Sun. 10:30 to 11:50 am

Cardiovascular Spectroscopy

Session Chair: Laura Marcu, Univ. of California, Davis (USA)

10:30 am: **Biochemical characterization of coronary atherosclerosis based on autofluorescence imaging**, Jesung Park, Paritosh Pande, Sebina Shrestha, Fred Clubb, Brian Applegate, Javier A. Jo, Texas A&M Univ. (USA) . . [8207E-97]

10:50 am: **Automated algorithm for classification of atherosclerotic plaques using depth-resolved spectral analysis of optical frequency-domain imaging datasets**, Christine P. Fleming, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Atsushi Tanaka, Joseph A. Gardecki, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Pál Maurovich-Horvat, William C. Warger II, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Jocelyn E. Eckert, Wellman Ctr. for Photomedicine (USA); Udo Hoffmann, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Brett E. Bouma, Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) [8207E-98]

11:10 am: **Evaluation of intracoronary near-infrared autofluorescence spectroscopy**, Hao Wang, Joseph A. Gardecki, Brett E. Bouma, Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) [8207E-99]

11:30 am: **Novel method for fast analysis of atherosclerotic plaque time-resolved fluorescence decay characteristics and accurate evaluation of plaque composition**, Jing Liu, Univ. of California, Davis (USA) [8207E-100]

SESSION 7

Room: 309 (Esplanade) Sun. 11:50 pm to 12:50 am

Cardiovascular Therapy

Session Chair: Kenton W. Gregory, Oregon Medical Laser Ctr. (USA)

11:50 pm: **Influences on vascular wall smooth muscle cells with novel short-duration thermal angioplasty**, Mie Kunio, Natsumi Shimazaki, Tsunenori Arai, Keio Univ. (Japan); Masami Sakurada, Tokorozawa Heart Ctr. (Japan) [8207E-101]

12:10 am: **Real-time control of angioplasty balloon inflation based on feedback from ontravascular optical coherence tomography**, Hamed Azamouh, Sébastien Vergnole, Guy Lamouche, National Research Council Canada (Canada) [8207E-102]

12:30 am: **Laser-driven short-duration heating angioplasty: chronic artery lumen patency and histology in porcine iliac artery**, Natsumi Shimazaki, Mie Kunio, Sho Naruse, Tsunenori Arai, Keio Univ. (Japan); Masami Sakurada, Tokorozawa Heart Ctr. (Japan) [8207E-103]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

Accurate measurement of systolic blood pressure by photoplethysmography, Meir Nitzan, Shaul Akiva, Ori Gleisner, Eran Shalom, Jerusalem College of Technology (Israel) [8207E-104]

Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Conference Chairs: **Henry Hirschberg**, Beckman Laser Institute and Medical Clinic (USA); **Steen Madsen**, Univ. of Nevada, Las Vegas (USA)

Program Committee: **Frederic Leblond**, Dartmouth College (USA); **Marlon Stephen Mathews**, Univ. of California, Irvine (USA); **Herbert Stepp**, Ludwig-Maximilians-Univ. München (Germany); **Victor X. D. Yang**, Ryerson Univ. (Canada)

Saturday 21 January

Introduction

Room: 252 (Mezzanine) Sat. 8:25 am

Session Chair: **Henry Hirschberg**,
Beckman Laser Institute and Medical Clinic (USA)

SESSION 1

Room: 252 (Mezzanine) Sat. 8:50 to 10:10 am

Brain Tumor Therapy: Intra Op I

Session Chair: **Herbert Stepp**,
Ludwig-Maximilians-Univ. München (Germany)

8:50 am: **Fluorescence guidance during stereotactic biopsy**, Herbert Stepp, Wolfgang Beyer, Ludwig-Maximilians-Univ. München (Germany); David Brucker, Andre Ehrhardt, Stefan K. Fischer, Ludwig-Maximilians-Univ. München (USA); Werner Goebel, KARL STORZ GmbH & Co. KG (Germany); Marcus H. Goetz, MRC Systems GmbH (Germany); Georg Hennig, Jochen Herms, Ludwig-Maximilians-Univ. München (Germany); Klaus-Martin Irion, KARL STORZ GmbH & Co. KG (Germany); Ann Johansson, Ludwig-Maximilians-Univ. München (Germany); Pan Li, MRC Systems GmbH (USA); Gesa Palte, Ludwig-Maximilians-Univ. München (Germany); Adrian Rühm, Klinikum der Univ. München (Germany); Sabine Sandner, Ludwig-Maximilians-Univ. München (USA) [8207F-127]

9:10 am: **Raman spectroscopic imaging as complementary tool for histopathologic assessment of brain tumors**, Christoph Krafft, Norbert Bergner, Institut für Photonische Technologien e.V. (Germany); Bernd F. M. Romeike, Rolf Kalf, Friedrich-Schiller-Univ. Jena (Germany); Kathrin D. Geiger, Gabriele Schackert, Technische Univ. Dresden (Germany); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany) [8207F-107]

9:30 am: **Value of 5-aminolevulinic acid for resection of spinal tumors**, Georg Widhalm, Barbara Kiesel, Medizinische Univ. Wien (Austria); Klaus Novak, Medizinische Univ. Wien (Azerbaijan); Georgi Minchev, Adelheid Wöhner, Christian Matula, Daniela Prayer, Johannes A. Hainfellner, Engelbert Knosp, Stefan Wolfsberger, Medizinische Univ. Wien (Austria) [8207F-108]

9:50 am: **A non-contact imaging approach for quantitative ALA-induced PpIX fluorescence guided resection**, Pablo A. Valdes, Frederic Leblond, Kolbein Kolste, Dartmouth College (USA); Valerie L. Jacobs, Dartmouth Hitchcock Medical Ctr. (USA); Brian C. Wilson, Univ. of Toronto (Canada); Keith D. Paulsen, Dartmouth College (USA); David W. Roberts, Dartmouth Hitchcock Medical Ctr. (USA) [8207F-109]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 252 (Mezzanine) Sat. 10:40 am to 12:00 pm

Cerebrovascular Imaging

Session Chair: **Marlon Stephen Mathews**,
Univ. of California, Irvine (USA)

10:40 am: **Intraoperative laser speckle contrast imaging for monitoring cerebral blood flow: results from a 10-patient pilot study**, Lisa M. Richards, Erica L. Weber, The Univ. of Texas at Austin (USA); Ashwin B. Parthasarathy, Boston Univ. (USA); Kaelyn L. Kappeler, St David's Hospital (USA); Douglas J. Fox, St. David's Hospital (USA); Andrew K. Dunn, The Univ. of Texas at Austin (USA) [8207F-110]

11:00 am: **Feasibility and methodology of optical coherence tomography imaging of human intracranial aneurysms: ex vivo pilot study**, Barry Vuong, Cuiuru Sun, Ryerson Univ. (Canada); Tim-Rasmus Kiehl M.D., Univ. Health Network (Canada); Joseph A. Gardecki, Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA); Beau A. Standish, Ryerson Univ. (Canada); Leodante da Costa M.D., Sunnybrook Health Sciences Ctr. (Canada) and Univ. of Toronto (Canada); Josaphat V. de Moraes M.D., Hospital de Baleia (Brazil); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA) and Harvard-MIT Health Sciences and Technology (USA); Victor X. D. Yang M.D., Ryerson Univ. (Canada) and Univ. of Toronto (Canada) [8207F-111]

11:20 am: **Feasibility of endovascular optical coherence tomography for high-resolution carotid vessel wall imaging**, Ho Yiu Cheng, Univ. of Toronto (Canada); Cuiuru Sun, Ryerson Univ. (Canada); Tom R. Marotta, Julian Spears, Walter J. Montanera, St. Michael's Hospital (Canada); Peter R. Herman, Univ. of Toronto (Canada); Aman Thind, Brian K. Courtney M.D., Sunnybrook Health Sciences Ctr. (Canada); Beau A. Standish, Victor X. D. Yang M.D., Ryerson Univ. (Canada) [8207F-112]

11:40 am: **Contrast-enhanced diffuse optical tomography of brain perfusion in humans using ICG**, Christina Habermehl, Christoph H. Schmitz, Jens M. Steinbrink, Charité Universitätsmedizin Berlin (Germany) [8207F-113]

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

SESSION 3

Room: 252 (Mezzanine) Sat. 1:30 to 3:10 pm

Brain Tumor Therapy: Post Op

Session Chair: **Henry Hirschberg**,
Beckman Laser Institute and Medical Clinic (USA)

1:30 pm: **Spectral and lifetime domain measurements of rat brain tumors**, Barbara Leh, Institut National de Physique Nucléaire et de Physique des Particules (France); Darine Abi Haidar, Institut National de Physique Nucléaire et de Physique des Particules (France) and Univ Paris 7-Denis Diderot (France); Kamal Allaoua, Institut National de Physique Nucléaire et de Physique des Particules (France); Mauricette Collado-Hilly, INSERM (France); Imène Chebbi, SARL Nanobactérie (France); Yves Charon, Institut National de Physique Nucléaire et de Physique des Particules (France) and Univ Paris 7-Denis Diderot (France); Marie-Alix Duval, Institut National de Physique Nucléaire et de Physique des Particules (France) and Univ. d'Evry Val d'Essonne (France); Laurent Ménard, Institut National de Physique Nucléaire et de Physique des Particules (France) and Univ. Paris 7-Denis Diderot (France); Rainer Siebert, Institut National de Physique Nucléaire et de Physique des Particules (France) [8207F-114]

1:50 pm: **Hyperthermia enhances photochemical internalization-mediated delivery of bleomycin in glioma spheroids**, Steen Madsen, Christina Fennimore, Univ. of Nevada, Las Vegas (USA); Henry Hirschberg M.D., Beckman Laser Institute and Medical Clinic (USA) [8207F-115]

2:10 pm: **Quantitative measurement of cerebral blood flow during hypothermia by using time-resolved near-infrared spectroscopy**, Mohammad Fazel Bakhsheshi, Mamadou Diop, Keith St Lawrence, Ting-Yim Lee, The Univ. of Western Ontario (Canada) [8207F-116]

2:30 pm: **Enhanced gene transfection by photochemical internalization of acid transforming polypeptide micelles**, Henry Hirschberg M.D., En-Chung Shih, Beckman Laser Institute and Medical Clinic (USA); Steen Madsen, Univ. of Nevada, Las Vegas (USA); Young Jik Kwon, Univ. of California, Irvine (USA) [8207F-117]

2:50 pm: **Dynamic contrast enhanced-magnetic resonance imaging (DCE-MRI) of photodynamic therapy (PDT) outcome and associated changes in the blood-brain barrier following Pc 4-PDT of Glioma in an athymic nude rat model**, Vaijayantee Belle, Ali A. Anka, Nathan M. Cross, Paul Thompson, Eric Mott, Rahul Sharma, Kayla Gray, Ruozhen Zhang, Yueshuo Xu, Jiayang Sun, Christopher A. Flask, Nancy L. Oleinick, David Dean, Case Western Reserve Univ. (USA) [8207F-118]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 252 (Mezzanine) Sat. 3:40 to 5:20 pm

CNS Imaging

Session Chair: Steen Madsen, Univ. of Nevada, Las Vegas (USA)

- 3:40 pm: **Spatial frequency domain optical imaging of neurovascular coupling in a mouse model of Alzheimer's disease**, Alexander J. Lin, Soren D. Konecky, Tyler B. Rice, Beckman Laser Institute and Medical Clinic (USA); Kim N. Green, Univ. of California, Irvine (USA); Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8207F-119]
- 4:00 pm: **Neurosurgical hand-held optical coherence tomography (OCT) forward-viewing probe**, Cuiyu Sun, Ryerson Univ. (Canada); Kenneth K. C. Lee, Univ. of Toronto (Canada); Barry Vuong, Ryerson Univ. (Canada); Michael Cusimano, St. Michael's Hospital (Canada); Alexander Brukson, Adrian Mariampillai, Beau A. Standish, Ryerson Univ. (Canada); Victor X. D. Yang M.D., Ryerson Univ. (Canada) and Univ. of Toronto (Canada) [8207F-120]
- 4:20 pm: **Discriminant analysis of functional near-infrared imaging for schizophrenia diagnosis**, Ching-Cheng Chuang, National Taiwan Univ. (Taiwan); I-Jen Chiang, Taipei Medical Univ. (Taiwan); Tsuo-Hung Lan, National Yang-Ming Univ. (Taiwan); Chung-Ming Chen, National Taiwan Univ. (Taiwan); Yao-Sheng Hsieh, Chun-Yang Wang, National Chiao Tung Univ. (Taiwan); Ching-Po Lin, Chia-Wei Sun, National Yang-Ming Univ. (Taiwan) . . . [8207F-121]
- 4:40 pm: **Hyperspectral optical tomography of evoked hemodynamic activity in the rat cortex**, Soren D. Konecky, Beckman Laser Institute and Medical Clinic (USA); Nathan A. Hagen, Rice Univ. (USA); Amaan Mazhar, Beckman Laser Institute and Medical Clinic (USA); Tomasz S. Tkaczyk, Rice Univ. (USA); Ron D. Frostig, Univ. of California, Irvine (USA); Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8207F-122]
- 5:00 pm: **Relative phase of oscillations of cerebral oxy-hemoglobin and deoxyhemoglobin concentrations during sleep in human subjects**, Michele L. Pierro, Angelo Sassaroli, Tufts Univ. (USA); Peter R. Bergethon, Boston Univ. School of Medicine (USA); Sergio Fantini, Tufts Univ. (USA) [8207F-123]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 5

Room: 252 (Mezzanine) Sun. 8:40 to 10:00 am

Brain Tumor Therapy Intra Op II

Session Chair: Frederic Leblond, Dartmouth College (USA)

- 8:40 am: **Compact fluorescence and white-light imaging system for intraoperative visualization of nerves**, Daniel C. Gray, Evgenia Kim, Victoria Cotero, Paul Stauding, Siavash Yazdanfar, Cristina Tan Hehr, GE Global Research (USA) [8207F-124]
- 9:00 am: **Non-contact photoacoustic tomography and ultrasonography for brain imaging**, Guy Rousseau, Alain Blouin, Jean-Pierre Monchalin, National Research Council Canada (Canada) [8207F-125]
- 9:20 am: **Full-field optical coherence tomography for intraoperative diagnosis during brain surgery?**, Anne Latrive, ESPCI - Institut Langevin (France) and LLTECH SAS (France); Osnath Assayag, ESPCI - Institut Langevin (France); Fabrice Harms, LLTECH SAS (France); Bertrand Devaux, Ctr. Hospitalier Sainte Anne (France); A. Claude Boccara, ESPCI - Institut Langevin (France) and LLTECH SAS (France) [8207F-126]
- 9:40 am: **Identifying brain cancers using dye-enhanced multimodal confocal imaging**, Dennis J. Wirth, Univ. of Massachusetts Lowell (USA); Matija Snuderl, Harvard Medical School (USA); Sameer A. Sheth, William Curry, Massachusetts General Hospital (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) and Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8207F-105]
- Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 252 (Mezzanine) Sun. 10:30 am to 12:30 pm

Neuro Imaging

Session Chair: Victor X. D. Yang, Ryerson Univ. (Canada)

- 10:30 am: **Full-field optical coherence microscopy (FFOCM) is a novel technique for subcellular imaging of myenteric neurons in the gastrointestinal tract: potential role in diagnosing Hirschsprung's disease**, Emmanuel Coron M.D., Yaron Bromberg, Wellman Ctr. for Photomedicine (USA); Alberto Pieretti, Massachusetts General Hospital (USA); Maxime Mahé, INSERM (France); Egidijus Aukorius, Wellman Ctr. for Photomedicine (USA); Michel Neunlist, INSERM (France); Brett E. Bouma, Wellman Ctr. for Photomedicine (USA); Allan Goldstein, Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) . . [8207F-128]
- 10:50 am: **In vivo optical microprobe imaging for intracellular Ca²⁺ dynamics in response to dopaminergic signaling in deep brain evoked by cocaine**, Zhongchi Luo, Yingtian Pan, Congwu Du, Stony Brook Univ. (USA) [8207F-129]
- 11:10 am: **Multichannel optical brain imaging to separate cerebral vascular, tissue metabolic, and neuronal effects of cocaine**, Zhongchi Luo, Zhijia Yuan, Yingtian Pan, Congwu Du, Stony Brook Univ. (USA) [8207F-130]
- 11:30 am: **Optical tractography of human brain**, Hui Wang, Junfeng Zhu, Univ. of Minnesota, Twin Cities (USA); Bruce Fischl, Massachusetts General Hospital (USA); David A. Boas, Athinoula A. Martinos Ctr. for Biomedical Imaging (USA); Taner Akkin, Univ. of Minnesota, Twin Cities (USA) . . [8207F-184]
- 11:50 am: **Optical coherence tomography of the spinal cord: optimization of an in vivo model**, Adrian Miriampillai, Ryerson Univ. (Canada); David W. Cadotte, Adam Cadotte, Kenneth K. C. Lee, Univ. of Toronto (Canada); Rasmus Kiehl, Univ. Health Network (Canada); Brian C. Wilson, Princess Margaret Hospital (Canada); Michael G. Fehlings, Univ. of Toronto (Canada); Victor X. D. Yang M.D., Ryerson Univ. (Canada) [8207F-226]
- 12:10 pm: **Biomechanical properties of soft tissue measurement using optical coherence elastography**, Marjan Razani, Adrian Miriampillai, Cuiyu Sun, Ryerson Univ. (Canada); Victor X. D. Yang M.D., Ryerson Univ. (Canada) and Univ. of Toronto (Canada); Michael C. Kolios, Ryerson Univ. (Canada) [8207F-227]

POSTER SESSION AND COFFEE BREAK

Room: South Hall A (with BiOS Expo) . Sun. 3:00 to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday am. The poster session, with authors present, will be held from 3:00 to 4:00 pm on Sunday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday or 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Cortical-depth dependent cerebral hemodynamic responses to direct epidural stimulation using NIRS and ORIS, Seungduk Lee, Dalkwon Koh, Korea Univ. (Korea, Republic of); Aream Jo, Hae Young Lim, Sungkyunkwan Univ. (Korea, Republic of); Young-Jin Jung, Chang-Hwan Im, Hanyang Univ. (Korea, Republic of); Choong-Ki Kim, Youngwook Seo, Korea Univ. (Korea, Republic of); Minah Suh, Sungkyunkwan Univ. (Korea, Republic of); Beop-Min Kim, Korea Univ. (Korea, Republic of) [8207F-131]

Development of wireless-based NIRS system with cancellation of motion artifacts, Choong-ki Kim, Seungduk Lee, Dalkwon Koh, Beop-Min Kim, Korea Univ. (Korea, Republic of) [8207F-132]

Use of hypothermia in conjunction with photodynamic therapy for treatment of glioblastoma multiforme, Carl J. Fisher, Univ. of Toronto (Canada); Yonghong Chen, Benjamin Lai, Ontario Cancer Institute (Canada); James H. Eubanks, Toronto Western Hospital (Canada); Lothar D. Lilje, Univ. of Toronto (Canada) [8207F-133]

In vivo identification of brain morphology using optical coherence tomography, Carissa Reynolds, Melissa Eberle, Mike S. Hsu, Yan Wang, Christian M. Oh, Devin K. Binder, B. Hyle Park, Univ. of California, Riverside (USA) [8207F-134]

Study of EEG affected by low-level laser array, Jih-Huah Wu, Ming Chuan Univ. (Taiwan) [8207F-135]

In vivo measurements of FOSCAN induced fluorescence in rat brain, Herwig Kostron M.D., Emrah Akkatuna, Univ. Hospital Innsbruck (Austria) [8207F-136]

Conference 8207G · Room: 274 (Mezzanine)

Monday-Tuesday 23-24 January 2012 • Part of Proceedings of SPIE Vol. 8207

Photons and Neurons IV

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

Program Committee: **Matthew D. Keller**, Lockheed Martin Aculight (USA); **Agnella I. Matic**, Northwestern Univ. (USA); **Anna Roe**, Vanderbilt Univ. (USA); **Edward S. Boyden**, MIT Media Lab. (USA); **Samarendra K. Mohanty**, The Univ. of Texas at Arlington (USA)

Monday 23 January

SESSION 1

Room: 274 (Mezzanine) Mon. 8:30 to 10:10 am

Neural Stimulation I

Session Chair: **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

8:30 am: **New applications for infrared neural stimulation**, Matthew D. Keller, Jonathon D. Wells, Lockheed Martin Aculight (USA) [8207G-147]

8:50 am: **Infrared light excites cells via transient changes in membrane electrical capacitance**, Mikhail G. Shapiro, The Univ. of Chicago (USA); Kazuaki Homma, Northwestern Univ. (USA); Sebastian Villarreal, The Univ. of Chicago (USA); Claus-Peter Richter, Northwestern Univ. (USA); Francisco Bezanilla, The Univ. of Chicago (USA) [8207G-148]

9:10 am: **Functional characterization of infrared neural stimulation in non-human primate cortex**, Jonathan Cayce, Robert M. Friedman, E. Duco Jansen, Anita Mahadevan-Jansen, Anna Roe, Vanderbilt Univ. (USA) [8207G-149]

9:30 am: **Selective, high-optrode-count, artifact-free stimulation with infrared light via intrafascicular Utah Slanted Optrode Arrays**, Gregory A. Clark, Sylvana L. Schister, Noah M. Ledbetter, David J. Warren, Florian Solzbacher, The Univ. of Utah (USA); Jonathon D. Wells, Matthew D. Keller, Lockheed Martin Aculight (USA); Steven M. Blair, Loren W. Rieth, Prashant R. Tathireddy, The Univ. of Utah (USA) [8207G-150]

9:50 am: **Cochlear infrared neural stimulation in the chronically deaf guinea pig**, Agnella I. Matic, Claus-Peter Richter, Northwestern Univ. (USA) [8207G-151]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 274 (Mezzanine) Mon. 10:40 am to 12:20 pm

Neural Stimulation II

Session Chair: **Agnella I. Matic**, Northwestern Univ. (USA)

10:40 am: **Perturbing biomechanical forces in the developing heart tube with optical pacing**, Lindsay M. Peterson, Matthew T. McPheeters, Lee M. Barwick, Shi Gu, Michiko Watanabe, Andrew M. Rollins, Michael W. Jenkins, Case Western Reserve Univ. (USA) [8207G-152]

11:00 am: **Novel hardware development for infrared neural stimulation**, Matthew D. Keller, Jonathon D. Wells, Lockheed Martin Aculight (USA); Matthew Dummer, Mary Hibbs-Brenner, Vixar Inc. (USA) [8207G-153]

11:20 am: **Optical characterization of the Utah Slant Optrode Array for intrafascicular infrared neural stimulation**, Tanya Vanessa F. Abaya, Mohit Diwekar, Steven M. Blair, Prashant R. Tathireddy, Loren W. Rieth, Florian Solzbacher, Gregory A. Clark, The Univ. of Utah (USA) [8207G-154]

11:40 am: **Identifying and controlling sources of variability in hybrid opto-electrical neural stimulation**, Austin R. Duke, Vanderbilt Univ. (USA); Hui Lu, Michael W. Jenkins, Case Western Reserve Univ. (USA); E. Duco Jansen, Vanderbilt Univ. (USA); Hillel Chiel, Case Western Reserve Univ. (USA) [8207G-155]

12:00 pm: **Neuron absorption study and mid-IR optical excitations**, Ding kai Guo, Xing Chen, Shilpa Vadala, Jennie Leach, Fow-Sen Choa, Univ. of Maryland, Baltimore County (USA); Bill Bewley, Chul Soo Kim, Jerry Meyer, U.S. Naval Research Lab. (USA) [8207G-156]

Lunch Break 12:20 to 1:30 pm

SESSION 3

Room: 274 (Mezzanine) Mon. 1:30 to 3:10 pm

Detection of Neural Activity I

Session Chair: **Matthew D. Keller**, Lockheed Martin Aculight (USA)

1:30 pm: **Parametric evaluation of calcium waves evoked by infrared neural stimulation**, Jonathan Cayce, Vanderbilt Univ. (USA); Matthew Bouchard, Columbia Univ. (USA); E. Duco Jansen, Vanderbilt Univ. (USA); Elizabeth M. Hillman, Columbia Univ. (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [8207G-157]

1:50 pm: **Design and implementation of an optical coherence tomography-based optical electrode for non-contact neural recording**, Md. Shahidul Islam, Md. Rezuhanul Haque, Christian M. Oh, Yan Wang, B. Hyle Park, Univ. of California, Riverside (USA) [8207G-158]

2:10 pm: **The influence of source-detector separation on NIRS signal correction**, Andrew J. Berger, Univ. of Rochester (USA); James Goodwin, Univ. of Rochester (USA) and Queensland Univ. of Technology (Australia); Chantel Gaudet, Univ. of Rochester (USA) [8207G-159]

2:30 pm: **Neural correlates of contour detection in the primary visual cortex revealed with voltage-sensitive dye imaging**, Hamutal Slovin, Bar-Ilan Univ. (USA) [8207G-161]

2:50 pm: **Neural imaging in songbirds using fiber optic fluorescence microscopy**, Fatemeh Nooshabadi, Gentry Hearn, Thierry Lints, Kristen C. Maitland, Texas A&M Univ. (USA) [8207G-160]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 274 (Mezzanine) Mon. 3:40 to 5:20 pm

Detection of Neural Activity II

Session Chair: **Samarendra K. Mohanty**, The Univ. of Texas at Arlington (USA)

3:40 pm: **Multi-plane two photon microscopy for high speed 3D neuroimaging**, Elizabeth M. Hillman, Lauren Grosberg, Brenda Chen, Columbia Univ. (USA); Ugne Kliibaite, Pubudu T. Galwaduge, Columbia Univ. . [8207G-162]

4:00 pm: **Plasticity in the visual cortex: interactions between synapses and microglia**, Ania Majewska, Univ. of Rochester (USA) [8207G-163]

4:20 pm: **Optically imaging intrinsic signals produced by intracortical microstimulation reveals the circuitry of cortical networks**, Robert M. Friedman, Andrea A. Brock, Omar A. Gharbawie, Iwona Stepniewska, Jon H. Kaas, Anna Roe, Vanderbilt Univ. (USA) [8207G-164]

4:40 pm: **Subthreshold and suprathreshold cortical lateral interactions revealed by optical imaging**, Yves Fregnac, Ctr. National de la Recherche Scientifique (France) [8207G-165]

5:00 pm: **What hemodynamics can and cannot tell us about local neural activity**, Aniruddha Das, Columbia Univ. (USA) [8207G-166]

Tuesday 24 January

SESSION 5

Room: 274 (Mezzanine) Tues. 8:00 to 9:20 am

Axonal Growth

Session Chair: Anita Mahadevan-Jansen, Vanderbilt Univ. (USA)

8:00 am: **Axonal regeneration of cultured mouse hippocampal neurons studied by an optical nano-surgery system**, Francesco Difato, Hanako Tsumi, Mattia Pesce, Istituto Italiano di Tecnologia (Italy); A. Guiggiani, Univ. degli Studi di Firenze (Italy); Fabio Benfenati, Axel Blau, Istituto Italiano di Tecnologia (Italy); M. Basso, Univ. degli Studi di Firenze (Italy); Massimo Vassalli, Consiglio Nazionale delle Ricerche (Italy); Evelina Chieragatti, Istituto Italiano di Tecnologia (Italy) [8207G-167]

8:20 am: **Repair of damage and stimulation of growth cone response following laser- induced sub-axotomy**, Tao Wu, Samarendra K. Mohanty, Veronica Gomez-Godinez, Lih-Huei Liaw, Beckman Laser Institute and Medical Clinic (USA); Jill Miotke, Ronald Meyer, Univ. of California, Irvine (USA); Michael Berns, Beckman Laser Institute and Medical Clinic (USA) [8207G-168]

8:40 am: **Enhancement and probing of neuronal growth using optical tweezers**, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8207G-169]

9:00 am: **Impact of nanosecond pulsed electric fields on primary hippocampal neurons**, Caleb C. Roth, General Dynamics Information Technology (USA); Jason A. Payne, Gerald J. Wilmink, Bennett L. Ibey, Danielle R. Dalzell, Air Force Research Lab. (USA) [8207G-170]

SESSION 6

Room: 274 (Mezzanine) Tues. 9:20 to 10:20 am

Optogenetics I

Session Chair: Anita Mahadevan-Jansen, Vanderbilt Univ. (USA)

9:20 am: **Shining new light on optogenetics**, Samarendra K. Mohanty, Ling Gu, The Univ. of Texas at Arlington (USA); Ting Li, Univ. of Electronic Science and Technology of China (China) [8207G-171]

9:40 am: **Two-photon control of neurons with optogenetics and caged neuromodulators**, Darcy Peterka, Adam M. Packer, Rafael Yuste M.D., Columbia Univ. (USA) [8207G-184]

10:00 am: **Optogenetic stimulation of the auditory nerve**, Victor H. Hernandez, Gerhard Hoch, Matthias Bartels, Georg-August-Univ. Göttingen (Germany); Gerhard Vogt, Carolyn Garnham, MED-EL Deutschland GmbH (Germany); George J. Augustine, Duke Univ. (USA); Nicola Strenzke, Tobias Moser, Georg-August-Univ. Göttingen (Germany) [8207G-173]

Coffee Break 10:20 to 10:40 am

SESSION 7

Room: 274 (Mezzanine) Tues. 10:40 am to 12:20 pm

Optogenetics II

Session Chair: E. Duco Jansen, Vanderbilt Univ. (USA)

10:40 am: **Imaging voltage in electrically excitable cells**, Joel Kralj, Daniel Hochbaum, Adam Douglass, Dougal Maclaurin, Veena Venkatachalam, Adam E. Cohen, Harvard Univ. (USA) [8207G-174]

11:00 am: **Targeted modulation of retinal cell subtypes to restore visual function in the rd10 mouse model of blindness**, Richard M. Stewart; M. Mehdi Doroudchi, Eos Neuroscience Inc. (USA) [8207G-175]

11:20 am: **A 3-D waveguide array for optogenetic control of neural circuits in the brain**, Anthony N. Zorzos, J. Scholvin, Edward S. Boyden, MIT Media Lab. (USA) [8207G-176]

11:40 am: **Implantable optrode design for optogenetic visual cortical prosthesis**, Na Dong, Xiaohan Sun, Southeast Univ. (China); Patrick Degenaar, Newcastle Univ. (United Kingdom) [8207G-177]

12:00 pm: **All-optical control of neuronal function via optical delivery of light-sensitive proteins and optogenetic stimulation**, Alexander Villalobos, Ling Gu, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8207G-178]

Monday 23 January

POSTERS - MONDAY

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

Conference attendees are invited to attend the BIOS 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 at <http://spie.org/x27476.xml>.

Polarization-dependent responses of fluorescent indicators partitioned into myelinated axons, Ileana Micu, Craig Brideau, Peter K. Stys M.D., Univ. of Calgary (Canada) [8207G-179]

Quantitative characterization of peripheral nerve structural features using optical coherence tomography, Michael C. Oliveira, Md. Shahidul Islam, Univ. of California, Riverside (USA); Francis P. Henry, Harvard Medical School (USA); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands); B. Hyle Park, Univ. of California, Riverside (USA) [8207G-180]

Fiber-array based optogenetic prosthetic system for stimulation therapy, Christopher Cote, Ling Gu, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8207G-181]

Quantitative study of peripheral nerve myelination using polarization-sensitive optical coherence tomography, Yan Wang, B. Hyle Park, Univ. of California, Riverside (USA) [8207G-182]

The microdibi project, Marco Genovese, Istituto Nazionale di Ricerca Metrologica (Italy) [8207G-183]

Optics in Bone Surgery and Diagnostics

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

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

Saturday 21 January

SESSION 1

Room: 234 (Mezzanine) Sat. 8:40 to 10:20 am

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

8:40 am: **Optical coherence tomography for the identification of musculoskeletal structures of the spine**, Kathy Beaudette, Ecole Polytechnique de Montréal (Canada); Mathias Strupler, Sainte-Justine Mother and Child Univ. Hospital Ctr. (Canada) and Ecole Polytechnique de Montréal (Canada); Fouzi Benboujja, Carl-Éric Aubin, Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) and Sainte-Justine Mother and Child Univ. Hospital Ctr. (Canada) [8207H-137]

9:00 am: **New bone surgery instrument based on femtosecond laser**, Iulian Ionita, Univ. of Bucharest (Romania) [8207H-138]

9:20 am: **Polymer-capped fiber optic Raman probe for in vivo non-invasive Raman tomography and spectroscopy**, Paul I. Okagbare, Michael D. Morris, Univ. of Michigan (USA) [8207H-139]

9:40 am: **Photoacoustic diagnosis of early osteoporotic bone loss and density variations**, Bahman Lashkari, Andreas Mandelis, Univ. of Toronto (Canada) [8207H-140]

10:00 am: **Bone-demineralization diagnosis in a bone-tissue-skin matrix using the pulsed-chirped photothermal radar**, Sreekumar Kaipilavil, Andreas Mandelis, Univ. of Toronto (Canada) [8207H-141]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 234 (Mezzanine) Sat. 10:50 am to 12:30 pm

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

10:50 am: **Raman spectroscopy: a powerful tool for monitoring unusual bone mineral in diseased or damaged bone**, Michael D. Morris, Univ. of Michigan (USA) [8207H-142]

11:10 am: **Validating in vivo Raman spectroscopy of bone in human subjects**, Francis W. Esmonde-White, Karen A. Esmonde-White, Michael D. Morris, Univ. of Michigan (USA) [8207H-143]

11:30 am: **Thermal coherence tomography: a depth-selective thermophotonic radar imaging technique for demineralization diagnosis in hard dental and bone tissues**, Nima Tabatabaei, Andreas Mandelis, Univ. of Toronto (Canada); Mehdi Dehghany, Kirk H. Michaelian, Natural Resources Canada (Canada) [8207H-144]

11:50 am: **Raman spectroscopy of bone metastasis**, Karen A. Esmonde-White, Joseph Sottnik, Univ. of Michigan Medical School (USA); Michael D. Morris, Univ. of Michigan (USA); Evan T. Keller, Blake J. Roessler, Univ. of Michigan Medical School (USA) [8207H-145]

12:10 pm: **Stem cell treated osteogenesis imperfecta bone imaged using Raman spectroscopy**, Kristy Cloyd, Martin Hedegaard, Maximilien Vanleene, Pascale Guillot, Sandra Shelfelbine, Molly M. Stevens, Imperial College London (United Kingdom) [8207H-146]

BIOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Lasers in Dentistry XVIII

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

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

Sunday 22 January

SESSION 1

Room: 232 (Mezzanine) Sun. 8:30 to 10:10 am

Lasers in Periodontology and Soft Tissue: Treatment and Diagnostics

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

8:30 am: **Comparison of Er,Cr:YSGG laser versus open flap debridement in periodontal pocket therapy: a clinical study**, Manak Gupta, Arundeeep K. Lamba, Farrukh Faraz, Shruti Tandon, Kirti Chawla, Dheeraj K. Koli, Maulana Azad Institute of Dental Sciences (India); Aarti Bhardwaj, Private Practitioner (India) [8208-01]

8:50 am: **Effects of the new 940 diode laser treatment combined with scaling and root planing in the reduction of periodontal pockets: an in vivo study**, Alireza Fallah, Iran Dental Laser Academy (Iran, Islamic Republic of) [8208-02]

9:10 am: **In-vivo gingival sulcus imaging using full-range, complex-conjugate-free, endoscopic spectral domain optical coherence tomography**, Yong Huang, Kang Zhang, The Johns Hopkins Univ. (USA); Wonjin Yi, Seoul National Univ. Dental Research Institute (Korea, Republic of); Jin Ung Kang, The Johns Hopkins Univ. (USA) [8208-03]

9:30 am: **Subgingival calculus detection by swept-source optical coherence tomography**, Yao-Sheng Hsieh, National Chiao Tung Univ. (Taiwan); Yi-Ching Ho, Shyh-Yuan Lee, National Yang-Ming Univ. (Taiwan); Chih-Wei Lu, Industrial Technology Research Institute (Taiwan); Cho-Pei Jiang, National Formosa Univ. (Taiwan); Ching-Cheng Chuang, National Taiwan Univ. (Taiwan); Chun-Yang Wang, National Chiao Tung Univ. (Taiwan); Chia-Wei Sun, National Yang-Ming Univ. (Taiwan) [8208-04]

9:50 am: **Er,Cr:YSGG laser: a new treatment modality for lower lip mucocele**, Kirti Chawla, Manak Gupta, Arundeeep K. Lamba, Farrukh Faraz, Shruti Tandon, Dheeraj K. Koli, Maulana Azad Institute of Dental Sciences (India); Aarti Bhardwaj, Private Practitioner (India) [8208-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 232 (Mezzanine) Sun. 10:40 am to 12:00 pm

Lasers and Composites: Bondstrength and Diagnostics

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

10:40 am: **Bond strengths evaluation of laser ceramic debonding**, Tatjana Dostálová M.D., 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); Michal Nemeec, Martin Fibrich, Czech Technical Univ. in Prague (Czech Republic); Mitsunobu Miyagi, Sendai National College of Technology (Japan) [8208-06]

11:00 am: **Shear bond strength of a self-etch adhesive to caries-affected dentin after caries removal by Er:YAG laser**, Zhenlin Zhan, Fujian Normal Univ. (China); Weiliang Wu, Fujian Medical Univ. (China); Haibin Zhao, Xianzeng Zhang, Fujian Normal Univ. (China); Shi Lin, Fujian Medical Univ. (China); Shusen Xie, Fujian Normal Univ. (China) [8208-07]

11:20 am: **Relationship between nondestructive OCT evaluation of resins composites and bond strength in a cavity**, Turki A. Bakhsh, Tokyo Medical and Dental Univ. (Japan) and King Abdulaziz Univ. (Saudi Arabia) and Global Ctr. of Excellence (Japan); Alireza Sadr, Tokyo Medical and Dental Univ. (Japan) and Globl Ctr. of Excellence (Japan); Yasushi Shimada, Tokyo Medical and Dental Univ. (Japan); Junji Tagami, Tokyo Medical and Dental Univ. (Japan) and Global Ctr. of Excellence (Japan); Yasunori Sumi, National Ctr. for Geriatrics and Gerontology (Japan) [8208-08]

11:40 am: **Assessing ex vivo dental biofilms and in vivo composite restorations using cross-polarization optical coherence tomography** [8208-09]

Lunch/Exhibition Break 12:00 to 1:40 pm

SESSION 3

Room: 232 (Mezzanine) Sun. 1:40 to 3:20 pm

Laser Ablation, Modelling, Enamel and Caries Imaging

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

1:40 pm: **Particle characteristics of different materials after ultra-short pulsed laser (USPL) irradiation**, Joerg Meister, Florian Schelle, Philip Kowalczyk, Matthias Frentzen, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) [8208-10]

2:00 pm: **Modeling distributed feedback GaAs/AlGaAs lasers in dentistry**, Meng-Mu Shih, Univ. of Florida (USA) [8208-11]

2:20 pm: **Investigations on the potential of a novel diode pumped Er:YAG laser system for dental applications**, Karl Stock, Florian Hausladen, Raimund Hibst, Univ. Ulm (Germany) [8208-12]

2:40 pm: **Hyperspectral laser-induced autofluorescence imaging of dental caries**, Miran Bürmen, Aleš Fidler, Franjo Pernuš, Boštjan Likar, Univ. of Ljubljana (Slovenia) [8208-13]

3:00 pm: **Spectrally enhanced image resolution of tooth enamel surfaces**, Liang Zhang, Leonard Y. Nelson, Joel H. Berg D.D.S., Eric J. Seibel, Univ. of Washington (USA) [8208-14]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: 232 (Mezzanine) Sun. 3:50 to 5:30 pm

Lasers in Early Caries Detection: Monitoring and Caries Treatment

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

3:50 pm: **Evaluation of cross-polarized near-infrared hyperspectral imaging for early detection of dental caries**, Peter Usenik, Miran Bürmen, Aleš Fidler, Franjo Pernuš, Boštjan Likar, Univ. of Ljubljana (Slovenia) [8208-15]

4:10 pm: **Longitudinal assessment of subsurface artificial root caries lesions by optical coherence tomography in comparison with transverse microradiography**, Alireza Sadr, Syozi Nakashima, Yasushi Shimada, Junji Tagami, Tokyo Medical and Dental Univ. (Japan); Yasunori Sumi, National Ctr. for Geriatrics and Gerontology (Japan) [8208-16]

4:30 pm: **Monitoring tooth demineralization using a cross polarization optical coherence tomographic system with an integrated MEMS scanner**, Daniel Fried, Univ. of California, San Francisco (USA) [8208-17]

4:50 pm: **Transmission of 1064-nm laser radiation during ablation with an ultra-short pulse laser system (USPL)**, Florian Schelle, Jörg Meister, Bernd Oehme, Matthias Frentzen, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) [8208-18]

5:10 pm: **Minimally invasive treatment of carious dentin with a nanosecond pulsed laser at 5.8 µm wavelength**, Katsunori Ishii, Masayuki Saiki, Osaka Univ. (Japan); Kazushi Yoshikawa, Kenzo Yasuo, Kazuyo Yamamoto, Osaka Dental Univ. Hospital (Japan); Kunio Awazu, Osaka Univ. (Japan) [8208-19]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

Comparison of soft tissues effects of 810, 940 and 980-nm diode lasers for dentistry, Rudolf M. Verdaasdonk, Albert van der Veen, Marja Verleng, Vrije Univ. Medical Ctr. (Netherlands); Vladimir Lemberg, Dmitri Boutoussov, BIOLASE Technology, Inc. (USA) [8208-20]

Relationship between Refractive Index and Mineral Content of Enamel and Dentin using OCT and TMR, Ilnaz Hariri, Alireza Sadr, Yasushi Shimada, Syozi Nakashima, Junji Tagami, Tokyo Medical and Dental Univ. (Japan); Yasunori Sumi, National Ctr. for Geriatrics and Gerontology (Japan) [8208-21]

Tooth structure analyzing by use of Stokes formalism and Mueller matrix, Yao-Sheng Hsieh, National Chiao Tung Univ. (Taiwan); Yi-Ching Ho, Shyh-Yuan Lee, National Yang Ming Univ. (Taiwan); Ching-Cheng Chuang, National Taiwan Univ. (Taiwan); Chun-Yang Wang, National Chiao Tung Univ. (Taiwan); Chia-Wei Sun, National Yang-Ming Univ. (Taiwan) [8208-22]

Treatment of an aberrant intraoral hair with Er,Cr:YSGG laser: a case report, Manak Gupta, Arundeeep K. Lamba, Farrukh Faraz, Shruti Tandon, Kirti Chawla, Dheeraj K. Koli, Maulana Azad Institute of Dental Sciences (India); Aarti Bhardwaj, Private Practitioner (India) [8208-23]

Management of denture-induced epulis fissuratum with Er,Cr:YSGG laser: a case report, Dheeraj K. Koli, Manak Gupta, Mahesh Verma, Arundeeep K. Lamba, Kirti Chawla, Maulana Azad Institute of Dental Sciences (India); Aarti Bhardwaj, Private Practitioner (India) [8208-24]

Diffusion analysis of one photosensitizer in bovine teeth using fluorescence optical imaging, Denis Jacomassi, Alessandra Rastelli, Sebastiao Pratavieira, Vanderlei Bagnato, Univ. de São Paulo (Brazil) . . [8208-25]

Optical characterization of one dental composite resin using bovine enamel as reinforcing filler, Jeison Tribioli, Denis Jacomassi, Alessandra Rastelli, Sebastiao Pratavieira, Vanderlei Bagnato, Cristina Kurachi, Univ. de São Paulo (Brazil) [8208-26]

All in one: Er,Cr:YSGG periodontal laser therapy, Aarti Bhardwaj, Private Practitioner (India); Manak Gupta, Dheeraj K. Koli, Kirti Chawla, Maulana Azad Institute of Dental Sciences (India) [8208-27]

Low-level laser intensity improves propulsive appliance effects on condylar cartilage, Augusto C. Ribeiro Figueiredo D.D.S., Fernanda Cristina A. dos Santos II, Lucas R. Capelleti, Sr., Marcos Vinicios B. Galdino, Sr., Renan V. Araújo, Sr., Mara R. Marques D.D.S., Univ. Federal de Goias (Brazil) . . [8208-28]

Image-guided laser ablation of occlusal caries using a rapidly swept CO₂ laser operating at 9.3- μ m, Kenneth H. Chan, Daniel Fried, Univ. of California, San Francisco (USA) [8208-29]

Remineralization of root caries monitored using cross polarization optical coherence tomography, Cynthia L. Darling, Hobin Kang, Daniel Fried, Univ. of California, San Francisco (USA) [8208-30]

An investigation of acid-etching CO₂ laser ablated enamel surfaces using cross polarization optical coherence tomography, Byung Nahm, Kenneth H. Chan, Hobin Kang, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) [8208-31]

Nondestructive monitoring of the repair of occlusal caries lesions using cross polarization optical coherence tomography, Hobin Kang, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) [8208-32]

Monitoring demineralization and remineralization in occlusal surfaces using optical coherence tomography and near-IR Imaging, Christopher M. Buehler, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) [8208-33]

Imaging secondary caries lesions with cross polarization optical coherence tomography, Robert Lee, Daniel Fried, Cynthia L. Darling, Univ. of California, San Francisco (USA) [8208-34]

Ophthalmic Technologies XXII

Conference Chairs: **Fabrice Manns**, Univ. of Miami (USA); **Per G. Söderberg**, Uppsala Univ. (Sweden); **Arthur Ho**, Brien Holden Vision Institute (Australia)

Program Committee: **Rafat R. Ansari**, NASA Glenn Research Ctr. (USA); **Michael Belkin**, Tel Aviv Univ. (Israel); **Ralf Brinkmann**, Univ. zu Lübeck (Germany); **Wolfgang Drexler**, Medizinische Univ. Wien (Austria); **Daniel X. Hammer**, Physical Sciences Inc. (USA); **Karen M. Joos**, Vanderbilt Univ. (USA); **Katsuhiko Kobayashi**, Topcon Corp. (Japan); **Kirill V. Larin**, Univ. of Houston (USA); **Ezra Maguen**, American Eye Institute (USA); **Donald T. Miller**, Indiana Univ. (USA); **Daniel V. Palanker**, Stanford Univ. School of Medicine (USA); **Jean-Marie Parel**, Bascom Palmer Eye Institute (USA); **Roberto Pini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Luigi L. Rovati**, Univ. degli Studi di Modena e Reggio Emilia (Italy); **Georg Schuele**, OptiMedica Corp. (USA); **Jerry Sebag**, The Univ. of Southern California (USA); **Peter Soliz**, VisionQuest Biomedical, LLC (USA); **William B. Telfair**, IRIDEX Corp. (USA); **Valery V. Tuchin**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

Saturday 21 January

SESSION 1

Room: 306 (Esplanade) Sat. 8:30 to 10:00 am

Ophthalmic Imaging: Models

Session Chairs: **Daniel X. Hammer**, Physical Sciences Inc. (USA); **Karen M. Joos**, Vanderbilt Univ. (USA)

8:30 am: **In vivo multiphoton imaging of the cornea in control and diabetic rats**, Gaël Latour, Laura Kowalczyk, Ecole Polytechnique (France); Michèle Savoldelli, Univ. Paris Descartes (France); Jean-Louis Bourges, Univ. Paris Descartes (France) and INSERM (France); Ivan Gusachenko, Karsten Plamann, Ecole Polytechnique (France); Francine Behar-Cohen, Univ. Paris Descartes (France) and INSERM (France); Marie-Claire Schanne-Klein, Ecole Polytechnique (France) [8209-01]

8:45 am: **In vivo assessment of the acute effect of sodium iodate toxicity on photoreceptor-RPE layer complex in a rat retinal model with UHROCT**, Sepideh Hariri, Alireza Akhlagh Moayed, Univ. of Waterloo (Canada); Shelley Boyd, Univ. of Toronto (Canada); Kostadinka Bizheva, Univ. of Waterloo (Canada) [8209-02]

9:00 am: **Measurement of pulsatile total blood flow in the rat retina with ultrahigh-speed spectral/Fourier domain OCT**, Woo Jhon Choi, Massachusetts Institute of Technology (USA); Bernhard Baumann, Massachusetts Institute of Technology (USA) and Tufts Univ. (USA); Allen C. Clermont, Edward P. Feener, Joslin Diabetes Ctr., Harvard Medical School (USA); Jay S. Duker M.D., Tufts Medical Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [8209-03]

9:15 am: **Effects of intraocular pressure on retinal and optic nerve head blood flow in rats determined by optical coherence tomography/optical microangiography**, Zhongwei Zhi, Univ. of Washington (USA); William Cepurna, Elaine Johnson, John Morrison, Oregon Health & Science Univ. (USA); Rui kang Wang, Univ. of Washington (USA) [8209-04]

9:30 am: **Ultrahigh-speed swept-source/Fourier-domain OCT imaging of the rodent retinal structure and blood flow**, Jonathan J. Liu, Massachusetts Institute of Technology (USA); Bernhard Baumann, Massachusetts Institute of Technology (USA) and Tufts Univ. (USA); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs, Inc. (USA); Martin F. Kraus, Massachusetts Institute of Technology (USA) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Ireneusz Grulkowski, Massachusetts Institute of Technology (USA) and Nicolaus Copernicus Univ. (Poland); Allen C. Clermont, Edward P. Feener, Harvard Medical School (USA); Joachim Hornegger, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Jay S. Duker M.D., Tufts Medical Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [8209-05]

9:45 am: **In vivo quantification of microglia dynamics with a scanning laser ophthalmoscope in a mouse model of focal laser injury**, Clemens Alt, Charles P. Lin, Wellman Ctr. for Photomedicine (USA) [8209-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 306 (Esplanade) Sat. 10:30 to 11:45 am

Ocular Biometry

Session Chairs: **Rafat R. Ansari**, NASA Glenn Research Ctr. (USA); **Ezra Maguen**, American Eye Institute (USA)

10:30 am: **A new principle for remote continuous monitoring of intraocular pressure variations**, Israel Margalit, Yevgeny Beiderman, Bar-Ilan Univ. (Israel); Alon Skaat, Michael Belkin, Tel Aviv Univ. Goldshleger Eye Research Institute (Israel); Ralf-Peter Tornow, Universitätsklinikum Erlangen (Germany); Vicente Mico Vicente Mico, Javier Garcia, Univ. de València (Spain); Zeev Zalevsky, Bar-Ilan Univ. (Israel) [8209-07]

10:45 am: **Image diversity, shape modification with accommodation, dynamical change with accommodation, and age dependence of the ciliary body imaged by optical coherence tomography**, Kimiya Shimizu, Nobuyuki Satou, Akihito Igarashi, Motoi Nakanishi, Kitasato Univ. (Japan); Atsushi Goto, Canon Inc. (Japan); Donghak Choi, Reiko Yoshimura, Hideaki Hiro-Oka, Hiroyuki Furukawa, Kitasato Univ. (Japan); Kohji Ohbayashi, Kitasato Univ. School of Medicine (Japan) [8209-08]

11:00 am: **Volumetric ocular anterior segment biometry using OCT registration and refraction correction techniques**, Ireneusz Grulkowski, Massachusetts Institute of Technology (USA) and Nicolaus Copernicus Univ. (Poland); Martin F. Kraus, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and Massachusetts Institute of Technology (USA); Benjamin Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Bernhard Baumann, Massachusetts Institute of Technology (USA) and Tufts Univ. (USA); David Huang M.D., Oregon Health & Science Univ. (USA); Joachim Hornegger, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); James G. Fujimoto, Massachusetts Institute of Technology (USA) [8209-09]

11:15 am: **Quantitative corneal refractive power measurements utilizing distributed scanning SDOCT**, Ryan P. McNabb, Francesco LaRocca, Sina Farsiu, Anthony N. Kuo, Joseph A. Izatt, Duke Univ. (USA) [8209-10]

11:30 am: **Design and validation of a quasi real-time global aberrometer: the EyeMapper**, Cathleen Fedtke, Klaus Ehrmann, Darrin Falk, Brien Holden, Brien Holden Vision Institute (Australia) [8209-11]

SESSION 3

Room: 306 (Esplanade) Sat. 11:45 am to 12:30 pm

Keynote Session

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

11:45 am: **Biological engineering of retinal disease: needs for technology**, Robin Ali, Univ. College London (United Kingdom) [8209-12]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 4

Room: 306 (Esplanade) Sat. 2:00 to 3:30 pm

**Ophthalmic Imaging:
Motion, Registration, Segmentation, Correction**

*Session Chairs: Wolfgang Drexler, Medizinische Univ. Wien (Austria);
Georg Schuele, OptiMedica Corp. (USA)*

2:00 pm: **The effect of (micro-) saccades on the image quality of ultrawide-field multimegahertz OCT data**, Thomas Klein, Wolfgang Wieser, Raphael J. André, Christoph M. Eigenwillig, Robert Huber, Ludwig-Maximilians-Universität München (Germany) [8209-13]

2:15 pm: **Heartbeat phase-coherent Doppler optical coherence tomography**, Tilman Schmoll, Rainer A. Leitgeb, Medizinische Univ. Wien (Austria) [8209-14]

2:30 pm: **Feature-based registration of cone photoreceptor images from AO-OCT volumes using iterative Delaunay triangulation**, Sangyeol Lee, Omer P. Kocaoglu, Ravi S. Jonnal, Qiang Wang, Donald T. Miller, Indiana Univ. (USA) [8209-15]

2:45 pm: **Automatic segmentation of closed-contour features in ocular images using graph theory and dynamic programming**, Stephanie J. Chiu, Aman Mittal, Catherine Bowes Rickman, Cynthia A. Toth M.D., Joseph A. Izatt, Sina Farsiu, Duke Univ. (USA) [8209-16]

3:00 pm: **Automated detection and counting of keratocytes in human corneal stroma from ultrahigh-resolution optical coherence tomograms**, Amir-Hossein Karimi, Alexander Wong, Kostadinka Bizheva, Univ. of Waterloo (Canada) [8209-17]

3:15 pm: **Spatial dewarping of ocular posterior segment SDOCT data**, Anthony N. Kuo, Ryan P. McNabb, Cynthia A. Toth M.D., Joseph A. Izatt, Duke Univ. (USA) [8209-18]

Coffee Break 3:30 to 4:00 pm

SESSION 5

Room: 306 (Esplanade) Sat. 4:00 to 5:45 pm

Ophthalmic Imaging: Vasculature and Blood Flow

Session Chairs: Luigi L. Rovati, Univ. degli Studi di Modena e Reggio Emilia (Italy); Kirill V. Larin, Univ. of Houston (USA)

4:00 pm: **Visualization of parafoveal capillary network by high-speed swept source optical coherence tomography with volumetric registration and averaging**, Zhenguo Wang, Zhijia Yuan, Charles Reisman, Qi Yang, Chih-Yang Chang, Kinpui Chan, Topcon Medical Systems, Inc. (USA) [8209-19]

4:15 pm: **Flow velocity assessment in retinal microvasculature with joint spectral and time domain OCT**, Iwona M. Gorczynska, Daniel Ruminski, Maciej Szkulmowski, Daniel Sztlag, Marcin Sylwestrzak, Andrzej A. Kowalczyk, Maciej D. Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8209-20]

4:30 pm: **Choroidal imaging by one-micrometer dual-beam Doppler optical coherence angiography with adjustable velocity range**, Franck Jaillon, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8209-21]

4:45 pm: **Using ultrahigh sensitive optical microangiography to achieve comprehensive depth-resolved microvasculature mapping for human retina**, Lin An, Univ. of Washington (USA) [8209-22]

5:00 pm: **Differential intensity contrast swept source optical coherence tomography for human retinal and choroidal vasculature visualization**, Reza Motaghianezam, Scott E. Fraser, California Institute of Technology (USA) [8209-23]

5:15 pm: **Investigation of exudative macular diseases by high-penetration Doppler optical coherence angiography**, Young-Joo Hong, Shuichi Makita, Univ. of Tsukuba (Japan); Myeong-Jin Ju, Byeong-Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of); Masahiro Miura, Tokyo Medical Univ. (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8209-24]

5:30 pm: **Ultrahigh-speed wide-field angiography**, Cedric Blatter, Tilman Schmoll, Medizinische Univ. Wien (Austria); Thomas Klein, Wolfgang Wieser, Christoph M. Eigenwillig, Robert Huber, Ludwig-Maximilians-Universität München (Germany); Rainer Leitgeb, Medizinische Univ. Wien (Austria) [8209-25]

BIOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 6

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

**Ophthalmic Tissues:
Optics, Mechanics, and Light Interactions**

*Session Chairs: Arthur Ho, Brien Holden Vision Institute (Australia);
Ezra Maguen, American Eye Institute (USA)*

8:00 am: **Swept source OCT with air puff chamber for corneal dynamics measurements**, Karol M. Karnowski, Nicolaus Copernicus Univ. (Poland); David Alonso-Caneiro, Nicolaus Copernicus Univ. (Poland) and Queensland Univ. of Technology (Australia); Bartłomiej J. Kaluzny, Andrzej A. Kowalczyk, Maciej D. Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8209-26]

8:15 am: **Estimation of surface wave propagation in mouse cornea**, Ravi Kiran Manapuram, Floredes M. Menodiado, Phiet Truong, Kirill V. Larin, Univ. of Houston (USA) [8209-27]

8:30 am: **Spatially resolved Brillouin spectroscopy for in vivo determination of the biomechanical properties of the crystalline lens**, Oliver Stachs, Stephan Reiss, Rudolf F. Guthoff, Heinrich Stolz, Univ. Rostock (Germany) [8209-28]

8:45 am: **Quantitative RNFL attenuation coefficient measurements by RPE-normalized OCT data**, Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Josine Van der Schoot, Rotterdam Ophthalmic Institute (Netherlands) and Rotterdam Eye Hospital (Netherlands); Hans G. Lemij, Rotterdam Ophthalmic Institute (Netherlands); Johannes F. de Boer, Rotterdam Ophthalmic Institute (Netherlands) and Vrije Univ. Amsterdam (Netherlands) [8209-29]

9:00 am: **Extraction of the optical attenuation coefficient of human corneal stroma from UHROCT tomograms**, Shiva Zabolli, Paul W. Fieguth, Kostadinka Bizheva, Univ. of Waterloo (Canada) [8209-30]

9:15 am: **Does near infrared radiation used for remote control, sensing and diagnostics cause cumulative damage in the lens?**, Per G. Söderberg, Z. Yu, K. Galichanin, N. Talebizadeh, Uppsala Univ. (Sweden); Karl Schulmeister, Seibersdorf Labor GmbH (Austria) [8209-31]

SESSION 7

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

Ophthalmic Surgery: Lasers and Imaging

*Session Chairs: William B. Telfair, IRIDEX Corp. (USA);
Ralf Brinkmann, Univ. zu Lübeck (Germany)*

9:30 am: **Restorative retinal photocoagulation**, Daniel V. Palanker, Yannis M. Paulus, Philip Huie, Stanford Univ. School of Medicine (USA); Loh-Shan Leung, Stanford Univ. (USA); Bryan Jones, The Univ. of Utah (USA); Alexander Sher, Univ. of California, Santa Cruz (USA) [8209-32]

9:45 am: **Precise and fast creation of LASIK flaps with nanosecond laser pulses from a compact 150 kHz UV laser system**, Norbert Linz, Sebastian Freidank, Sebastian Eckert, Univ. zu Lübeck (Germany); Kerstin Schlott, Medizinisches Laserzentrum Lübeck GmbH (Germany); Sebastian Faust, Stefan Schwed, SCHWIND eye-tech-solutions GmbH & Co. KG (Germany); Alfred Vogel, Univ. zu Lübeck (Germany) [8209-33]

Coffee Break 10:00 to 10:30 am

10:30 am: **A miniature forward-imaging optical coherence tomography (OCT) probe**, Karen M. Joos M.D., Jin-Hui Shen, Vanderbilt Univ. (USA) [8209-34]

10:45 am: **Intraoperative optical coherence tomography (iOCT) for ophthalmic surgery**, Maya Müller M.D., UniversitaetsKlinikum Schleswig-Holstein (Germany); Eva Lankenau, Opto Medical Technologies GmbH (Germany); Philipp Steven, UniversitaetsKlinikum Schleswig-Holstein (Germany); Marc Krug, Emra Acidereli, Opto Medical Technologies GmbH (Germany); Stefan Oelckers, Moeller-Wedel GmbH (Germany); Salvatore Grisanti, UniversitaetsKlinikum Schleswig-Holstein (Germany); Reginald Birngruber, Gereon Hüttmann, Univ. zu Lübeck (Germany) [8209-35]

11:00 am: **Phase-resolved optical frequency-domain imaging for the evaluation of retinal pigment epithelium and choroid transplantation surgery**, Boy Braaf, Elsbeth J. T. van Zeeburg, Koenraad A. Vermeer, Victor Arni D. P. Sicam, Rotterdam Ophthalmic Institute (Netherlands); Jan C. van Meurs, The Rotterdam Eye Hospital (Netherlands); Johannes F. de Boer, Rotterdam Ophthalmic Institute (Netherlands) [8209-36]

SESSION 8

Room: 306 (Esplanade) Sun. 11:15 am to 12:30 pm

Ophthalmic OCT: Technology

Session Chairs: **Wolfgang Drexler**, Medizinische Univ. Wien (Austria);
Daniel V. Palanker, Stanford Univ. School of Medicine (USA)

11:15 am: **Optimization of CSLO design**, Francesco LaRocca, Al-Hafeez Dhalla, Sina Farsi, Duke Univ. (USA); Joseph A. Izatt, Duke Univ. (USA) and BiopTigen Inc. (USA) [8209-37]

11:30 am: **Ophthalmic OCT imaging with new ultrahigh-speed MEMS tunable VCSEL light source technology**, Benjamin M. Potsaid, Massachusetts Institute of Technology (USA); James Y. Jiang, Thorlabs Inc. (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Martin F. Kraus, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); David Huang M.D., Oregon Health & Science Univ. (USA); Joachim Hornegger, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Alex E. Cable, Thorlabs Inc. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [8209-38]

11:45 am: **Comparison of MEMS-based handheld OCT scanner with commercial OCT system in corneal and retinal evaluation**, Samir I. Sayegh, EYE Ctr. (USA); Woonggyu Jung, Univ. of Illinois at Urbana-Champaign (USA); Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Daniel T. McCormick, AdvancedMEMS (USA); Zita Hubler, Eric J. Chaney, Univ. of Illinois at Urbana-Champaign (USA); Charles N. Stewart, Blue Highway, LLC (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8209-39]

12:00 pm: **Extended depth optical coherence tomography with an optical switch for ocular biometry**, Marco Ruggeri, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA); Carolina De Freitas, Stephen Uhlhorn, Bascom Palmer Eye Institute (USA); Fabrice Manns, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA); Jean-Marie Parel, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA) and Vision Cooperative Research Ctr. (Australia). [8209-40]

12:15 pm: **High contrast, eye-tracked optical coherence tomography of retinal and choroidal pathologies at 800/1060 nm**, Boris Považay, Medizinische Univ. Wien (Austria); Marieh Esmaelpour, Medizinische Univ. Wien (Austria) and Ludwig Boltzmann Institute for Retinology (Austria); Christoph Bloch, Daniel Fechtig, Medizinische Univ. Wien (Austria); Ingrid Böttcher, Heidelberg Engineering GmbH (Germany); Angelika Unterhuber, Bernd Hofer, Medizinische Univ. Wien (Austria); Susanne Binder M.D., Ludwig Boltzmann Institute for Retinology (Austria); Ralph Engelhardt, Heidelberg Engineering GmbH (Germany); Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8209-41]

Lunch/Exhibition Break 12:30 to 1:45 pm

SESSION 9

Room: 306 (Esplanade) Sun. 1:45 to 3:00 pm

Ophthalmic Imaging: Polarization

Session Chairs: **Per G. Söderberg**, Uppsala Univ. (Sweden);
Jerry Sebag, The Univ. of Southern California (USA)

1:45 pm: **Detection of inter- and intrafibrillar corneal stroma modifications by the analysis of polarization-modulated second-harmonic generation micrographs**, Fulvio Ratto, Paolo Matteini, Istituto di Fisica Applicata Nello Carrara (Italy); Riccardo Cicchi, Univ. degli Studi di Firenze (Italy); Francesca Rossi, Istituto di Fisica Applicata Nello Carrara (Italy); Dimitrios Kapsokalyvas, Francesco S. Pavone, Univ. degli Studi di Firenze (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) [8209-42]

2:00 pm: **Ocular biometric factors affecting to scleral birefringence**, Masahiro Yamanari, Univ. of Tsukuba (Japan); Satoko Nagase, Tokyo Medical Univ. (Japan); Shinichi Fukuda, Kotaro Ishii, Yiheng Lim, Univ. of Tsukuba (Japan); Masahiro Miura, Tokyo Medical Univ. (Japan); Tetsuro Oshika, Yoshiaki Yasuno, Univ. of Tsukuba (Japan). [8209-43]

2:15 pm: **Birefringence measurement of retinal nerve fiber layer using AO-PS-OCT: a comparison with PS-OCT**, Qiang Wang, Indiana Univ. (USA); Barry Cense, Utsunomiya Univ. (Japan); Omer P. Kocaoglu, Ravi S. Jonnal, Sangyeol Lee, Zhuolin Liu, Donald T. Miller, Indiana Univ. (USA). [8209-44]

2:30 pm: **Polarization-sensitive optical coherence tomography for in vivo phase retardation measurements of basal laminar deposits**, Barry Cense, Utsunomiya Univ. (Japan); Qiang Wang, Sangyeol Lee, Liang Zhao, Joel Papay, Donald T. Miller, Ann E. Elsner, Indiana Univ. (USA). [8209-45]

2:45 pm: **Wide-field high-definition polarization sensitive optical coherence tomography of the retina**, Michael Pircher, Stefan Zotter, Erich Götzinger, Medizinische Univ. Wien (Austria); Hirofumi Yoshida, Futoshi Hirose, Canon Inc. (Japan); Matthias Bolz, Clemens Vass, Ursula Schmidt-Erfurth, Christoph K. Hitznerberger, Medizinische Univ. Wien (Austria). [8209-46]

Poster Session and Coffee Break

Room: South Hall A (with BIOS Expo) . Sun. 3:00 to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday am. The poster session, with authors present, will be held from 3:00 to 4:00 pm on Sunday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday or 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Effect of dehydration in the UV transmittance of "in vitro" corneas, Victor A. Cacciocarro Lincoln, Liliiane Ventura, Sidney J. Faria e Sousa, Marcio M. Makiyama Mello, Univ. de São Paulo (Brazil) [8209-54]

A prototype for measurements in visible light transmittance of sunglasses, Marcio M. Makiyama Mello, Victor A. Cacciocarro Lincoln, Liliiane Ventura, Univ. de São Paulo (Brazil) [8209-55]

Spectroscopic measurements during the corneal collagen cross linking procedure for in vitro human corneas, Liliiane Ventura, Victor A. Cacciocarro Lincoln, Sidney J. Faria e Sousa, Marcio M. Makiyama Mello, Univ. de São Paulo (Brazil) [8209-56]

Does tropicamide affect choroidal blood flow in humans? a laser Doppler flowmetry study, Nithiyanantham Palanisamy, Univ. degli Studi di Modena e Reggio Emilia (Italy); Charles E. Riva, Univ. of Lausanne Medical School (Switzerland); Luigi L. Rovati, Univ. degli Studi di Modena e Reggio Emilia (Italy); Mauro Cellini, Corrado Gizzi, Ernesto Strobbe, Emilio C. Campos, Univ. degli Studi di Bologna (Italy) [8209-57]

An ophthalmic instrument to detect nano and micro-aggregates in blood flow, Stefano Cattini, Luigi L. Rovati, Roberta Salvatori, Antonietta M. Gatti, Univ. degli Studi di Modena e Reggio Emilia (Italy) [8209-58]

'All-Laser' endothelial corneal transplant in human patients, Francesca Rossi, Istituto di Fisica Applicata Nello Carrara (Italy); Luca Menabuoni, Alex Malandrini, Annalisa Canovetti, Ivo Lenzetti, U.O. Oculistica - Ospedale Misericordia e Dolce (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) [8209-59]

Extracting diagnostic information from optical coherence tomography images of diabetic retinal tissues using depth-dependent attenuation rate and fractal analysis, Delia Cabrera DeBuc, Bascom Palmer Eye Institute (USA) [8209-60]

Prospects of the vision correction under non-ablative laser radiation, Emil N. Sobol, Institute on Laser and Information Technologies (Russian Federation); Andrei V. Bolshunov M.D., Research Institute of Eye Diseases, RAMS (Russian Federation); Olga I. Baum, Alexander Omelchenko, Institute on Laser and Information Technologies (Russian Federation) [8209-61]

Efficient outer retina cellular simulation, Adi N. Azar, Alice C. Parker, Ko-Chung Tseng, The Univ. of Southern California (USA) [8209-62]

Reflectometry technique for characterizing human tear film, Hui Lu, Michael R. Wang, Jianhua Wang, Meixiao Shen, Univ. of Miami (USA) [8209-63]

Portable retinal imaging for eye disease screening using a consumer-grade digital camera, E. Simon Barriga, VisionQuest Biomedical, LLC (USA); Andrey V. Larichev, Lomonosov Moscow State Univ. (Russian Federation); Gilberto Zamora, Peter Soliz, VisionQuest Biomedical, LLC (USA) [8209-65]

Toward optical coherence topography, Samir I. Sayegh, Yanshui Jiang, EYE Ctr. (USA) [8209-66]

Toward the development of a low-cost laser Doppler module for ophthalmic microscopes, Stefano Cattini, Luigi L. Rovati, Univ. degli Studi di Modena e Reggio Emilia (Italy) [8209-67]

Corneal tissue ablation using 6.1 μm quantum cascade laser, Yong Huang, Jin Ung Kang, The Johns Hopkins Univ. (USA). [8209-68]

Test and design of a high-spatial and temporal resolution aberrometer, Bruno Emica, Serge Meimon, ONERA (France); Guillaume Chenevros, Observatoire de Paris à Meudon (France); Jean-Marc Conan, Thierry Fusco, ONERA (France); Michel Paques, Ctr. Hospitalier National d'Ophthalmologie des Quinze-Vingts (France) [8209-69]

In vivo imaging of the fast intrinsic optical signal (fIOS) in chicken retina with functional UHROCT, Alireza Akhlagh Moayed, Sepideh Hariri, Vivian Choh, Kostadinka Bizheva, Univ. of Waterloo (Canada) [8209-70]

Conference 8209 · Room: 306 (Esplanade)

SESSION 10

Room: 306 (Esplanade) Sun. 4:00 to 5:45 pm

Ophthalmic Adaptive Optics

Session Chairs: **Daniel X. Hammer**, Physical Sciences Inc. (USA);
Peter Soliz, VisionQuest Biomedical, LLC (USA)

4:00 pm: **LCoS-based adaptive optics visual analyzer in white light**,
Enrique-Josua Fernández, Pedro M. Prieto, Pablo Artal, Univ. de Murcia
(Spain) [8209-47]

4:15 pm: **Adaptive optics line scanning ophthalmoscope: recent progress**,
Robert D. Ferguson, Daniel X. Hammer, David P. Biss, Emily Plumb, Physical
Sciences Inc. (USA); Cynthia A. Toth M.D., Michelle McCall, Duke Univ. Medical
Ctr. (USA) [8209-48]

4:30 pm: **Patient retinal imaging with adaptive optics-assisted optical
coherence tomography**, Kenta Sudo, Utsunomiya Univ. (Japan); Kazuhiro
Kurokawa, Kazuhiro Sasaki, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba
(Japan); Toyohiko Yatagai, Barry Cense, Utsunomiya Univ. (Japan) . . . [8209-49]

4:45 pm: **Large-field of view lens-based adaptive optics scanning laser
ophthalmoscope**, Franz Felberer, Julia Sophie Kroishamer, Christoph K.
Hitzenberger, Michael Pircher, Medizinische Univ. Wien (Austria) [8209-50]

5:00 pm: **In vivo imaging of inner retinal cellular morphology with adaptive
optics/optical coherence tomography: limitations and challenges**, Robert J.
Zawadzki, UC Davis Medical Ctr. (USA); Steven M. Jones, Lawrence Livermore
National Lab. (USA); Dae Yu Kim, UC Davis Medical Ctr. (USA); Lisa A. Poyneer,
Lawrence Livermore National Lab. (USA); Arlie G. Capps, UC Davis Medical Ctr.
(USA); Scot S. Olivier, Lawrence Livermore National Lab. (USA); John S. Werner,
UC Davis Medical Ctr. (USA) [8209-51]

5:15 pm: **Optic nerve head features measured with a multimodal adaptive
optics system**, Daniel X. Hammer, Robert D. Ferguson, David P. Biss, Mircea
Mujat, Nicusor V. Iftimia, Ankit H. Patel, Emily Plumb, Physical Sciences Inc.
(USA); Gadi Wollstein, Larry Kagemann, Hiroshi Ishikawa, Zach Nadler,
Joel S. Schuman M.D., Univ. of Pittsburgh Medical Ctr. (USA) [8209-52]

5:30 pm: **Adaptive optics optical coherence tomography for measuring
phase and reflectance dynamics of photoreceptors**, Omer P. Kocaoglu,
Ravi S. Jonnal, Sangyeol Lee, Qiang Wang, Zhuolin Liu, Donald T. Miller,
Indiana Univ. (USA) [8209-53]

Pascal Rol Award

Room: 306 (Esplanade) Sun. 5:45 to 6:00 pm

Session Chairs: **Arthur Ho**, Brien Holden Vision Institute (Australia);
Fabrice Manns, Univ. of Miami (USA)

Outstanding extended abstracts submitted to the Ophthalmic Technologies
XXII conference will be nominated for the Pascal Rol Award for Best Paper in
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FINAL DISCUSSION

Room: 306 (Esplanade) Sun. 6:00 to 6:15 pm

Session Chairs: **Arthur Ho**, Brien Holden Vision Institute (Australia);
Fabrice Manns, Univ. of Miami (USA); **Per G. Söderberg**, Uppsala
Univ. (Sweden)

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

Conference Chairs: **David H. Kessel**, Wayne State Univ. (USA); **Tayyaba Hasan**, MGH/Harvard Medical School (USA)

Program Committee: **Charles J. Gomer**, Childrens Hospital Los Angeles (USA); **Nancy L. Oleinick**, Case Western Reserve Univ. (USA); **Brian W. Pogue**, Dartmouth College (USA); **Ravindra K. Pandey**, Roswell Park Cancer Institute (USA); **Kenneth K. Wang**, Mayo Clinic (USA)

Saturday 21 January

Room: 236 (Mezzanine).....Sat. 8:50 am

Welcome Remarks and Introduction

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

SESSION 1

Room: 236 (Mezzanine)..... Sat. 9:00 to 10:00 am

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

9:00 am: **Determinants of autophagic cell death after PDT**, David H. Kessel, Wayne State Univ. (USA)..... [8210-01]

9:20 am: **Topical delivery of preformed photosensitizer for photodynamic therapy of cutaneous lesions**, Nancy L. Oleinick, Malcolm E. Kenney, Minh Lam, Thomas S. McCormick, Case Western Reserve Univ. (USA); Kevin D. Cooper M.D., Case Western Reserve Univ. (USA) and Univ. Hospitals Case Medical Ctr. (USA); Elma D. Baron M.D., Case Western Reserve Univ. (USA) and Univ. Hospitals Case Medical Ctr. (USA)..... [8210-02]

9:40 am: **Nanoconstructs for combinations based on PDT and oncogenic inhibitors**, Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA) ... [8210-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 236 (Mezzanine)..... Sat. 10:30 to 11:50 am

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

10:30 am: **Whole-body or local hypothermia enhances the tumor-imaging and phototherapeutic potential of photosensitizers (Invited Paper)**, Avinash Srivatsan, Elizabeth Repasky, Arindam Sen, Ravindra K. Pandey, Roswell Park Cancer Institute (USA)..... [8210-04]

10:50 am: **Targeting stromal influences in pancreatic cancer with photodynamic therapy**, Jonathan P. Celli, Imran Rizvi, Iqbal Massodi, Michael Glidden, Massachusetts General Hospital (USA); Stephen P. Pereira, Univ. College London (United Kingdom); Tayyaba Hasan, Massachusetts General Hospital (USA)..... [8210-05]

11:05 am: **In vitro 3D tumor model-based screen of EtNBS derivatives to optimize PDT of hypoxic tumor environments**, Oliver J. Klein, Brijesh Bhayana, Wellman Ctr. for Photomedicine (USA); Yong Jin Park, KAIST (Korea, Democratic Peoples Republic of); Conor L. Evans, Wellman Ctr. for Photomedicine (USA)..... [8210-06]

11:20 am: **Coupling photodynamic therapy with EGFR inhibition improves therapeutic benefit in human tumor xenografts**, Shannon Gallagher-Colombo, Joann Miller, Amanda L. Maas, Shirron L. Carter, Min Yuan, Theresa M. Busch, Univ. of Pennsylvania (USA)..... [8210-07]

11:35 am: **Assessing heterogeneity and PDT response in head and neck lesions with diffuse optical spectroscopies**, Daniel J. Rohrbach, Weirong Mo, Nestor Rigual, Erin Tracy, Ken Keymel, Michele T. Cooper, Heinz Baumann, Barbara W. Henderson, Ulas Sunar, Roswell Park Cancer Institute (USA)..... [8210-08]

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

PANEL DISCUSSION

Room: 236 (Mezzanine) Sat. 1:30 to 2:05 pm

NIH Grant Process and PDT

Panel Moderator: **David H. Kessel**, Wayne State Univ. (USA)

Panelists include: **Rosemary Wong**, Program Director, Radiation Research Program, DCTD, NCI, NIH; **Nancy L. Oleinick**, Case Western Reserve Univ. and **Charles J. Gomer**, Childrens Hospital Los Angeles

SESSION 3

Room: 236 (Mezzanine)..... Sat. 2:05 to 3:05 pm

Session Chair: **Timothy C. Zhu**, The Univ. of Pennsylvania Health System (USA)

2:05 pm: **A real-time treatment guidance system for pleural PDT**, Timothy C. Zhu, Xing Liang, Julia Sandell, Jarod C. Finlay, Andrea Dimofte, Keith A. Cengel, Joseph S. Friedberg, Stephen M. Hahn, Eli Glatstein, The Univ. of Pennsylvania Health System (USA)..... [8210-09]

2:20 pm: **Light dose verification for pleural PDT**, Julia Sandell, Xing Liang, Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA)..... [8210-10]

2:35 pm: **Characterization of tissue optical properties for prostate PDT using interstitial diffuse optical tomography**, Xing Liang, Timothy C. Zhu, Univ. of Pennsylvania (USA)..... [8210-11]

2:50 pm: **Photoacoustic imaging of intravenously injected photosensitizer in rat burn models for efficient antibacterial photodynamic therapy**, Yasuyuki Tsunoi, Keio Univ. (Japan); Shunichi Sato, Hiroshi Ashida, National Defense Medical College (Japan); Mitsuhiro Terakawa, Keio Univ. (Japan)..... [8210-12]

POSTER SESSION AND COFFEE BREAK

Room: South Hall A (with BIOS Expo) . Sat. 3:05 to 4:05 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:05 to 4:05 pm on Saturday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 am on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:05 to 4:05 pm. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Control of burn wound sepsis in rats by methylene blue-mediated photodynamic treatment, Hiroyuki Hasegawa, Keio Univ. (Japan); Shunichi Sato, Daizoh Saitoh, Nariyoshi Shinomiya, Hiroshi Ashida, National Defense Medical College (Japan); Mitsuhiro Terakawa, Keio Univ. (Japan)..... [8210-31]

Thermography for early detection of cancer, Jaeyoung Kim, Haeyoung Choi, SeonYoung Ryu, MyungHo Kook, GhiSeok Kim, GeonHee Kim, KiSoo Chang, Korea Basic Science Institute (Korea, Republic of)..... [8210-32]

Maximizing fluence rate and field uniformity of light blanket for intraoperative photodynamic therapy, Michael Goodwin, Timothy C. Zhu, Jarod C. Finlay, The Univ. of Pennsylvania Health System (USA)..... [8210-34]

Photodynamic therapy is conservative approach for treatment of lymphangioma, Ahmed A. Sultan, Univ. College London (United Kingdom); Zaid Hamdoon, Kostas Karavidas, Gian B. Bottini, Univ. College Hospital (United Kingdom); Dara Muhammad Rashed, Univ. College London (United Kingdom); Jack Lee, Simon Morley, Colin Hopper, Univ. College Hospital (United Kingdom)..... [8210-35]

Double-excitation technique: eliminating tissue auto-fluorescence from in vivo PPIX measurements, Sason Torosean, Dartmouth College (USA); Johan Axelsson, Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) [8210-36]

Evaluating primary human ovarian cancer using a targeted multimodal theranostic agent, Tracy W. B. Liu, Jocelyn M. Stewart, Univ. of Toronto (Canada) and Ontario Cancer Institute (Canada); Juan Chen, Ontario Cancer Institute (Canada); Jiyun Shi, Univ. of Toronto (Canada); Thomas D. MacDonald, Univ. of Toronto (Canada) and Ontario Cancer Institute (Canada); Brian C. Wilson, Benjamin G. Neel, Gang Zheng, Ontario Cancer Institute (Canada) [8210-37]

Optimization of parameters in photodynamic therapy to kill *p. aeruginosa* with 809-nm diode laser and indocyanine green, Nermin Topaloglu, Sahrü Yüksel, Murat Gülsöy, Bogaziçi Üniv. (Turkey) [8210-39]

Modeling stromal determinants of ovarian cancer growth and response to PDT-chemotherapy combinations, Imran Rizvi, Jonathan P. Celli, Sriram R. Anbil, Stefan A. Elrington, Iqbal Massodi, Massachusetts General Hospital (USA); Umut Gurkan, Utkan Demirci, Brigham and Women's Hospital (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) [8210-40]

Histological differences between orthotopic xenograft pancreas models affect verteporfin uptake measured by fluorescence microscopy and spectroscopy, Kimberley S. Samkoe, Dartmouth Hitchcock Medical Ctr. (USA); Julia A. O'Hara, Dartmouth Medical School (USA); Alina Chen, Martin E. Isabelle, Dartmouth College (USA); Paul J. Hoopes, Dartmouth Medical School (USA); Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA); Brian W. Pogue, Dartmouth College (USA) [8210-41]

Tissue photosensitizer dosimetry using spectrally-resolved fluorescence for pre-clinical and clinical verteporfin-PDT of pancreatic cancer, Martin E. Isabelle, Dartmouth College (USA); Scott C. Davis, Thayer School of Engineering at Dartmouth (USA); Zan Li, Dartmouth College (USA); Julia A. O'Hara, Dartmouth Medical School (USA); Kimberley Samkoe, Thayer School of Engineering at Dartmouth (USA); Paul J. Hoopes, Dartmouth Medical School (USA); S. Pereira, Univ. College Hospital (United Kingdom); Charles A. Mosse, Univ. College London (United Kingdom); Tayyaba Hasan, Massachusetts General Hospital (USA); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) [8210-42]

SESSION 4

Room: 236 (Mezzanine) Sat. 4:05 to 5:10 pm

Session Chair: Jonathan P. Celli, Massachusetts General Hospital (USA)

4:05 pm: **The role of bone marrow derived cells in photodynamic therapy responsiveness**, Charles J. Gomer, Children's Hospital Los Angeles (USA) and Univ. of Southern California (USA) [8210-13]

4:25 pm: **Microendoscopy guided photodynamic therapy of ovarian cancer**, Bryan Q. Spring, Adnan O. Abu-Yousif, Xiang Zheng, Tayyaba Hasan, Massachusetts General Hospital (USA) [8210-14]

4:40 pm: **Mechanistic studies on thiaza and thioxa-based type 1 photosensitizers**, Raghavan Rajagopalan, Covidien (USA); Tsien-Sung Lin, Richard Loomis, Jie Wei, Washington Univ. in St. Louis (USA); Amruta R. Poreddy, Amolkumar Karwa, Bethel Asmelash, Richard B. Dorshow, Covidien (USA) [8210-15]

4:55 pm: **Comparing three energy delivery devices in porcine pancreatic tissue: Nd:YAG laser, RFA, LED**, Tjeerd de Boorder, John Klaessens, Frank Vleggaar, Herke Jan Noordmans, Univ. Medical Ctr. Utrecht (Netherlands); Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands) [8210-16]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 5

Room: 236 (Mezzanine) Sun. 9:00 to 10:00 am

Session Chair: Kenneth K. Wang, Mayo Clinic (USA)

9:00 am: **Development of photodynamic therapy for pancreatic cancer**, Kenneth K. Wang M.D., Mayo Clinic (USA) [8210-17]

9:20 am: **Qualitative and quantitative differences in the toxicity of HPPH-mediated PDT with a 24 versus 48-hour drug light interval: moving from the bedside to the bench and back**, Keith A. Cengel, Univ. of Pennsylvania School of Medicine (USA); Sai Yendamuri, Todd Demmy, Roswell Park Cancer Institute (USA); Melissa Culligan, The Univ. of Pennsylvania Health System (USA); Maureen Schofield, Debbie Smith, Salman Puneekar, Daniel Sterman, James Stevenson, Theresa M. Busch, Eli Glatstein, Stephen M. Hahn, Joseph S. Friedberg, Univ. of Pennsylvania School of Medicine (USA) [8210-18]

9:40 am: **Activation of p53-mediated apoptosis in squamous cell carcinoma tumors in vivo, during combination treatment with 5-fluorouracil and ALA-photodynamic therapy**, Edward V. Maytin M.D., Sanjay Anand, Kishore Rollakanti, Nikoleta Brankov, Karthik Iyer, The Cleveland Clinic (USA) . [8210-19]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 236 (Mezzanine) Sun. 10:30 to 11:55 am

Session Chair: Brian W. Pogue, Dartmouth College (USA)

10:30 am: **Light dose mapping in pancreatic PDT trial VERTPAC to compare with volume of necrosis in treatment outcome**, Brian W. Pogue, Michael Jermyn, Scott C. Davis, Thayer School of Engineering at Dartmouth (USA); Sandy Mosse, Matthew Huggett, Stephen P. Pereira, Univ. College London, National Medical Laser Ctr. (United Kingdom); Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA) [8210-20]

10:50 am: **Induction of cutaneous phototoxicity after photodynamic therapy by over-exposure to CRT and LCD monitor: a simulation study**, Tim Lei, Srinivas Pendyala, Larry Scherrer, Zheng Huang, Univ. of Colorado Denver (USA) [8210-21]

11:05 am: **A compact laparoscope type radiation source for the pin-point cancer treatment using a femtosecond laser**, Nobuki Kawashima, Kinki Univ. (Japan) [8210-22]

11:20 am: **Influence of the photosensitizer photobleaching in the propagation of light during photodynamic therapy**, Irene Salas-García, Félix Fanjul-Vélez, Noé Ortega-Quijano, José L. Arce-Diego, Univ. de Cantabria (Spain) [8210-23]

Discussion 11:35 to 11:55 am

Lunch/Exhibition Break 11:55 am to 1:30 pm

SESSION 7

Room: 236 (Mezzanine) Sun. 1:30 to 3:00 pm

Session Chair: Conor L. Evans, Wellman Ctr. for Photomedicine (USA)

1:30 pm: **Selectivity of Amphinex® based bleomycin photochemical internalization in the Syrian hamster cheek pouch tumour model**, Ahmed A. Sultan, Tzu-Wen Wang, Josephine H. Woodhams, Univ. College London (United Kingdom); Amrita Jay, Univ. College Hospital (United Kingdom); Kristian Berg, Oslo Univ. Hospital (Norway); Anders Høgset, PCI Biotech AS (Norway); Alexander J. MacRobert, Stephen G. Bown M.D., Colin Hopper, Univ. College London (United Kingdom) [8210-24]

1:45 pm: **Photodynamic therapy of pleurally disseminated non-small cell lung carcinoma in an orthotopic murine model**, Craig E. Grossman M.D., Stephen Pickup, Amy Durham, E. Paul Wileyto, Mary E. Putt, Theresa M. Busch, Univ. of Pennsylvania (USA) [8210-25]

2:00 pm: **Accurate dosimetry for monitoring response to photodynamic therapy**, Madhavi Seetamraju, Rajan S. Gurjar, Richard Myers, Radiation Monitoring Devices, Inc. (USA); Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA); David E. Wolf, Radiation Monitoring Devices, Inc. (USA) [8210-26]

2:15 pm: **Photodynamic therapy for the management of leukoplakia and oral lichen planus using methylene blue**, Chidambaranathan Pravada, Sathyabama Deemed Univ. (India); Ekta Ingle, JayanthKumar Vadivel, Dornadula Koteeswaran, Meenakshi Ammal Dental College & Hospital (India); Wilfred Prasanna Savarimuthu, Ganesan Bharanidharan, Prakasa Rao Aruna, Anna Univ. Chennai (India); Chilakapati Muralikrishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India); Singaravelu Ganesan, Anna Univ. Chennai (India) [8210-27]

2:30 pm: **Singlet oxygen dosimetry modeling for photodynamic therapy**, Xing Liang, Timothy C. Zhu, Univ. of Pennsylvania (USA) [8210-29]

2:45 pm: **Binding potential can determine tumor epidermal growth factor receptor status in response to photodynamic therapy in pancreatic cancer**, Kimberley S. Samkoe, Dartmouth Hitchcock Medical Ctr. (USA); Kenneth M. Tichauer, Thayer School of Engineering at Dartmouth (USA); Jason Gunn, Thayer School of Engineering at Dartmouth; Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA); Brian W. Pogue, Dartmouth College (USA) [8210-30]

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21–22 January 2012
SOUTH HALL A

Saturday · 12:00 pm to 5:00 pm
Sunday · 10:00 am to 5:00 pm

Conference 8211 · Room: 206 (Mezzanine)

Saturday 21 January 2012 • Proceedings of SPIE Vol. 8211

Mechanisms for Low-Light Therapy VII

Conference Chairs: **Michael R. Hamblin**, Massachusetts General Hospital (USA); **Juanita Anders**, Uniformed Services Univ. of the Health Sciences (USA); **James D. Carroll**, THOR Photomedicine Ltd. (United Kingdom)

Saturday 21 January

SESSION 1

Room: 206 (Mezzanine) Sat. 8:50 to 10:30 am

Reviews and Dosimetry

Session Chair: **Michael R. Hamblin**,
Massachusetts General Hospital (USA)

8:50 am: **Penetration of light into living tissue** (*Invited Paper*), Lars Hode, Swedish Laser-Medical Society (Sweden); Peter Jenkins, Irradia USA (USA); Jan Tunér D.D.S., Dala Dental (Sweden); Tomas Hode, Immunophotonics, Inc. (USA) [8211-01]

9:20 am: **Mechanisms for low level light therapy - what's new?** (*Invited Paper*), Michael R. Hamblin, Ying-Ying Huang, Sulbha K. Sharma, Wellman Ctr. for Photomedicine (USA) [8211-02]

9:50 am: **LLLT biphasic dose response: update**, James D. Carroll, THOR Photomedicine Ltd. (United Kingdom) [8211-03]

10:10 am: **Red laser attenuation in biological tissues: study of inflammatory process and pigmentation influence**, Caetano P. Sabino, Martha Simões Ribeiro, Ilka T. Kato, Daiane T. Meneguzzo, Renato A. Prates, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [8211-04]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: 206 (Mezzanine) Sat. 11:00 am to 12:20 pm

In Vitro/In Vivo studies

Session Chair: **Juanita Anders**,
Uniformed Services Univ. of the Health Sciences (USA)

11:00 am: **Study of the characteristics of an irradiation experimental setup on fibroblast like cell cultures**, Taciana D. Magrini, Arnaldo R. dos Santos, Herculano da Silva Martinho, Univ. Federal do ABC (Brazil) [8211-05]

11:20 am: **Antimicrobial activity of new porphyrins of synthetic and natural origin**, Grigor V. Gyulkhandanyan, Institute of Biochemistry (Armenia); Robert K. Ghazaryan, Yerevan State Medical Univ. (Armenia); Marina Paronyan, Institute of Biotechnology (Armenia); Ghukas Ulikhanyan, Armenian Pharmaceutical Association (Armenia); Aram Gyulkhandanyan, Institute of Biochemistry (Armenia); Lida Sahakyan, Yerevan State Medical Univ. (Armenia) [8211-06]

11:40 am: **Effects of LED or laser phototherapy on bone defects grafted with MTA and irradiated with laser or LED light: a comparative Raman spectroscopic study**, Antônio Luiz B. Pinheiro, Luiz Guilherme P. Soares, Artur Felipe S. Barbosa, Univ. Federal da Bahia (Brazil); Landulfo Silveira, Jr., Univ. do Vale do Paraíba (Brazil) [8211-07]

12:00 pm: **Chromophore absorbance change quantification in tissue during low-level light therapy**, Daniel Huynh, Carl J. Fisher, Christine Chung, Ontario Cancer Institute (Canada); Li Qian, Univ. of Toronto (Canada); Lothar Lilge, Ontario Cancer Institute (Canada) [8211-08]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 3

Room: 206 (Mezzanine) Sat. 1:30 to 3:00 pm

In Vivo Studies

Session Chair: **James D. Carroll**,
THOR Photomedicine Ltd. (United Kingdom)

1:30 pm: **In vivo studies of LLLT for traumatic brain injury** (*Invited Paper*), Michael R. Hamblin, Weijun Xuan, Qiuhue Wu, Ying-Ying Huang, Sulbha K. Sharma, Liyi Huang, Wellman Ctr. for Photomedicine (USA) [8211-09]

2:00 pm: **Effects of polarization in low-level laser therapy of spinal cord injury in rats**, Takahiro Ando, Keio Univ. (Japan); Shunichi Sato, Hiroaki Kobayashi, Hiroshi Nawashiro, Hiroshi Ashida, National Defense Medical College (Japan); Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Harvard-MIT Health Sciences and Technology (USA); Minoru Obara, Keio Univ. (Japan) [8211-10]

2:20 pm: **Control of anoxic depolarization in rat brain by near-infrared laser irradiation and its monitoring by intrinsic optical signal imaging**, Satoko Kawachi, Shunichi Sato, Yoichi Uozumi, Hiroshi Nawashiro, Miya Ishihara, Makoto Kikuchi, National Defense Medical College (Japan) [8211-11]

2:40 pm: **Healing effect of low-level laser therapy (LLLT) on bone fracture**, Chung-Ku Rhee M.D., Dankook Univ. Hospital (Korea, Republic of); Hee-gon Park, Dankook Univ. (Korea, Republic of); Jin-Chul Ahn M.D., Dankook Univ. Hospital (Korea, Republic of) [8211-12]

POSTER SESSION AND COFFEE BREAK

Room: South Hall A (with BiOS Expo) . Sat. 3:00 to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:00 to 4:00 pm on Saturday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 am on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:00 to 4:00 pm. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Coherence and speckle in photomedicine and photobiology, Zeev Zalevsky, Bar-Ilan Univ. (Israel); Michael Belkin, Tel Aviv Univ. (Israel) [8211-18]

Mechanism study on mitochondrial fragmentation under oxidative stress caused by high-fluence low-power laser irradiation, Shengnan Wu, South China Normal Univ. (China) [8211-19]

Photodynamic action on microorganisms using iron oxide Fe₂O₃ nanoparticles and LED blue (405 nm) light, Elena S. Tuchina, Pavel O. Petrov, Marina V. Kulikova, Vyacheslav I. Kochubey, Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) [8211-20]

Effectiveness of the use of LLLT on disorders of the maxillofacial region, Luiz Guilherme P. Soares, Carolina Montagn Carvalho, Aparecida Maria C. Marques, Maria Cristina T. Cangussú, Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8211-21]

Evaluation of photodynamic antimicrobial therapy (PACT) against promastigotes form of the Leishmania (Viannia) braziliensis: in vitro study, Artur Felipe S. Barbosa, Univ. Federal da Bahia (Brazil); Suely L. Galdino, Univ. Federal de Pernambuco (Brazil); Manoel Barral Netto, Fundacao Oswaldo Cruz (Brazil); Ivan da Rocha Pitta, Univ. Federal de Pernambuco (Brazil); Bruno B. Sangiorgi, Fundacao Oswaldo Cruz (Brazil); Neander A. Correia, Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8211-22]

Effect of non-homogenous thermal stress during sub-lethal photodynamic antimicrobial chemotherapy, Sunil Dehipawala, Nidhi Gadura, Todd Holden, Sumudu Dehipawala, Robert Hong, Dimitrios Kokkinos, George Tremberger, Jr., David Lieberman, Tak D. Cheung, Queensborough Community College (USA) [8211-23]

GaAIs laser therapy on neuropathic pain in rats, Changsu Na M.D., Young-Su Lee M.D., Dae-Hwan Youn M.D., Chan-Hern Choi M.D., Dongshin Univ. (Korea, Republic of); Suk-Hee Lee, Young-Min Moon, Sung-Ho Jeong, Gwangju Institute of Science and Technology (Korea, Republic of); Wang-In Kim, Dongshin Univ. (Korea, Republic of) [8211-24]

The effect of the photobiomodulation in the treatment of Bell's palsy: clinical experience, Aparecida Maria C. Marques, Fabio Colombo, Carolina Montagn Carvalho, Gardênia Paraguassu, José A. Sousa, Luiz Guilherme P. Soares, Edival Magalhães, Maria Cristina T. Cangussú, Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8211-25]

Efficacy of the photodynamic antimicrobial therapy (PACT) with the use of methylene blue associated with the λ 660nm laser in Leishmania (Leishmania) amazonensis: in vitro study, Aparecida Maria C. Marques, Univ. Federal da Bahia (Brazil); Gustavo M. Pires-Santos, Eliomara Alves, Research Ctr. Gonçalo Moniz (Brazil); Susana C. Oliveira-Sampaio, Juliana S. Monteiro, Artur Felipe S. Barbosa, Univ. Federal da Bahia (Brazil); Mariana Azevedo-Silva, Marcos A. Vannier-Santos, Research Ctr. Gonçalo Moniz (Brazil); Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8211-26]

SESSION 4

Room: 206 (Mezzanine) Sat. 4:00 to 6:00 pm

Clinical Studies

Session Chair: Tomas Hode, Immunophotonics, Inc. (USA)

4:00 pm: **A novel role of iNOS gene expression in the anti-inflammatory and tissue protective mechanisms of 905 nm superpulsed laser therapy**, Arkady Mandel, Theralase, Inc. (Canada); Lothar Lilge, Ontario Cancer Institute (Canada) [8211-13]

4:20 pm: **Pulsed versus CW low-level light therapy on osteoarticular signs and symptoms in patients with limited scleroderma (CREST syndrome) (Invited Paper)**, Daniel Barolet M.D., Opusmed Inc. (Canada) and McGill Univ. (Canada) [8211-14]

4:50 pm: **Enlightenment and light (Invited Paper)**, Donald D. Patthoff D.D.S., Academy of Laser Dentistry (USA) [8211-15]

5:20 pm: **No urge to purge**, Eleanor D. Laser, Consultant (USA) [8211-16]

5:40 pm: **Aculaser therapy for the treatment of cerebral palsy**, Shahzad Anwar, Anwar Shah's First C.P. and Paralysis Clinic and Research Ctr. (Pakistan) [8211-17]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Photonics West maps:

Moscone Center Maps pp. 2–4

Walking Map p. 4

Frontiers in Biological Detection: From Nanosensors to Systems

Conference Chairs: **Benjamin L. Miller**, Univ. of Rochester Medical Ctr. (USA); **Philippe M. Fauchet**, Univ. of Rochester (USA)

Program Committee: **Holger Becker**, microfluidic ChipShop GmbH (Germany); **Xudong Fan**, Univ. of Michigan (USA); **Jiri Homola**, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic); **Laura Maria Lechuga**, Ctr. d'Investigacions en Nanociència i Nanotecnologia (Spain); **Frances S. Ligler**, U.S. Naval Research Lab. (USA); **Daniel V. Lim**, Univ. of South Florida (USA); **Christopher Myatt**, Precision Photonics Corp. (USA); **Elric W. Saaski**, Research International, Inc. (USA); **Michael Joseph Sailor**, Univ. of California, San Diego (USA); **Sharon M. Weiss**, Vanderbilt Univ. (USA)

Saturday 21 January

SESSION 1

Room: 302 (Esplanade) Sat. 8:30 to 10:00 am

Membranes and SERS

Session Chair: **Benjamin L. Miller**,
Univ. of Rochester Medical Ctr. (USA)

8:30 am: **Stretchable and shapeable nanomembranes for biological detection on and off the chip** (*Invited Paper*), Oliver G. Schmidt, Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden (Germany) . . . [8212-01]

9:00 am: **Polymer-coated surface enhanced Raman scattering (SERS) gold nanoparticles for multiplexed labeling of chronic lymphocytic leukemia cells**, Christina M. MacLaughlin, Nisa Mullaithilaga, Gilbert C. Walker, Univ. of Toronto (Canada); Chen Wang, Mount Sinai Hospital (Canada) [8212-02]

9:15 am: **Lipid-encapsulation of surface enhanced Raman scattering (SERS) nanoparticles and targeting to chronic lymphocytic leukemia (CLL) cells**, Shell Y. Ip, Christina M. MacLaughlin, Univ. of Toronto (Canada); Nisa Mullaithilaga, Mount Sinai Hospital (Canada); Michelle Joseph, Univ. of Toronto (Canada); Samantha Wala, Chen Wang, Mount Sinai Hospital (Canada); Gilbert C. Walker, Univ. of Toronto (Canada) [8212-03]

9:30 am: **A novel nano-enhanced evanescence technique (NEET) for integrated microfluidic biochemical detections in micro-total analysis systems**, Arvind Chandrasekaran, Muthukumaran Packirisamy, Concordia Univ. (Canada) [8212-04]

9:45 am: **Specific detection of protein aggregates with a Bloch surface wave sensor**, Vincent Paeder, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Maria Kolymadi Markovic, Univ. of Neuchâtel (Switzerland); Valeria Musi, Lubos Hvozďara, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Reinhard Neier, Univ. of Neuchâtel (Switzerland); Hans Peter Herzig, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8212-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 302 (Esplanade) Sat. 10:30 am to 12:00 pm

Interferometry and Porous Silicon

Session Chair: **Philippe M. Fauchet**, Univ. of Rochester (USA)

10:30 am: **The potential of back-scattering interferometry for use in diagnostics** (*Invited Paper*), Darryl J. Bornhop, Amanda Kussrow, Ian Olmsted, Carolyn S. Enders, Vanderbilt Univ. (USA); David Cox, Arnold Castro, Ronald Ballard, Ctrs. for Disease Control and Prevention (USA) [8212-06]

11:00 am: **Resonant porous silicon microcavity for enhanced detection of protease activity in chronic wound fluid**, Stephanie Pace, Fransiska S. H. Krismastuti, Flinders Univ. (Australia); Brooke Farrugia, Tim Dargaville, Queensland Univ. of Technology (Australia); Nicolas H. Voelcker, Flinders Univ. (Australia) [8212-07]

11:15 am: **Highly sensitive anisotropic porous silicon-based optical sensors**, Jesús Álvarez, Univ. de València (Spain); Paolo Bettotti, Neeraj Kumar, Univ. degli Studi di Trento (Italy); Isaac Suárez, Daniel Hill, Juan Martínez-Pastor, Univ. de València (Spain) [8212-08]

11:30 am: **Photonic crystal microcavity engineering and high-density biopatterning for chip-integrated microarray applications**, Wei-Cheng Lai, The Univ. of Texas at Austin (USA); Swapnajit Chakravarty, Omega Optics, Inc. (USA); Yi Zou, Ray T. Chen, The Univ. of Texas at Austin (USA) [8212-09]

11:45 am: **Experimental demonstration of application of ring-down measurement approach to microcavities for biosensing**, Muhammad I. Cheema, Andrew G. Kirk, McGill Univ. (Canada); Simin Mehrabani, Andrea M. Armani, The Univ. of Southern California (USA); Ahmad A. Hayat, Francis Vanier, Yves-Alain Peter, Ecole Polytechnique de Montréal (Canada) [8212-10]

Lunch/Exhibition Break 12:00 to 1:45 pm

SESSION 3

Room: 302 (Esplanade) Sat. 1:45 to 3:00 pm

Optofluidics and Optical Forces

Session Chair: **Benjamin L. Miller**,
Univ. of Rochester Medical Ctr. (USA)

1:45 pm: **Optofluidics in bio-chemical analysis** (*Invited Paper*), Xudong Fan, Univ. of Michigan (USA) [8212-11]

2:15 pm: **Demonstration of optical-force assisted particle transport to an optical biosensor**, Adam Heiniger, Benjamin L. Miller, Philippe M. Fauchet, Univ. of Rochester (USA) [8212-12]

2:30 pm: **Optoelectronic tweezers for medical diagnostics**, Clemens Kremer, Steven Neale, Anoop Menachery, Mike Barrett, Jonathan M. Cooper, Univ. of Glasgow (United Kingdom) [8212-13]

2:45 pm: **Optofluidic surface-enhanced Raman spectroscopy with nanoparticle-functionalized flow-through nanohole capillary**, Yunbo Guo, Maung Kyaw Khaing Oo, Xudong Fan, Univ. of Michigan (USA) [8212-14]

POSTER SESSION AND COFFEE BREAK

Room: South Hall A (with BiOS Expo) . Sat. 3:00 to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:00 to 4:00 pm on Saturday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 am on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:00 to 4:00 pm. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Morphological change monitoring of CMV infected tobacco leaf in vivo by optical coherence tomography, Changho Lee, Seung-yeol Lee, SeungHoon Han, Hee-Young Jung, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) [8212-24]

Classification of bacteria by analysis of Fresnel diffraction patterns of bacteria colonies, Igor B. Buzalewicz, Agnieszka Suchwalko, Halina Podbielska, Institute of Biomedical Engineering and Instrumentation (Poland) [8212-26]

Impedance spectroscopy of food micotoxins, Oleksandr I. Bilyy, Roman Y. Yaremyk, Ivan Franko National Univ. of L'viv (Ukraine); Ihor Y. Kotsyumbas, State Scientific-Research Control Institute of Veterinary Preparations and Fodder Additives (Ukraine) [8212-27]

Quantitative analysis of OCT signal for virus-infected gourd seed distinction, Changho Lee, Seung-yeol Lee, SeungHoon Han, Hee-Young Jung, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) [8212-28]

Detection of pancreatic biomarkers by gallium nitride-based high electron mobility transistor, Chia-Chang Tsai, Wen-Ti Hsu, Shu-Fang Jian, Kuang-Hung Cheng, Shuchen Hsieh, Hay-Yan J. Wang, Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan) [8212-29]

SESSION 4

Room: 302 (Esplanade) Sat. 4:00 to 5:15 pm

Devices and Funding Agency Interests

Session Chair: Philippe M. Fauchet, Univ. of Rochester (USA)

4:00 pm: **Microflow cytometer for optical analysis of phytoplankton**, Joel P. Golden, Nastaran Hashemi, Jeffrey S. Erickson, Frances S. Ligler, U.S. Naval Research Lab. (USA) [8212-15]

4:15 pm: **Microflow cytometer with 3D hydrodynamic focusing**, Genni Testa, Romeo Bernini, Consiglio Nazionale delle Ricerche (Italy) [8212-16]

4:30 pm: **Demonstration of a microfluidic polarimeter**, Rajitha P. Rajan, Ambarish Ghosh, Indian Institute of Science (India) [8212-17]

4:45 pm: **Highlights of biosensing program at NSF (Invited Paper)**, Aleksandr Simonian, National Science Foundation (USA) [8212-18]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. *See page 16 for details.*

Sunday 22 January

SESSION 5

Room: 302 (Esplanade) Sun. 9:00 to 10:00 am

New Optical Methods

Session Chair: Benjamin L. Miller, Univ. of Rochester Medical Ctr. (USA)

9:00 am: **Lensless microscopy and sensing on a chip (Invited Paper)**, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8212-19]

9:30 am: **Integrated optical sensor array for biochemical multiparameter analysis**, Daniel Pergande, Peter Lützow, Helmut Heidrich, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany) [8212-20]

9:45 am: **Differential diffractive reflectance modulation sensing**, Nityanand Kumawat, Gurusiddhappa R. Prashanth, Manoj M. Varma, Indian Institute of Science (India) [8212-21]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 302 (Esplanade) Sun. 10:30 to 11:45 am

New Materials and Applications

Session Chair: Philippe M. Fauchet, Univ. of Rochester (USA)

10:30 am: **Xerogel-nanocrystallite hybrids for optical sensing (Invited Paper)**, Frank V. Bright, Univ. at Buffalo (USA) [8212-22]

11:00 am: **Design of a gel electrophoresis device with an integrated transmitter/receiver system for power delivery and data communication: toward a wireless lab-on-chip**, Philip J. R. Roche, Kevin Greig, Yucai Wang, Maurice C. K. Cheung, Andrew G. Kirk, Vamsy P. Chodavarapu, McGill Univ. (Canada) [8212-23]

11:15 am: **Nano-sensing with a silica micro-toroid (Invited Paper)**, Tao Lu, Univ. of Victoria (Canada) [8212-25]

Monday-Wednesday 23-25 January 2012 • Proceedings of SPIE Vol. 8213

Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVI

Conference Chairs: **Joseph A. Izatt**, Duke Univ. (USA); **James G. Fujimoto**, Massachusetts Institute of Technology (USA); **Valery V. Tuchin**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

Program Committee: **Peter E. Andersen**, Technical Univ. of Denmark (Denmark); **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign (USA); **Zhongping Chen**, Beckman Laser Institute and Medical Clinic (USA); **Johannes F. de Boer**, Vrije Univ. Amsterdam (Netherlands); **Wolfgang Drexler**, Medizinische Univ. Wien (Austria); **Christoph K. Hitzenberger**, Medizinische Univ. Wien (Austria); **Rainer A. Leitgeb**, Medizinische Univ. Wien (Austria); **Xingde D. Li**, The Johns Hopkins Univ. (USA); **Adrian Gh. Podoleanu**, Univ. of Kent (United Kingdom); **Andrew M. Rollins**, Case Western Reserve Univ. (USA); **Natalia M. Shakhova**, Institute of Applied Physics (Russian Federation); **Guillermo J. Tearney**, Wellman Ctr. for Photomedicine (USA); **Ruikang Wang**, Univ. of Washington (USA); **Maciej D. Wojtkowski**, Nicolaus Copernicus Univ. (Poland); **Yoshiaki Yasuno**, Univ. of Tsukuba (Japan)

Monday 23 January

SESSION 1

Room: 303 (Esplanade) Mon. 8:30 to 10:00 am

Imaging Vascular Structure and Flow: Ophthalmology

Session Chair: **Joseph A. Izatt**, Duke Univ. (USA)

8:30 am: **Non-invasive optical imaging of true capillary blood flow within microcirculatory tissue beds using supercontinuum light source**, Zhongwei Zhi, Ruikang Wang, Univ. of Washington (USA) [8213-01]

8:45 am: **High-resolution three-dimensional vasculature imaging by adaptive optics optical coherence angiography**, Kazuhiro Kurokawa, Kazuhiro Sasaki, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8213-02]

9:00 am: **In vivo human retinal and choroidal vasculature visualization using differential phase contrast swept source optical coherence tomography at 1060 nm**, Reza Motaghiannezam, Scott E. Fraser, California Institute of Technology (USA) [8213-03]

9:15 am: **Phase-stabilized optical frequency domain imaging for the measurement of choroidal blood flow**, Boy Braaf, Koenraad A. Vermeer, Victor Arni D. P. Sicam, Johannes F. de Boer, Rotterdam Ophthalmic Institute (Netherlands) [8213-04]

9:30 am: **Measurement of blood flow in 3-D based on intensity information analysis of OCT data**, Daniel Ruminski, Iwona M. Gorczynska, Maciej Szkulmowski, Danuta Bukowska, Maciej D. Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8213-05]

9:45 am: **Intensity vs. phase-variance optical coherence tomography for visualization of human retinal capillary networks: comparative study**, Dae Yu Kim, UC Davis Medical Ctr. (USA); Jeff Fingler, California Institute of Technology (USA); John S. Werner, UC Davis Medical Ctr. (USA); Daniel M. Schwartz, Univ. of California, San Francisco (USA); Scott E. Fraser, California Institute of Technology (USA); Robert J. Zawadzki, UC Davis Medical Ctr. (USA) [8213-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 303 (Esplanade) Mon. 10:30 am to 12:00 pm

New Clinical and Pre-Clinical Applications

Session Chair: **James G. Fujimoto**, Massachusetts Institute of Technology (USA)

10:30 am: **Handheld OCT probe for advanced diagnostics in primary care medicine**, Woonggyu Jung, Univ. of Illinois at Urbana-Champaign (USA); Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Daniel T. McCormick, AdvancedMEMS (USA); Cac T. Nguyen, Zita Hubler, Eric J. Chaney, Univ. of Illinois at Urbana-Champaign (USA); Samir I. Sayegh, EYE Ctr. (USA); Michael Novak, Carle Foundation Hospital (USA); Charles N. Stewart, Blue Highway, LLC (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8213-07]

10:45 am: **Real-time three-dimensional dynamic imaging of airways reactivity using optical coherence tomography**, Jiefeng Xi, Rex Yung M.D., Wayne Mitzner, Robert Brown M.D., Xingde D. Li, The Johns Hopkins Univ. (USA) [8213-08]

11:00 am: **Volumetric optical frequency domain imaging of pulmonary pathology**, Lida P. Hariri, Matthew B. Applegate, Mari Mino-Kenudson, Eugene J. Mark, Brett E. Bouma, Guillermo J. Tearney M.D., Melissa J. Suter, Massachusetts General Hospital (USA) [8213-09]

11:15 am: **Studying limb formation defects in mouse model of human diseases with OCT**, Kirill V. Larin, Univ. of Houston (USA); Irina V. Larina, Mary E. Dickinson, Paul Overbeek, Baylor College of Medicine (USA) [8213-10]

11:30 am: **Assessment of collagen changes in ovarian tissue by measuring optical scattering coefficient from OCT images**, Yi Yang, Tianheng Wang, Nrusingh C. Biswal, Univ. of Connecticut (USA); Xiaohong Wang, Melinda Sanders, Molly Brewer, Univ. of Connecticut Health Ctr. (USA); Quing Zhu, Univ. of Connecticut (USA) [8213-11]

11:45 am: **Fourier domain OCT imaging of American cockroach nervous system**, Joanna Wyszowska, Iwona M. Gorczynska, Daniel Ruminski, Karol Karnowski, Andrzej A. Kowalczyk, Maria Stankiewicz, Maciej D. Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8213-12]

Lunch 12:00 to 1:30 pm

SESSION 3

Room: 303 (Esplanade) Mon. 1:30 to 3:30 pm

Ophthalmic New Technology

Session Chair: **Maciej D. Wojtkowski**, Nicolaus Copernicus Univ. (Poland)

1:30 pm: **Probing single cone photoreceptor functionality to green light stimulus with combined SLO/OCT**, Stefan Zotter, Michael Pircher, Erich Götzinger, Teresa Torzicky, Marco Bonesi, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) [8213-13]

1:45 pm: **Instrument tip-tracking ophthalmic intrasurgical SDOCT**, Justin V. Migacz, Paul Hahn, Rachelle V. O'Connell, Chris Thomas, Z. Moustafa, Chunmei Wang, Stephanie J. Chiu, Duke Univ. (USA); Liyi Dai, U.S. Army Research Office (USA); Cynthia A. Toth M.D., Joseph A. Izatt, Duke Univ. (USA) [8213-14]

2:00 pm: **Ultra-high speed spectral domain OCT for retina imaging at half megahertz A-line capturing rate**, Lin An, Oregon Health & Science Univ. (USA); Tueng Shen, Ruikang Wang, Univ. of Washington (USA) [8213-15]

2:15 pm: **Visible light optical coherence tomography for in vivo imaging the spectral contrasts of the retinal nerve fiber layer**, Xiangyang Zhang, Shuliang Jiao, The Univ. of Southern California (USA) [8213-16]

2:30 pm: **Towards digital holographic imaging of the eye using a partially coherent light source**, Amardeep S. G. Singh, Tilman Schmoll, Medizinische Univ. Wien (Austria); Bahram Javidi, Univ. of Connecticut (USA); Rainer Leitgeb, Medizinische Univ. Wien (Austria) [8213-17]

2:45 pm: **Adaptive optics-assisted optical coherence tomography using a single small stroke deformable mirror**, Kenta Sudo, Utsunomiya Univ. (Japan); Kazuhiro Kurokawa, Kazuhiro Sasaki, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan); Toyohiko Yatagai, Barry Cense, Utsunomiya Univ. (Japan) [8213-18]

3:00 pm: **Multicolor, integrated light stimulator for in vivo imaging of intrinsic optical signals in light-stimulated chicken retina with functional UHR-OCT**, Alireza Akhlagh Moayed, Sepideh Hariri, Vivian Choh, Kostadinka Bizheva, Univ. of Waterloo (Canada) [8213-19]

3:15 pm: **Adaptive optics - optical coherence tomography system for in vivo imaging of the mouse retina**, Yifan Jian, Ali Issaei, Simon Fraser Univ. (Canada); Robert J. Zawadzki, UC Davis Medical Ctr. (USA); Marinko V. Sarunic, Simon Fraser Univ. (Canada) [8213-20]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 303 (Esplanade) Mon. 4:00 to 6:00 pm

New Light Sources and Systems

Session Chair: Zhongping Chen,

Beckman Laser Institute and Medical Clinic (USA)

4:00 pm: **MEMS tunable VCSEL light source for ultrahigh speed 100kHz - 1MHz axial scan rate and long range centimeter class OCT imaging**, Benjamin M. Potsaid, Massachusetts Institute of Technology (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA); Peter J. S. Heim, Covega Corp. (USA); James Y. Jiang, Alex E. Cable, Thorlabs Inc. (USA) [8213-21]

4:15 pm: **Dispersion compensated megahertz FDML laser for imaging the anterior segment**, Wolfgang Wieser, Thomas Klein, Ludwig-Maximilians-Univ. München (Germany); Desmond C. Adler, LightLab Imaging LLC (USA); Francois Trépanier, TeraXion Inc. (Canada); Christoph M. Eigenwillig, Sebastian Karpf, Ludwig-Maximilians-Univ. München (Germany); Joseph M. Schmitt, LightLab Imaging LLC (USA); Robert Huber, Ludwig-Maximilians-Univ. München (Germany) [8213-22]

4:30 pm: **Coherence length extension of Fourier-domain mode locked lasers**, Desmond C. Adler, LightLab Imaging LLC (USA); Wolfgang Wieser, Ludwig-Maximilians-Univ. München (Germany); Francois Trépanier, TeraXion Inc. (Canada); Joseph M. Schmitt, LightLab Imaging LLC (USA); Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany) [8213-23]

4:45 pm: **Polarization maintaining buffered Fourier domain mode-locked swept source for optical coherence tomography**, Jun Zhang, Joe Jing, Pinghe Wang, Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8213-24]

5:00 pm: **Comb spacing-swept multi-wavelength source for deeper OCT imaging**, So-Young Park, Jae Seok Park, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of) [8213-25]

5:15 pm: **Broadband Fourier domain mode-locked laser for optical coherence tomography at 1060 nm**, Sebastian Marschall, Technical Univ. of Denmark (Denmark); Thomas Klein, Wolfgang Wieser, Benjamin R. Biedermann, Ludwig-Maximilians-Univ. München (Germany); Christian Pedersen, Technical Univ. of Denmark (Denmark); Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany); Peter E. Andersen, Technical Univ. of Denmark (Denmark) [8213-26]

5:30 pm: **Dual-wavelength-swept active mode locking laser for multiband OCT imaging**, Hwidon Lee, Chang-Seok Kim, Myung-Young Jeong, Zhongping Chen, Pusan National Univ. (Korea, Republic of) [8213-27]

5:45 pm: **A monolithic semiconductor laser with long coherence length for fast and inexpensive optical coherence tomography**, Jason R. Ensher, Paul Boschert, Katherine Featherston, Jonathan Huber, Michael Crawford, Michael Minneman, Insight Photonic Devices (USA); Chris Chiccone, Dennis Derickson, California Polytechnic State Univ., San Luis Obispo (USA) [8213-28]

POSTERS - MONDAY

Room: 103 (Exhibit Level) Mon. 5:30 to 7:30 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, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Using surface wave to assess mechanical properties of skin and skin diseases as measured by phase-sensitive OCT, Chunhui Li, Guangying Guan, Univ. of Washington (USA); Zhihong Huang, Univ. of Dundee (United Kingdom); Ruikang Wang, Univ. of Washington (USA) [8213-85]

Discretely swept optical coherence tomography system using superstructure grating distributed Bragg reflector lasers at 1561-1639 nm, Donghak Choi, Reiko Yoshimura, Hideaki Hiro-Oka, Hiroyuki Furukawa, Kitasato Univ. (Japan); Atsushi Goto, Canon Inc. (Japan); Nobuyuki Satou, Akihito Igarashi, Motoi Nakanishi, Kimiya Shimizu, Kitasato Univ. (Japan); Kohji Ohbayashi, Kitasato Univ. School of Medicine (Japan) [8213-86]

Depth profile absorber concentration reconstruction using photothermal optical coherence tomography, Roberto Reif, Guangying Guan, Ruikang Wang, Univ. of Washington (USA) [8213-87]

Imaging of breast cancer tumor margins with an OCT needle probe, Robert A. McLaughlin, Andrea Curatolo, Boon Y. Yeo, Kelsey M. Kennedy, Bryden C. Quirk, Rodney W. Kirk, Dirk Lorenser, The Univ. of Western Australia (Australia); Benjamin A. Wood, PathWest Lab. Medicine WA (Australia); Anita G. Bourke, Sir Charles Gairdner Hospital (Australia); Christobel M. Saunders, David D. Sampson, The Univ. of Western Australia (Australia) [8213-88]

High resolution long imaging range SSOCT system based on a multi-spectral band Fourier domain mode-locked swept source, Jun Zhang, Pinghe Wang, Joe Jing, Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8213-89]

Frequency-domain coherence-gated Shack-Hartmann wavefront sensor, Jingyu Wang, Adrian G. Podoleanu, Univ. of Kent (United Kingdom) [8213-90]

Automated three-dimensional registration of intra-vascular optical coherence tomography images for the clinical evaluation of stent implantation over time, Giovanni Ughi, Tom Adriaenssens, Katholieke Univ. Leuven (Belgium); Matilda Larsson, Royal Institute of Technology (Sweden); Christophe Dubois, Peter Sinnaeve, Mark Coosemans, Walter Desmet, Jan D'Hooghe, Katholieke Univ. Leuven (Belgium) [8213-91]

Motion-insensitive optical coherence tomography based microangiography, Ting-Ta Chi, Cheng-Kung Lee, Chiung-Ting Wu, Hung-Yu Tseng, Yean-Woei Kiang, Chih-Chung Yang, Chun-Pin Chiang D.D.S., National Taiwan Univ. (Taiwan); Meng-Tsan Tsai, Chang Gung Univ. (Taiwan) [8213-92]

Resolution improvement in dual-band OCT by filling the spectral gap, Peter Cimalla, Maria Gaertner, Julia Walther, Edmund Koch, Universitätsklinikum Carl Gustav Carus Dresden (Germany) [8213-93]

Partially coherent reconstruction for optical coherence tomography, Martin L. Williger, Guillermo J. Tearney M.D., Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) [8213-94]

High-speed spectroscopic OCT around 1550 nm based on dual-band swept laser source, Rui Zhu, Jianbing Xu, Chi Zhang, Kenneth K. Y. Wong, Edmund Y. Lam, The Univ. of Hong Kong (Hong Kong, China) [8213-95]

Wide tuning range wavelength-swept laser at 1020 nm for ultra-high resolution FD-OCT, Sang-Won Lee, Hyun-Woo Song, Moon-Youn Jung, Seung-Hwan Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) [8213-96]

Gold nanocages with enhanced scattering as OCT contrast agents, Yong-Ping Chen, Jiefeng Xi, Jiasong Li, Jessica Mavada, The Johns Hopkins Univ. (USA); Jessica C. Ramella-Roman, The Catholic Univ. of America (USA); Xingde D. Li, The Johns Hopkins Univ. (USA) [8213-97]

Microfluidics analysis of blood using spectral and time domain optical coherence tomography, Danuta Bukowska, Maciej Szkulmowski, Iwona M. Gorczynska, Andrzej A. Kowalczyk, Maciej D. Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8213-98]

Limited effect of phase modulation amplitude on polarization-sensitive optical coherence tomography measurements with continuous polarization modulation, Zenghai Lu, Deepa K. Kasaragod, Stephen J. Matcher, The Univ. of Sheffield (United Kingdom) [8213-99]

Lateral resolution improvement in oversampled optical coherence tomography images assuming weighted multiscatterer contributions, Evgenia Bousi, Costas Pitris, Univ. of Cyprus (Cyprus) [8213-100]

Brownian motion quantification of micro- and nanoparticles using phase resolved Doppler Optical coherence tomography, Chang Soo Kim, Wenjuan Qi, Jun Zhang, Beckman Laser Institute and Medical Clinic (USA); Young Jik Kwon, Univ. of California, Irvine (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8213-101]

Correction of phase-error for phase-resolved k-clocked optical frequency domain imaging, Jianhua Mo, Jianan Li, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) [8213-102]

High-speed polarization sensitive optical coherence tomography for retinal diagnostics, Biwei Yin, Bingqing Wang, The Univ. of Texas at Austin (USA); Kalyanramu Vemishetty, Jim Nagle, National Instruments Corp. (USA); Shuang Liu, Tianyi Wang, Henry Rylander III, Thomas E. Milner, The Univ. of Texas at Austin (USA) [8213-103]

Estimating external beam radiation damage of the esophagus in mice using endoscopic OCT, Daniel M. de Bruin, Academisch Medisch Ctr. (Netherlands); Marcel van Herk, Alessia Gasparini, Jan Jakob Sonke, Netherlands Cancer Institute (Netherlands); Ton G. van Leeuwen, Dirk J. Faber, Academisch Medisch Ctr. (Netherlands) [8213-104]

Evaluation of polypyrrole nanoparticles as an absorptive contrast agent for optical coherence tomography imaging beyond 1 micron, Kinman Au, Zenghai Lu, Stephen J. Matcher, Steven P. Armes, The Univ. of Sheffield (United Kingdom) [8213-105]

- Speckle reduction in swept source optical coherence tomography images with slow-axis averaging**, Ou Tan, Yan Li, Yimin Wang, Casey Eye Institute (USA); Martin F. Kraus, Massachusetts Institute of Technology (USA) and Univ. Erlangen-Nuremberg (Germany); Jonathan J. Liu, Massachusetts Institute of Technology (USA); Benjamin Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Bernhard Baumann, James G. Fujimoto, Massachusetts Institute of Technology (USA); David Huang M.D., Casey Eye Institute (USA) [8213-106]
- Quantitative comparison of wavelength dependence on penetration depth and imaging contrast for ultrahigh-resolution optical coherence tomography using supercontinuum sources at five wavelength regions**, Shutaro Ishida, Norihiko Nishizawa, Nagoya Univ. (Japan) [8213-107]
- Megahertz processing rate for Fourier domain optical coherence tomography using a graphics processing unit**, Yuuki Watanabe, Dai Kamiyama, Yamagata Univ. (Japan) [8213-108]
- Quantitative comparison of hardware architectures for high-speed processing in optical coherence tomography**, Brian E. Applegate, Texas A&M Univ. (USA); Darren Schmidt, Kalyanramu Vemishetty, National Instruments Corp. (USA) [8213-109]
- Improvement of the coherence length of a 200 kHz swept light source driven by a KTN deflector**, Shogo Yagi, NTT Photonics Labs. (Japan); Kazunori Naganuma, NTT Advanced Technology Corp. (Japan); Tadayuki Imai, Yasuo Shibata, Jun Miyazu, Masahiro Ueno, Yuuichi Okabe, NTT Photonics Labs. (Japan); Yuzo Sasaki, Kazuo Fujiura, NTT Advanced Technology Corp. (Japan); Masahiro Sasaura, Kazutoshi Kato, NTT Photonics Labs. (Japan); Masato Ohmi, Masamitsu Haruna, Osaka Univ. (Japan) [8213-110]
- Estimation of vibration amplitude in Fourier domain optical coherence tomography interferometric signals from Doppler spectrum**, Maciej D. Wojtkowski, David Alonso-Caneiro, Nicolaus Copernicus Univ. (Poland); Brendan F. Kennedy, The Univ. of Western Australia (Australia); Karol Karnowski, Nicolaus Copernicus Univ. (Poland); David D. Sampson, The Univ. of Western Australia (Australia) and Microscopy (Australia); Maciej Szkulmowski, Nicolaus Copernicus Univ. (Poland) [8213-111]
- Enhanced optical clearing of skin in vivo and OCT in-depth imaging**, Xiang Wen, Britton Chance Ctr. for Biomedical Photonics (China) and Key Lab. of Biomedical Photonics of Ministry of Education (China); Steven L. Jacques, Oregon Health & Science Univ. (USA); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Dan Zhu, Britton Chance Ctr. for Biomedical Photonics (China) and Key Lab. of Biomedical Photonics of Ministry of Education (China) [8213-112]
- Self-assembled quantum dot based swept laser source for optical coherence tomography applications**, Negin Peyvast, David Childs, Nikola Krstajic, Zenghai Lu, Stephen J. Matcher, The Univ. of Sheffield (United Kingdom); Daniil Livshits, Alexey Shkolnik, Igor Krestnikov, Innolume GmbH (Germany); Richard Hogg, The Univ. of Sheffield (United Kingdom) . . [8213-113]
- Enhancement of the signal-to-noise ratio at depths in Fourier-domain optical coherence tomography**, Adrian Bradu, Univ. of Kent (United Kingdom); Petr Bouchal, Brno Univ. of Technology (Czech Republic); Adrian G. Podoleanu, Univ. of Kent (United Kingdom) [8213-114]
- Phase-sensitive optical coherence microscopy for detection of neural activity**, Rehmaan Ansari, Gereon Hüttmann, Achim Schweikard, Univ. zu Lübeck (Germany) [8213-115]
- Detailed software design of an ultraparallel ultrahigh speed SD-OCT for real-time 4D display at 12 volume/second**, Hideaki Hiro-oka, Donghak Choi, Kimiya Shimizu, Kitasato Univ. (Japan); Kohji Ohbayashi, Kitasato Univ. School of Medicine (Japan) [8213-116]
- High-power sweeping semiconductor light sources at 840 nm with up to 100 nm tuning range**, Vladimir Shidlovskii, Sergei D. Yakubovich, Stepan Ilchenko, Andrei Lobintsov, Mikhail V. Shramenko, Superlum (Russian Federation) [8213-117]
- Non-local sparse reconstruction of OCT images**, Chenyi Liu, Beijing Univ. of Posts and Telecommunications (China); Alexander Wong, Kostadinka Bizheva, Paul W. Fieguth, Univ. of Waterloo (Canada); Hongxia Bie, Beijing Univ. of Posts and Telecommunications (China) [8213-118]
- Complex conjugate term manipulation in optical frequency-domain imaging using the time-frequency distribution**, Norman Lippok, Stephane Coen, Poul M. F. Nielsen, Frédérique Vanholsbeeck, The Univ. of Auckland (New Zealand) [8213-119]
- Flow velocity analysis by joint spectral and time domain optical coherence tomography (STdOCT) and phase-resolved Doppler OCT**, Julia Walther, Edmund Koch, Universitätsklinikum Carl Gustav Carus Dresden (Germany) [8213-120]
- Dynamic analysis of mental sweating and the peripheral vessels for the activity of the autonomic nervous system by optical coherence tomography**, Masato Ohmi, Daisuke Takada, Yuki Wada, Masamitsu Haruna, Osaka Univ. (Japan) [8213-121]
- Swept-source OCT using programmable laser**, Guy Lamouche, Sébastien Vergnole, National Research Council Canada (Canada); Youngjae Kim, Bryan Burgoyne, Alain Villeneuve, Jr., Genia Photonics Inc. (Canada) [8213-122]
- Optical coherence tomography based angle-resolved backscattering studies on bovine tendon and cartilage**, Deepa K. Kasaragod, Zenghai Lu, Stephen J. Matcher, The Univ. of Sheffield (United Kingdom) [8213-123]
- Linear in-wavenumber optical spectrum registration in SD-OCT**, Pavel A. Shilyagin, Valentin M. Gelikonov, Grigory V. Gelikonov, Institute of Applied Physics (Russian Federation) [8213-124]
- Centrally symmetric hollow core interferometer for common path optical coherence tomography**, Yinan Zhang, Edward Pienkowski, Tao Wei, Xinwei Lan, Hai Xiao, Missouri Univ. of Science and Technology (USA) [8213-125]
- High-speed spectral-domain optical coherence tomography with dual detection of the retina and the cornea**, Hyun-Woo Jeong, Beop-Min Kim, Korea Univ. (Korea, Republic of) [8213-126]
- New method for suppressing the mirror image in Fourier-domain optical coherence tomography**, Chiung-Ting Wu, Ting-Ta Chi, Cheng-Kung Lee, Yean-Woei Kiang, Chih-Chung Yang, Chun-Pin Chiang D.D.S., Meng-Tsan Tsai, National Taiwan Univ. (Taiwan) [8213-127]
- Single-shot full complex spectrum spectrometer-based OCT with a single-line photodiode array**, Pavel A. Shilyagin, Valentin M. Gelikonov, Grigory V. Gelikonov, Alexander A. Moiseev, Institute of Applied Physics (Russian Federation) [8213-128]
- Optical coherence tomography imaging for ex-vivo endoscopic laryngeal cancer screening using a forward-viewing resonant fiber optic scanning endoscope**, Ramona C. Cernat, Univ. of Kent (United Kingdom); Yuying Y. Zhang, The Johns Hopkins Univ. (USA); Adrian Bradu, Univ. of Kent (United Kingdom); Taran Tatla, Northwick Park & St. Marks Hospitals (United Kingdom); Paul J. Tadrous, Northwick Park Hospital (United Kingdom); Xingde D. Li, The Johns Hopkins Univ. (USA); Adrian G. Podoleanu, Univ. of Kent (United Kingdom) [8213-129]
- Parametric study of femtosecond inscription of micro-structures for OCT artifact fabrication**, Janarthanan Rasakanthan, Graham C. B. Lee, Mykhaylo Dubov, Aston Univ. (United Kingdom); Peter D. Woolliams, National Physical Lab. (United Kingdom); Kate Sugden, Aston Univ. (United Kingdom) . [8213-130]
- Linewidth of swept laser source**, Haitham Omran, Diaa Khalil, Ain Shams Univ. (Egypt) [8213-131]

Tuesday 24 January

SESSION 5

Room: 303 (Esplanade) Tues. 8:30 to 10:00 am

Cardiovascular New Technology

Session Chair: Guillermo J. Tearney, Massachusetts General Hospital (USA)

8:30 am: **Measurement and perturbation of embryonic cardiac dynamics using optical coherence tomography and optical pacing**, Lindsay M. Peterson, Matthew T. McPheeters, Lee M. Barwick, Shi Gu, Andrew M. Rollins, Michael W. Jenkins, Case Western Reserve Univ. (USA) [8213-29]

8:45 am: **Simultaneous high-resolution morphological and biochemical optical imaging of atherosclerosis**, Paritosh Pande, Jesung Park, Sebina Shrestha, Fred Clubb, Brian Applegate, Javier A. Jo, Texas A&M Univ. (USA) [8213-30]

9:00 am: **Classification of atherosclerotic plaques using depth resolved spectral analysis of optical frequency domain imaging datasets**, Christine P. Fleming, Atsushi Tanaka M.D., Massachusetts General Hospital (USA) and Harvard Medical School (USA); Joseph A. Gardecki, Massachusetts General Hospital (USA); Pál Maurovich-Horvat, William C. Warger II, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Jocelyn E. Eckert, Massachusetts General Hospital (USA); Udo Hoffmann, Massachusetts General Hospital (USA) and Harvard Univ. (USA); Brett E. Bouma, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8213-31]

9:15 am: **In vivo intracardiac OCT imaging through percutaneous access: towards image guided radio-frequency ablation**, Hui Wang, Wei Kang, Thomas Carrigan, Austin P. Bishop, Mauricio Arruda, Andrew M. Rollins, Case Western Reserve Univ. (USA) [8213-32]

9:30 am: **Advances in a fully integrated intravascular OCT-ultrasound system for cardiovascular imaging**, Joseph Jing, Beckman Laser Institute and Medical Clinic (USA); Jiawen Li, Jiechen Yin, Univ. of California, Irvine (USA); Xiang Li, The Univ. of Southern California (USA); Jun Zhang, Beckman Laser Institute and Medical Clinic (USA); Khiet Hoang M.D., Pranav M. Patel, Univ. of California, Irvine School of Medicine (USA); Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Univ. of California, Irvine (USA) and Beckman Laser Institute and Medical Clinic (USA) [8213-33]

9:45 am: **Three-dimensional volumetric quantification of fibrous caps using intravascular optical coherence tomography**, Zhao Wang, Case Western Reserve Univ. (USA); Daniel Chamie, Hiram Bezerra, Univ. Hospitals of Cleveland (USA); David L. Wilson, Case Western Reserve Univ. (USA); Marco A. Costa M.D., Univ. Hospitals of Cleveland (USA); Andrew M. Rollins, Case Western Reserve Univ. (USA) [8213-34]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 303 (Esplanade) Tues. 10:30 am to 12:00 pm

Imaging Vascular Structure and Flow: New Technology

Session Chair: Ruikang Wang, Univ. of Washington (USA)

10:30 am: **Multiple blood flow imaging modes by ultrahigh speed dual-beam Doppler optical coherence angiography**, Shuichi Makita, Franck Jaillon, Univ. of Tsukuba (Japan); Barry Cense, Utsunomiya Univ. (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8213-35]

10:45 am: **Real-time, angle-insensitive total axial flow measurement using transversal scanning Doppler OCT**, Hansford C. Hendargo, Al-Hafeez Dhalla, Joseph A. Izatt, Duke Univ. (USA) [8213-36]

11:00 am: **Strain rate measurement of embryonic chick heart in vivo using spectral domain optical coherence tomography**, Peng Li, Univ. of Washington (USA); Xin Yin, Liang Shi, Sandra Rugonyi, Oregon Health & Science Univ. (USA); Ruikang Wang, Univ. of Washington (USA) [8213-37]

11:15 am: **Real-time speckle variance swept-source optical coherence tomography using a graphics processing unit**, Kenneth K. C. Lee, Univ. of Toronto (Canada) and Ryerson Univ. (Canada); Adrian Mariampillai, Beau A. Standish, Victor X. D. Yang M.D., Ryerson Univ. (Canada) [8213-38]

11:30 am: **Simultaneous in-vivo structural and functional assessment of the microcirculation using correlation mapping optical coherence tomography (cmOCT)**, Joey G. Enfield, Enock Jonathan, Univ. of Limerick (Ireland); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) [8213-39]

11:45 am: **Intensity-based modified Doppler variance algorithm dedicated for phase instable optical coherence tomography systems**, Gangjun Liu, Danny Chou, Wangcun Jia, Wenjuan Qi, Bernard Choi, Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8213-40]

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

SESSION 7

Room: 303 (Esplanade) Tues. 1:30 to 3:30 pm

Catheter/Endoscopic and Cancer

Session Chair: Natalia M. Shakhova, Institute of Applied Physics (Russian Federation)

1:30 pm: **All-fiber optically based catheter system for simultaneous endoscopic optical coherence tomography and fluorescence imaging**, Jessica Mavadia, Jiefeng Xi, Xingde D. Li, The Johns Hopkins Univ. (USA) [8213-41]

1:45 pm: **Ultra-thin 30-gauge needle probe for minimally invasive 3D optical coherence tomography**, Dirk Lorensen, Xiaojie Yang, Rodney W. Kirk, Bryden C. Quirk, Robert A. McLaughlin, The Univ. of Western Australia (Australia); David D. Sampson, The Univ. of Western Australia (Australia) and Ctr. for Microscopy, Characterisation and Analysis (Australia) [8213-42]

2:00 pm: **Preclinical study on breast cancer using full-field optical coherence tomography**, Osnath Assayag, Ecole Supérieure de Physique et de Chimie Industrielles (France); Martine Antoine, Hôpital de Paris (France); Brigitte Sigal-Zafrani, Institut Curie (France); Fabrice Harms, LLTECH SAS (France); Adriano Burcheri, Ecole Supérieure de Physique et de Chimie Industrielles (France); Bertrand de Poly, LLTECH SAS (France); A. Claude Boccara, Ecole Supérieure de Physique et de Chimie Industrielles (France) and LLTech SAS (France) [8213-43]

2:15 pm: **Catheter designs for magnetomotive optical coherence tomography**, Jong S. Kim, Beckman Institute for Advance Science and Technology (USA); Di Li, Adeel Ahmad, Beckman Institute for Advance Science and Technology (USA) and Univ. of Illinois at Urbana-Champaign (USA); Steven G. Adie, Beckman Institute for Advance Science and Technology (USA); Stephen A. Boppart M.D., Beckman Institute for Advance Science and Technology (USA) and Univ. of Illinois at Urbana-Champaign (USA) . . . [8213-44]

2:30 pm: **Cellular resolution imaging using a full-field optical coherence tomography endoscopic probe**, Anne Latriève, A. Claude Boccara, ESPCI - Institut Langevin (France) and LLTech (France) [8213-45]

2:45 pm: **Optical frequency domain imaging as a diagnostic method and interactive tool for marking-guided biopsy in patients referred for screening or surveillance of Barrett's esophagus**, Michalina Gora, Melissa J. Suter, Massachusetts General Hospital (USA); Emmanuel Coron M.D., Massachusetts General Hospital (USA) and Institute of Digestive Diseases (France); Kevin Gallagher, Gregory Y. Lauwers, Massachusetts General Hospital (USA); Brett E. Bouma, Massachusetts General Hospital (USA) and Massachusetts Institute of Technology (USA); Norman S. Nishioka M.D., Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) and Massachusetts Institute of Technology (USA) [8213-46]

3:00 pm: **Image guided 3D OCT for early diagnosis of carcinoma in situ of the bladder**, Hugang Ren, Ki Park, Stony Brook Univ. (USA); Kenneth Shroyer, Wayne C. Waltzer, Stony Brook Univ. Medical Ctr. (USA); Yingtian Pan, Stony Brook Univ. (USA) [8213-47]

3:15 pm: **Elastic and optical tomography for the intraoperative diagnosis of tumors**, Adriano Burcheri, Amir Nahas, A. Claude Boccara, Ecole Supérieure de Physique et de Chimie Industrielles (France) [8213-48]

Coffee Break 3:30 to 4:00 pm

SESSION 8

Room: 303 (Esplanade) Tues. 4:00 to 6:00 pm

OCT New Technology

Session Chair: Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA)

4:00 pm: **Multi-MHz FDML OCT: snapshot retinal imaging at 6.7 million axial-scans per second**, Thomas Klein, Wolfgang Wieser, Raphael J. André, Christoph M. Eigenwillig, Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany) [8213-49]

4:15 pm: **Optical amplification of the signal and performance of the ultrafast spectral domain optical coherence tomography at an A-scan rate of 12.5 MHz in a wavelength region of 1300 nm**, Donghak Choi, Hideaki Hiro-Oka, Kimiya Shimizu, Kitasato Univ. (Japan); Kohji Ohbayashi, Kitasato Univ. School of Medicine (Japan) [8213-50]

4:30 pm: **Dual-depth SSCT for simultaneous complex conjugate resolved anterior segment and conventional retinal imaging**, Al-Hafeez Z. Dhalla, Theresa Bustamante, Hansford C. Hendargo, Ryan P. McNabb, Anthony N. Kuo, Joseph A. Izatt, Duke Univ. (USA) [8213-51]

4:45 pm: **Streak-mode Fourier domain optical coherence tomography**, Rui Wang, Julie X. Yun, Clemson Univ. (USA); Xiaocong Yuan, Nankai Univ. (China); Richard L. Goodwin, Univ. of South Carolina (USA); Roger R. Markwald, Medical Univ. of South Carolina (USA); Bruce Z. Gao, Clemson Univ. (USA) [8213-52]

5:00 pm: **Dispersion encoded full-range swept source OCT at 1060 nm**, Bernd Hofer, Medizinische Univ. Wien (Austria); Ling Wang, Katholieke Univ. Leuven (Belgium); Boris Hermann, René Werkmeister, Boris Povazay, Aneesh Alex, Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8213-53]

5:15 pm: **Depth-ambiguity free or polarization sensitive optical frequency domain imaging using the Pancharatnam-Berry phase**, Norman Lippok, Stephane Coen, Rainer Leonhardt, Poul M. F. Nielsen, Frédérique Vanholsbeeck, The Univ. of Auckland (New Zealand) [8213-54]

5:30 pm: **Influence of image detectors on the signal fall-off in spectral domain optical coherence tomography systems**, Martin Hagen-Eggert, Univ. zu Lübeck (Germany); Peter Koch, Thorlabs GmbH (Germany); Gereon Hüttmann, Univ. zu Lübeck (Germany) [8213-55]

5:45 pm: **Multiple-depth en face optical coherence tomography using active recirculation loops in the non-stationary state**, John A. Rogers, Adrian Bradu, Adrian G. Podoleanu, Univ. of Kent (United Kingdom) [8213-56]

Wednesday 25 January

SESSION 9

Room: 303 (Esplanade) Wed. 8:30 to 10:00 am

OCT Novel Applications

Session Chair: Wolfgang Drexler, Medizinische Univ. Wien (Austria)

8:30 am: **Simultaneous dark-bright field swept source OCT for ultrasound detection**, Cedric Blatter, Branislav Grajciar, Boris Hermann, Medizinische Univ. Wien (Austria); Robert Huber, Ludwig-Maximilians-Univ. München (Germany); Wolfgang Drexler, Rainer Leitgeb, Medizinische Univ. Wien (Austria) . . [8213-57]

8:45 am: **Optimizing magnetomotive contrast of SPIO-labeled platelets for thrombosis imaging in optical coherence tomography**, Amy L. Oldenburg, Dmitry Spivak, Frank Tsui, The Univ. of North Carolina at Chapel Hill (USA); Thomas Fischer, The Univ. of North Carolina at Chapel Hill School of Medicine (USA) [8213-58]

9:00 am: **Conformal laser therapy**, Martin L. Williger, David L. Arruda, Milen Shishkov, Benjamin J. Vakoc, Guillermo J. Tearney M.D., Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) [8213-59]

9:15 am: **In vivo measurement of differential motion within the organ of Corti under sound stimulation using optical coherence tomography**, Niloy Choudhury, Michigan Technological Univ. (USA); Fangyi Chen, Dingjun Zha, Anders Fridberger, Oregon Health & Science Univ. (USA); Ruikang Wang, Univ. of Washington (USA); Steven L. Jacques, Alfred L. Nuttall, Oregon Health & Science Univ. (USA) [8213-60]

9:30 am: **Measuring the vibrational response of the mouse ear using coherently interleaved optical coherence tomography**, Ryan L. Shelton, Texas A&M Univ. (USA); Simon S. Gao, John S. Oghalai M.D., Stanford Univ. (USA); Brian E. Applegate, Texas A&M Univ. (USA) [8213-61]

9:45 am: **Spectral and time domain OCT - a tool for optimal imaging of biological samples**, Maciej Szkulmowski, Iwona M. Gorczynska, Daniel Szlag, Maciej D. Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8213-62]

Coffee Break 10:00 to 10:30 am

SESSION 10

Room: 303 (Esplanade) Wed. 10:30 am to 12:00 pm

Phase and Polarization Sensitive OCT

Session Chair: Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria)

10:30 am: **Imaging of photothermal tissue expansion via phase sensitive Optical Coherence Tomography**, Hendrik Spahr, Linda Rudolph, Heike H. Müller, Reginald Birngruber, Gereon Hüttmann, Univ. zu Lübeck (Germany) [8213-63]

10:45 am: **Ultrahigh speed swept source / Fourier domain polarization sensitive optical coherence tomography**, Bernhard Baumann, Massachusetts Institute of Technology (USA) and Univ. of Pittsburgh Medical Ctr. (USA); Woo Jhon Choi, Massachusetts Institute of Technology (USA); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); David Huang M.D., Oregon Health & Science Univ. (USA); Joel S. Schuman M.D., Univ. of Pittsburgh Medical Ctr. (USA); Jay S. Duker M.D., Tufts Medical Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [8213-64]

11:00 am: **Automated measurement of choroidal thickness by polarization sensitive optical coherence tomography**, Teresa Torzicky, Erich Götzinger, Michael Pircher, Stefan Zotter, Marco Bonesi, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) [8213-65]

11:15 am: **Absolute measurement of subnanometer scale vibration of cochlear partition of an excised guinea pig cochlea using spectral-domain phase-sensitive optical coherence tomography**, Hrebesh M. Subhash, Oregon Health & Science Univ. (USA) [8213-66]

11:30 am: **Automated detection of chorio-scleral interface using polarization-sensitive optical coherence tomography**, Lian Duan, Masahiro Yamanari, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8213-67]

11:45 am: **Polarimetry noise analysis and compensation in polarization sensitive optical coherence tomography**, Ellen Ziyi Zhang, Benjamin J. Vakoc, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8213-68]

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

SESSION 11

Room: 303 (Esplanade) Wed. 1:30 to 3:30 pm

Novel Coherence Microscopy

Session Chair: Rainer Leitgeb, Medizinische Univ. Wien (Austria)

1:30 pm: **Optical coherence microscopy for deep tissue imaging of the cerebral cortex with intrinsic contrast**, Vivek J. Srinivasan, Harsha Radhakrishnan, Massachusetts General Hospital (USA); James Y. Jiang, Scott Barry, Alex E. Cable, Thorlabs Inc. (USA) [8213-69]

1:45 pm: **Structural and functional imaging of the pathology of Alzheimer's disease in a mouse model using extended-focus optical coherence microscopy**, Arno Bouwens, Tristan Bolmont, Christophe Pache, Patrick C. Fraering, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8213-70]

2:00 pm: **Sub-cellular resolution imaging of coronary arteries and respiratory mucosa using micro-optical coherence tomography (μOCT)**, Linbo Liu, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Joseph A. Gardecki, Massachusetts General Hospital (USA); Brett E. Bouma, Massachusetts General Hospital (USA) and Massachusetts Institute of Technology (USA) and Harvard Medical School (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts Institute of Technology (USA) [8213-71]

2:15 pm: **Interferometric synthetic aperture microscopy with virtual adaptive optics aberration correction**, Steven G. Adie, Benedikt W. Graf, Adeel Ahmad, P. Scott Carney, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8213-72]

2:30 pm: **Combined two-photon microscopy and optical coherence tomography for in vivo tissue imaging**, Bosu Jeong, Hyoseok Nam, Min Seong Jang, Taejun Wang, Junsang Doh, Bo-Gie Yang, Myoung Ho Jang, Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8213-73]

2:45 pm: **Quantifying sub-diffractive tissue mass density correlation function by spectroscopic optical coherence tomography**, Ji Yi, Jeremy D. Rogers, Ilker R. Capoglu, Andrew J. Radosevich, Yolanda Stypula, Northwestern Univ. (USA); Hemant K. Roy, NorthShore Univ. HealthSystem (USA); Allen Taflove, Vadim Backman, Northwestern Univ. (USA) [8213-74]

3:00 pm: **High resolution holoscopy**, Gesa L. Franke, Univ. zu Lübeck (Germany); Dierck Hillmann, Thorlabs GmbH (Germany) and Medizinisches Laserzentrum Lübeck (Germany); Thorsten Claußen, Christian Lührs, Peter Koch, Thorlabs GmbH (Germany); Gereon Hüttmann, Univ. zu Lübeck (Germany) [8213-75]

3:15 pm: **Development and dynamics of 3D mammary epithelial-stromal co-cultures using optical coherence tomography**, Raghav K. Chhetri, Amanda C. Sullivan, The Univ. of North Carolina at Chapel Hill (USA); Melissa A. Troester, The Univ. of North Carolina at Chapel Hill (USA) and Lineberger Comprehensive Cancer Ctr. (USA); Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) and 4Biomedical Research Imaging Ctr. (USA) [8213-76]

Coffee Break 3:30 to 4:00 pm

SESSION 12

Room: 303 (Esplanade) Wed. 4:00 to 6:00 pm

Signal/Image Processing*Session Chair: Valery V. Tuchin,*

N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

4:00 pm: **Anterior segment and retinal 3D-OCT motion correction using image registration and orthogonal scan patterns**, Martin F. Kraus, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and Massachusetts Institute of Technology (USA); Ireneusz Grulkowski, Massachusetts Institute of Technology (USA) and Nicolaus Copernicus Univ. (Poland); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Bernhard Baumann, Massachusetts Institute of Technology (USA) and Tufts Univ. (USA); Joel S. Schuman M.D., Univ. of Pittsburgh Medical Ctr. (USA); Jay S. Duker M.D., New England Eye Ctr. (USA); David Huang M.D., Oregon Health & Science Univ. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA); Joachim Hornegger, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8213-77]

4:15 pm: **Holoscapy image reconstruction**, Dierck Hillmann, Thorlabs GmbH (Germany) and Medizinisches Laserzentrum Lübeck GmbH (Germany); Gesa L. Franke, Univ. zu Lübeck (Germany); Christian Lührs, Thorsten Claußen, Peter Koch, Thorlabs GmbH (Germany); Gereon Hüttmann, Univ. zu Lübeck (Germany) and Medizinisches Laserzentrum Lübeck GmbH (Germany) [8213-78]

4:30 pm: **Morphological image analysis for classification of gastrointestinal tissues using optical coherence tomography**, Pilar Beatriz García-Allende, Helmholtz Zentrum München GmbH (Germany) and Imperial College London (United Kingdom); Iakovos Amygdalos, Hiruni Dhanapala, Robert D. Goldin, George B. Hanna, Daniel S. Elson, Imperial College London (United Kingdom) [8213-79]

4:45 pm: **Hybrid FPGA and GPU acceleration of optical frequency domain angiography computation**, William Chun Yip Lo, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA); Hongying Tang, Tianjin Univ. (China) and Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA); Ellen Ziyi Zhang, Wellman Ctr. for Photomedicine (USA); Brett Bouma, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA); Benjamin J. Vakoc, Wellman Ctr. for Photomedicine (USA) [8213-80]

5:00 pm: **Joint spectral and time domain processing applied to optical coherence elastography**, Brendan F. Kennedy, Kelsey M. Kennedy, The Univ. of Western Australia (Australia); Karol M. Karnowski, Maciej Szkulmowski, Maciej D. Wojtkowski, Nicolaus Copernicus Univ. (Poland); David D. Sampson, The Univ. of Western Australia (Australia) [8213-81]

5:15 pm: **Graphics processing unit-based ultra-high-speed real-time multidimensional Fourier domain optical coherence tomography**, Kang Zhang, Jin Ung Kang, The Johns Hopkins Univ. (USA) [8213-82]

5:30 pm: **Digital refocusing in optical coherence tomography**, Alexander A. Moiseev, Grigory V. Gelikonov, Pavel A. Shilyagin, Dmitry A. Terpelov, Valentin M. Gelikonov, Institute of Applied Physics (Russian Federation) [8213-83]

5:45 pm: **Graphics processing unit based dispersion encoded full-range frequency domain OCT**, Ling Wang, Cardiff Univ. (United Kingdom) and Katholieke Univ. of Leuven (Belgium); Boris Povazay, Medizinische Univ. Wien (Austria); Jeremy A. Guggenheim, Cardiff Univ. (United Kingdom); Wolfgang Drexler, Bernd Hofer, Medizinische Univ. Wien (Austria) [8213-84]

Courses of Related Interest

SC312 Principles and Applications of Optical Coherence Tomography (Fujimoto) Sunday, 1:30 to 5:30 pm

SC1054 Bio-Interferometry (Nolte) Sunday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Advanced Biomedical and Clinical Diagnostic Systems X

Conference Chairs: **Tuan Vo-Dinh**, Duke Univ. (USA); **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA); **Warren S. Grundfest**, Univ. of California, Los Angeles (USA)

Program Committee: **Maurice C. G. Aalders**, Univ. van Amsterdam (Netherlands); **Francesco Baldini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Jennifer K. Barton**, The Univ. of Arizona (USA); **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign (USA); **Daniel S. Gareau**, Oregon Health & Science Univ. (USA); **Hong Liu**, The Univ. of Oklahoma (USA); **Laura Marcu**, Univ. of California, Davis (USA); **Mary-Ann Mycek**, Univ. of Michigan (USA); **Jianan Y. Qu**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Urs Utzinger**, The Univ. of Arizona (USA); **Georges A. Wagnières**, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Sunday 22 January

SESSION 1

Room: 252 (Mezzanine) Sun. 2:10 to 3:10 pm

Fluorescence Systems

Session Chair: **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

2:10 pm: **A compact fluorescence and white light imaging system for intraoperative visualization of nerves**, Daniel C. Gray, Evgenia Kim, Victoria Cotero, Paul Staudinger, Siavash Yazdanfar, Cristina Tan Hehir, GE Global Research (USA) [8214-01]

2:30 pm: **Tracking ophthalmic drugs in the eye using confocal fluorescence microscopy**, Kim K. Buttenschoen, John M. Girkin, Durham Univ. (United Kingdom); Daniel Daly, Lein Applied Diagnostics Ltd. (United Kingdom) [8214-02]

2:50 pm: **Novel compact endoscope design for simultaneous wide-field multispectral fluorescence lifetime imaging (FLIM)**, Shuna Cheng, Joey M. Jabbour, Kristen Maitland, Javier A. Jo, Texas A&M Univ. (USA) [8214-03]

Coffee Break 3:10 to 3:40 pm

SESSION 2

Room: 252 (Mezzanine) Sun. 3:40 to 5:40 pm

Scattering and Reflectance Techniques

Session Chairs: **Tuan Vo-Dinh**, Duke Univ. (USA); **Hong Liu**, The Univ. of Oklahoma (USA)

3:40 pm: **Plasmonic coupling interference: a new approach for cancer diagnostics using SERS detection**, Hsin-Neng Wang, Tuan Vo-Dinh, Duke Univ. (USA) [8214-05]

4:00 pm: **Estimation of diffuse reflectance spectrum from RGB values by the synthesis of new colors for tissue measurements**, Quan Liu, Shuo Chen, Nanyang Technological Univ. (Singapore) [8214-06]

4:20 pm: **Design, validation, and implementation of a diffuse reflectance spectroscopic imaging system for tissue absorption and scattering**, Justin Y. Lo, Sulochana Dhar, Martin Brooke, Bing Yu, Duke Univ. (USA); Thomas F. Kuech, Univ. of Wisconsin-Madison (USA); Nan M. Jokerst, Nimmi Ramanujam, Duke Univ. (USA) [8214-07]

4:40 pm: **Diffuse reflectance imaging system for spatial mapping of tissue optical properties**, Sheldon F. Bish, Youmin Wang, Xiaojing Zhang, James W. Tunnell, The Univ. of Texas at Austin (USA) [8214-08]

5:00 pm: **Discrimination of selected species of pathogenic bacteria using near-infrared Raman spectroscopy and principal components analysis**, Landulfo Silveira, Jr., Univ. Camilo Castelo Branco (Brazil); Hector E. Giana, Lab. Oswaldo Cruz (Brazil); Fernanda S. de Siqueira Oliveira, Univ. Estadual Paulista (Brazil) [8214-09]

5:20 pm: **Effect of hormonal variation on in vivo high-wavenumber Raman spectra improves cervical precancer detection**, Shiyamala Duraipandian, Zhiwei Huang, Wei Zheng, National Univ. of Singapore (Singapore); Joseph Ng, Jeffrey J. H. Low, Ilancheran A, National Univ. Hospital (Singapore) and National Univ. of Singapore (Singapore) [8214-10]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

Accurate measurement of systolic blood

The cervical cancer detection system based on an endoscopic rotary probe, Yanshuang Yang, Huijuan Zhao, Zhuangping Qin, Feng Gao, Tianjin Univ. (China) [8214-44]

Fluorescence yield and lifetime tomography from time-resolved transmittances of a breast tumor phantom, Yiming Lu, Wei Zhang, Linhui Wu, Feng Gao, Huijuan Zhao, Tianjin Univ. (China) [8214-45]

Prokaryotic expression and polyclonal antibody preparation of autophagy-related gene ATG5 in arabidopsis, Wen Li Chen, Jing Zhou, South China Normal Univ. (China) [8214-46]

A multichannel time-resolved system for fluorescence diffusion optical tomography, Wei Zhang, Feng Gao, Linhui Wu, Yiming Lu, Wenjuan Ma, Huijuan Zhao, Tianjin Univ. (China) [8214-47]

Axial accuracy correction for FDK algorithm in digital tomosynthesis imaging, Hui Miao, Huijuan Zhao, Feng Gao, Tianjin Univ. (China) [8214-48]

Toward surface analysis on diabetic feet soles to predict ulcerations using photometric stereo, Chanjuan Liu, Ferdi van der Heijden, Univ. Twente (Netherlands); Jaap van Netten, Hospital Group Twente (Netherlands) [8214-49]

A novel technique for x-ray source size determination based on wavelet transformation, Zhongxing Zhou, Feng Gao, Huijuan Zhao, Lixin Zhang, Tianjin Univ. (China) [8214-50]

Fiber-based full-field optical coherence tomography, Hye Joon Ma, Seung Suk Lee, Chosun Univ. (Korea, Republic of); Byeong Il Lee, Swook Hann, Korea Photonics Technology Institute (Korea, Republic of); Eun-Seo Choi, Chosun Univ. (Korea, Republic of) [8214-51]

Low-cost/high-accuracy transcutaneous bilirubin meter for neonatal jaundice using laser diodes or LEDs, Mostafa Hamza, Mansoura Univ. (Egypt); Mohammad H. Sayed El-Ahl, Military Medical Academy (Egypt); Ahmad M. Hamza, National Research Ctr. (Egypt); Aya M. Hamza, Yahya M. Hamza, Tabarak Children's Hospital (Egypt) [8214-52]

Bacterial biofilm disruption using laser-generated shockwaves, Artemio Navarro, Jr., Zachary D. Taylor, Univ. of California, Los Angeles (USA); Anthony Z. Matolek D.V.M., VA Greater Los Angeles Healthcare System (USA); Ahuva Weltman, Vidyanmala Ramaprasad, Sean Huang, Univ. of California, Los Angeles (USA); David O. Beenhouwer M.D., David A. Haake M.D., UCLA School of Medicine (USA); Vijay Gupta, Warren S. Grundfest M.D., Univ. of California, Los Angeles (USA) [8214-53]

Monday 23 January**SESSION 3****Room: 252 (Mezzanine) Mon. 9:00 to 10:00 am****Microscopy and Confocal Imaging***Session Chair: Tuan Vo-Dinh, Duke Univ. (USA)*

9:00 am: **Field-portable reflection and transmission microscopy based on lensless digital holography**, Myungjun Lee, Oguzhan Yaglidere, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8214-11]

9:20 am: **Cellular pattern recognition discriminates normal skin from melanoma in non-invasive confocal imaging**, Amy Swerdlin, Eric Simpson, Steven Jacques, Daniel S. Gareau, Oregon Health & Science Univ. (USA) [8214-12]

9:40 am: **Comparing combined Raman spectroscopy: in vivo confocal microscopy related to age and location in human skin**, Mark A. Mackanos, Chetan Patil, Vanderbilt Univ. (USA); Chris L. Arrasmith, Montana State Univ. (USA); Constantine Paras, Vanderbilt Univ. (USA); David L. Dickensheets, Montana State Univ. (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [8214-14]

Coffee Break 10:00 to 10:30 am

SESSION 4**Room: 252 (Mezzanine) Mon. 10:30 am to 12:10 pm****Biosensing and Imaging I***Session Chair: Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy)*

10:30 am: **Haematic pH sensor for extracorporeal circulation**, Luca Ferrari, Paola Fabbri, Luigi L. Rovati, Francesco Pilati, Univ. degli Studi di Modena e Reggio Emilia (Italy) [8214-15]

10:50 am: **In vivo dynamic breast tumor oxygenation imaging for assessing response to neoadjuvant chemotherapies**, Shudong Jiang, Brian W. Pogue, Michael Jermy, Kelly E. Michaelsen, Dartmouth College (USA); Tracy E. Frazier, Peter A. Kaufman, Wendy A. Wells, Roberta M. diFlorio-Alexander, Dartmouth Hitchcock Medical Ctr. (USA); Keith D. Paulsen, Dartmouth College (USA) [8214-16]

11:10 am: **Measuring the mechanical properties of blood clots using resonant acoustic spectroscopy with optical vibrometry**, Gongting Wu, Alisa Wolberg, Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) [8214-17]

11:30 am: **Comparison of performance of commercial vessel imaging systems in a tissue phantom**, Herke Jan Noordmans, Natascha Cuper, Univ. Medical Ctr. Utrecht (Netherlands); Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands) [8214-18]

11:50 am: **Determining limitations of protoporphyrin IX for resolving depth of tumors during fluorescence-guided neurosurgery**, Kolbein Kolste, Pablo A. Valdes, Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA); David W. Roberts, Dartmouth Hitchcock Medical Ctr. (USA); Frederic Leblond, Thayer School of Engineering at Dartmouth (USA) [8214-04]

Lunch Break 12:10 to 1:20 am

SESSION 5**Room: 252 (Mezzanine) Mon. 1:20 to 3:00 pm****Biosensing and Imaging II***Session Chairs: Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy); Jianan Y. Qu, Hong Kong Univ. of Science and Technology (Hong Kong, China)*

1:20 pm: **Multimodality 3D imaging for histology 3D reconstruction**, Yukako Yagi, Maristela Onozato, Pinky A. Bautista, Mari Mino-Kenudson, Massachusetts General Hospital (USA) [8214-19]

1:40 pm: **Multispectral image enhancement by spectral shifting**, Pinky A. Bautista, Yukako Yagi, Massachusetts General Hospital (USA) [8214-20]

2:00 pm: **Multidepth imaging by chromatic dispersion confocal microscopy**, Cory Olsovsky, Ryan L. Shelton, Meagan Saldua, Oscar Carrasco-Zevallos, Brian Applegate, Kristen Maitland, Texas A&M Univ. (USA) [8214-21]

2:20 pm: **Stroboscopic illumination scheme for seamless 3D endoscopy**, Neil T. Clancy, Danail Stoyanov, Guang-Zhong Yang, Daniel S. Elson, Imperial College London (United Kingdom) [8214-22]

2:40 pm: **Recent advances in optical chemo/biosensing for biomedical applications at IFAC-CNR**, Francesco Baldini, Ambra Giannetti, Folco Senesi, Cosimo Trono, Istituto di Fisica Applicata Nello Carrara (Italy) [8214-23]

Coffee Break 3:00 to 3:30 pm

SESSION 6**Room: 252 (Mezzanine) Mon. 3:30 to 6:10 pm****Medical Devices and Methods***Session Chairs: Warren S. Grundfest, Univ. of California, Los Angeles (USA); Laura Marcu, Univ. of California, Davis (USA)*

3:30 pm: **Optical sensor system for continuous non-invasive monitoring of total hemoglobin concentration in real time in patients in the clinical environment**, Elfed Lewis, Univ. of Limerick (Ireland); Ulrich Timm, Univ. of Rostock (Germany) and Univ. of Limerick (Ireland); Gabriel Leen, Univ. of Limerick (Ireland); Jens Kraitl, Hartmut Ewald, Univ. of Rostock (Germany); Deirde McGrath, Univ. of Limerick (Ireland); George Shorten, Alan Broderick, Cork Univ. Hospital (Ireland) [8214-24]

3:50 pm: **New technique for easy registration of visual (multispectral) and thermal images to evaluate tissue perfusion**, Rudolf M. Verdaasdonk, Britt Kunnen, Liselot Vink, Albert van der Veen, Vrije Univ. Medical Ctr. (Netherlands); Herke Jan Noordmans, John Klaessens, Univ. Medical Ctr. Utrecht (Netherlands) [8214-25]

4:10 pm: **Non-invasive surface and tomographic imaging of breast cancer using a hand-held optical device**, Sarah J. Erickson, Manuela Roman, Jean Gonzalez, Florida International Univ. (USA); Richard Kiszonas, Univ. of Miami, Sylvester Comprehensive Cancer Ctr. (USA); Cristina Lopez-Penalver, Advanced Medical Specialities (USA); Anuradha Godavarty, Florida International Univ. (USA) [8214-26]

4:30 pm: **Development and evaluation of a light-emitting diode endoscopic light source**, Neil T. Clancy, Rui Li, Imperial College London (United Kingdom); Kevin Rogers, Univ. of Glamorgan (United Kingdom) and Cymtec Ltd. (United Kingdom); Paul Driscoll, Cymtec Ltd. (United Kingdom); Peter Excell, Glyndwr Univ. (United Kingdom); Ron Yandle, Cymtec Ltd. (United Kingdom); George B. Hanna, Imperial College London (United Kingdom); Nigel Copner, Univ. of Glamorgan (United Kingdom) and Cymtec Ltd. (United Kingdom); Daniel S. Elson, Imperial College London (United Kingdom) [8214-27]

4:50 pm: **An in-vitro cell system for studying molecular mechanisms of action associated with low intensity focused ultrasound**, Meghedi Babakhanian, Univ. of California, Los Angeles (USA) and Ctr. for Advanced Surgical and Interventional Technology (USA); Richard Fan, Univ. of California, Los Angeles (USA) and Ctr. for Advanced Surgical and Interventional Technology (CASIT) (USA); Amit P. Mulgaonkar, Rahul S. Singh, Univ. of California, Los Angeles (USA) and Ctr. for Advanced Surgical and Interventional Technology (USA); Martin O. Culjat, Univ. of California, Los Angeles (USA) and Ctr. for Advanced Surgical and Interventional Technology (USA) and Univ. of California, Los Angeles (USA); Shahab Danesh, Ligia Toro, Univ. of California, Los Angeles (USA); Warren S. Grundfest M.D., Univ. of California, Los Angeles (USA) and Ctr. for Advanced Surgical and Interventional Technology (USA); William P. Melega, Univ. of California, Los Angeles (USA) [8214-28]

5:10 pm: **Optical measurements of microvascular circulatory function in the foot for detection of peripheral neuropathy**, Gilberto Zamora, E. Simon Barriga, VisionQuest Biomedical, LLC (USA); Shuang Luan, Viktor Checkh, Phillip H. Heintz, Mark R. Burge, The Univ. of New Mexico (USA); Peter Soliz, VisionQuest Biomedical, LLC (USA) [8214-29]

5:30 pm: **An all fiberized portable cytometer for cellular and molecular biology analysis in space and other remote environments**, Ozzy Mermut, Christophe Riviere, Sebastien Leclair, INO (Canada); Michel Fortin, Handyem (Canada); Genevieve Dubeau-Laramée, Daniel Provencal, Luchino Y. Cohen, Canadian Space Agency (Canada) [8214-30]

5:50 pm: **Clinical study for spectral diagnosis of in vivo melanoma and non-melanoma skin cancer diagnosis**, Liang Lim, Brandon Nichols, The Univ. of Texas at Austin (USA); Narasimhan Rajaram, Duke Univ. (USA); Jason S. Reichenberg M.D., The Univ. of Texas Medical Branch (USA); Michael R. Migden M.D., The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); James W. Tunnell, The Univ. of Texas at Austin (USA) [8214-31]

Tuesday 24 January

SESSION 7

Room: 252 (Mezzanine) Tues. 8:40 to 10:00 am

Coherence Techniques I

Session Chair: A. Claude Boccara,

Ecole Supérieure de Physique et de Chimie Industrielles (France)

8:40 am: **Toward a real-time core-needle biopsy assessment with full-field OCT**, Adriano Burcheri, Ecole Supérieure de Physique et de Chimie Industrielles (France); Vincent Servois, Brigitte Sigal-Zafrani, Institut Curie (France); A. Claude Boccara, Ecole Supérieure de Physique et de Chimie Industrielles (France) and LLTech SAS (France) [8214-32]

9:00 am: **In-vitro observation of induced cartilage-degeneration progression by Fourier-domain OCT**, Ulrich Marx, Robert Schmitt, Fraunhofer-Institut für Produktionstechnologie (Germany); Björn Rath, Sven Nebelung, Markus Tingart, Christian Lüring, Universitätsklinikum Aachen (Germany) [8214-33]

9:20 am: **Office-based multifunctional anterior eye segment optical coherence tomography**, Yiheng Lim, Masahiro Yamanari, Young-Joo Hong, Shuichi Makita, Univ. of Tsukuba (Japan); Masahiro Miura, Tokyo Medical Univ. (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8214-34]

9:40 am: **Dual-wavelength photothermal (DWP) OCT for in vivo depth-resolved measurement of oxygen saturation (SaO₂) in murine brain arterioles**, Roman V. Kuranov, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Austin B. McElroy, Syed M. S. Kazmi, The Univ. of Texas at Austin (USA); Jeffrey W. Kiel, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Andrew K. Dunn, The Univ. of Texas at Austin (USA); Timothy Q. Duong, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Thomas E. Milner, The Univ. of Texas at Austin (USA) [8214-35]

Coffee Break 10:00 to 10:30 am

SESSION 8

Room: 252 (Mezzanine) Tues. 10:30 to 11:10 am

Coherence Techniques II

Session Chair: Jennifer K. Barton, The Univ. of Arizona (USA)

10:30 am: **Live OCT display on an intraoperative surgical microscope featuring augmented reality**, Kyungun Kim, Changho Lee, Hyosang Jung, Unsang Jung, Namhyun Jo, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Hongkyun Kim, Kyungpook National Univ. Hospital (Korea, Republic of) [8214-36]

10:50 am: **In vivo measurements of local hemoglobin absorption in the dermal microcirculation by low-coherence spectroscopy**, Nienke Bosschaart, Dirk J. Faber, Ton G. van Leeuwen, Maurice C. G. Aalders, Univ. van Amsterdam (Netherlands) [8214-38]

Lunch/Exhibition Break 11:10 am to 1:00 pm

SESSION 9

Room: 252 (Mezzanine) Tues. 1:00 to 3:00 pm

Digital Pathology

Session Chair: Daniel S. Gareau, The Rockefeller Univ. (USA)

1:00 pm: **Rapid confocal imaging of large areas of excised tissue with strip mosaicing**, Sanjeeva Abeytunge, Bjorg A. Larson, Yongbiao Li, Memorial Sloan-Kettering Cancer Ctr. (USA); Emily Seltzer, Livingston High School (USA); Brian Parks, New York Univ. School of Medicine (USA); Ricardo Toledo-Crow, Miliind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA) . . . [8214-39]

1:20 pm: **Large-area reflectance confocal microscopy for intraoperative lumpectomy margin assessment**, DongKyun Kang, Elena F. Brachtel, Barbara L. Smith, Massachusetts General Hospital (USA); Jeong Hyun Lee, KAIST (Korea, Republic of); Brett E. Bouma, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) [8214-40]

1:40 pm: **Photoacoustic detection of induced melanoma in vitro using a mouse model**, Sagar K. Gupta, Kiran K. Bhattacharyya, Jessica R. Newton, Thomas P. Quinn, John A. Viator, Univ. of Missouri-Columbia (USA) . . [8214-41]

2:00 pm: **Optical color-coding for automated detection of skin cancers (Invited Paper)**, Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8214-42]

2:20 pm: **Tri-modal confocal margin screening for the presence of residual squamous cell carcinoma in Mohs surgical excisions**, Anna Bar, Nicholas Snavely, Nathaniel Chen, Steven Jacques, Daniel S. Gareau, Oregon Health & Science Univ. (USA) [8214-13]

2:40 pm: **Optical biopsy on breast tissue using Light-CT: toward OCT-based diagnosis in pathology**, Fabrice Harms, LLTECH SAS (France); Osnath Assayag, Adriano Burcheri, ESPCI - Institut Langevin (France); Martine Antoine, Hôpital de Paris (France); Brigitte Sigal-Zafrani, Institut Curie (France); Bertrand de Poly, LLTECH SAS (France); A. Claude Boccara, ESPCI - Institut Langevin (France) and LLTECH SAS (France) [8214-43]

Design and Quality for Biomedical Technologies V

Conference Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Rongguang Liang**, College of Optical Sciences, The Univ. of Arizona (USA) *Conference Co-Chair:* **Joshua Pfefer**, U.S. Food and Drug Administration (USA)

Program Committee: **Anthony J. Durkin**, Beckman Laser Institute and Medical Clinic (USA); **Kazuhiro Gono**, Olympus Medical Systems Corp. (Japan); **Jeeseong Hwang**, National Institute of Standards and Technology (USA); **Stephen P. Morgan**, The Univ. of Nottingham (United Kingdom); **Robert J. Nordstrom**, National Institutes of Health (USA); **Jannick P. Rolland**, Univ. of Rochester (USA); **Eric J. Seibel**, Univ. of Washington (USA); **Tomasz S. Tkaczyk**, Rice Univ. (USA); **Rudolf M. Verdaasdonk**, Vrije Univ. Medical Ctr. (Netherlands)

Sunday 22 January

SESSION 1

Room: 206 (Mezzanine). Sun. 8:30 to 10:20 am

Development of Imaging Techniques

Session Chair: **Joshua Pfefer**, U.S. Food and Drug Administration (USA)

- 8:30 am: **Scanning nonlinear endomicroscopy technology and potential applications** (*Invited Paper*), Xingde D. Li, The Johns Hopkins Univ. (USA) [8215-01]
- 9:00 am: **OCT-based freeze-drying microscopy**, Mircea Mujat, Physical Sciences Inc. (USA); Krystin Greco, Univ. of Connecticut (USA); Kristin L. Galbally-Kinney, Robert D. Ferguson, Nicusor V. Iftimia, Daniel X. Hammer, Phillip A. Mulhall, William J. Kessler, Physical Sciences Inc. (USA); Michael J. Pikal, Univ. of Connecticut (USA) [8215-02]
- 9:20 am: **Interferometer for measuring the dynamic surface topography of a human tear film**, Brian C. Primeau, John E. Greivenkamp, The Univ. of Arizona (USA) [8215-03]
- 9:40 am: **Visualization of mucosal vasculature with narrow-band imaging: a theoretical study**, Quanzeng Wang, U.S. Food and Drug Administration (USA); Du Le, U.S. Food and Drug Administration (USA) and The Catholic Univ. of America (USA); Anant Agrawal, U.S. Food and Drug Administration (USA); Jessica C. Ramella-Roman, The Catholic Univ. of America (USA); Joshua Pfefer, U.S. Food and Drug Administration (USA) [8215-04]
- 10:00 am: **Precision limit analysis for optimized DOT imaging probe**, Ling Chen, Nanguang Chen, National Univ. of Singapore (Singapore) [8215-05]
- Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 206 (Mezzanine). Sun. 10:50 am to 12:30 pm

Quality and System Calibration

Session Chair: **Rudolf M. Verdaasdonk**, Vrije Univ. Medical Ctr. (Netherlands)

- 10:50 am: **Monitoring of biofilm formation on different material surfaces of medical devices using hyperspectral imaging method**, Do-Hyun Kim, U.S. Food and Drug Administration (USA); Moon S. Kim, U.S. Dept. of Agriculture (USA); Jeeseong Hwang, National Institute of Standards and Technology (USA) [8215-06]
- 11:10 am: **Comparison of the measurements of an experimental endoscope tester with the Dovieq MDE endoscope test system for two hospitals**, Herke Jan Noordmans, Univ. Medical Ctr. Utrecht (Netherlands); Menno de Braak, Bert Dommerholt, DOVIDEQ medical BV (Netherlands); Henk van den Brink, Univ. Medical Ctr. Utrecht (Netherlands) [8215-07]
- 11:30 am: **Numerical comparison of thermal damage threshold from pulsed and scanned laser in a measurement aperture**, Do-Hyun Kim, U.S. Food and Drug Administration (USA) [8215-08]
- 11:50 am: **Automated model-based calibration of imaging spectrographs**, Matjaž Kosec, Sensum d.o.o. (Slovenia); Dejan Tomaževič, Sensum d.o.o. (Slovenia) and Univ. of Ljubljana (Slovenia); Franjo Pernuš, Boštjan Likar, Univ. of Ljubljana (Slovenia) and Sensum d.o.o. (Slovenia) [8215-09]
- 12:10 pm: **Optical fibers with polyimide coatings for medical applications**, Andrei A. Stolov, Brian Slyman, Debra A. Simoff, Adam S. Hokansson, R. Steve Allen, John Earnhardt, OFS (USA) [8215-10]
- Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 3

Room: 206 (Mezzanine). Sun. 1:30 to 3:30 pm

Joint Session with Conference 8229B

Session Chairs: **Robert J. Nordstrom**, National Institutes of Health (USA); **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA)

- 1:30 pm: **Calibration and validation of chemical imaging spectrometry for clinical use** (*Invited Paper*), Maritoni Litorja, National Institute of Standards and Technology (USA) [8215-11]
- 2:00 pm: **Standard test methods for established medical imaging modalities and their implications for optical coherence tomography** (*Invited Paper*), Joshua Pfefer, Anant Agrawal, Alex Beylin, U.S. Food and Drug Administration (USA) [8215-12]
- 2:30 pm: **Challenges in manufacturing optical tissue phantoms: an industrial perspective** (*Invited Paper*), Jean-Pierre Bouchard, Isabelle Noiseux, Ozzy Mermut, INO (Canada) [8229B-53]
- 3:00 pm: **Report on a recent workshop: Standards for Phantoms for the Performance Evaluation and Validation of Optical Medical Imaging Devices** (*Invited Paper*), Jeeseong Hwang, National Institute of Standards and Technology (USA); Robert J. Nordstrom, National Cancer Institute (USA) [8229B-54]
- Coffee Break 3:30 to 4:00 pm

PANEL DISCUSSION
Room: 206 (Mezzanine) Sun. 4:00 to 5:00 pm
Session Chair: **Robert J. Nordstrom**, National Institutes of Health (USA)
 Panelists: **Maritoni Litorja**, **Joshua Pfefer**, **Jean-Pierre Bouchard**, INO (Canada), **Jeeseong Hwang**, NIST

Monday 23 January

SESSION 4

Room: 206 (Mezzanine). Mon. 8:30 to 10:00 am

Clinical Systems

Session Chair: **Rongguang Liang**, College of Optical Sciences, The Univ. of Arizona (USA)

- 8:30 am: **Primary care imaging using a handheld OCT-video scanner** (*Invited Paper*), Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8215-13]
- 9:00 am: **Clinical dissemination of near-infrared fluorescence imaging using the FLARE imaging system**, Sylvain Gioux, Nicholas J. Durr, Alan Stockdale, Conor J. Cross, Yoshitomo Ashitate, John V. Frangioni, Beth Israel Deaconess Medical Ctr. (USA) [8215-14]
- 9:20 am: **Fluorescence goggle device for intraoperative oncologic imaging**, Yang Liu, Adam Bauer, Walter J. Akers, Gail P. Sudlow, Kexian Liang, Tauseef Charanya, Suman Mondal, Joseph P. Culver, Samuel Achilefu, Washington Univ. in St. Louis (USA) [8215-15]
- 9:40 am: **Visualization technique for air flows in a live operating room in view of infection prevention**, Rudolf M. Verdaasdonk, Robin van den Berg, Albert van der Veen, Vrije Univ. Medical Ctr. (Netherlands); Herke Jan Noordmans, Univ. Medical Ctr. Utrecht (Netherlands) [8215-16]
- Coffee Break 10:00 to 10:40 am

Conference 8215 · Room: 206 (Mezzanine)

SESSION 5

Room: 206 (Mezzanine) Mon. 10:40 am to 12:20 pm

Design of Imaging Techniques

Session Chair: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA)

10:40 am: **Parallel 3D confocal/OCM imaging system with adaptive objective lens** (*Invited Paper*), Guoqiang Li, Univ. of Missouri-St. Louis (USA) . . . [8215-18]

11:00 am: **An afocal beam relay for laser XY scanning systems**, David Kessler, Kessler Optics & Photonics Solutions, Ltd. (USA) [8215-19]

11:20 am: **Instrumentation considerations for measurement of early-arriving photons in diffuse fluorescence tomography**, Niksa Valim, Mark Niedre, Northeastern Univ. (USA) [8215-20]

11:40 am: **Comparison of divided-pupil and full-pupil configurations for line-scanning confocal microscopy of skin**, Yogesh G. Patel, Charles A. DiMarzio, Northeastern Univ. (USA); Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA) [8215-21]

12:00 pm: **Development of low-cost webcam-based biomedical monitoring system over a network for real-time physiological assessment**, Sijung Hu, Vicente Azorin-Peris, Loughborough Univ. (United Kingdom); Charlotte Papin, Univ. Paris-Sud 11 (France); Sun Yu, Aayush Karki, Roy Kalawsky, Ron Summers, Loughborough Univ. (United Kingdom) [8215-22]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 6

Room: 206 (Mezzanine) Mon. 1:30 to 3:10 pm

Hyperspectral Imaging

Session Chair: **Jeeseong Hwang**, National Institute of Standards and Technology (USA)

1:30 pm: **Hyperspectral projection of a skin flap animal model for use as a digital tissue phantom**, David Allen, Steven W. Brown, Joseph P. Rice, Jeeseong Hwang, Maritoni Litorja, National Institute of Standards and Technology (USA); Ronald X. Xu, Ohio State Univ. (USA) [8215-23]

1:50 pm: **Multispectral imaging approach for simplified non-invasive in vivo evaluation of gingival erythema**, Timo Eckhard, Eva Maria Valero, Juan Luis Nieves, Univ. of Granada (Spain) [8215-24]

2:10 pm: **Hyperspectral imaging and analysis of subcellular substances in single cells**, Ji Youn Lee, National Institute of Standards and Technology (USA); Fuyuki Tokumasu, National Institute of Standards and Technology (USA) and National Institute of Health (USA); Daniel Samarov, David Allen, Maritoni Litorja, National Institute of Standards and Technology (USA); Dan Sackett, Ralph Nossal, National Institute of Health (USA); Jeeseong Hwang, National Institute of Standards and Technology (USA) [8215-25]

2:30 pm: **Intercomparison of EMCCD- and sCMOS-based imaging spectrometers for biomedical applications in low-light conditions**, Julio E. Hernandez-Palacios, Norsk Elektro Optikk AS (Norway); Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway); Trond Løke, Norsk Elektro Optikk AS (Norway); Torbjørn Skauli, Norwegian Defence Research Establishment (Norway) [8215-26]

2:50 pm: **Characterization and modeling of the spatially and spectrally varying point-spread function in hyperspectral imaging systems for computational correction of axial optical aberrations**, Žiga Špiclin, Miran Bürmen, Franjo Pernuš, Boštjan Likar, Univ. of Ljubljana (Slovenia) [8215-27]

POSTER SESSION

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

Conference attendees are invited to attend the BIOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

On the spectral sensitivity calibration of fluorescence spectrometers: extension to the NIR, polarization, and grating effects, Samantha Fore, PicoQuant Photonics North America, Inc. (USA); Sebastian Tannert, Peter Kapusta, Alexander Glatz, Uwe Ortmann, Felix Koberling, Rainer Erdmann, PicoQuant GmbH (Germany) [8215-28]

A new phototherapy unit for neonatal hyperbilirubinemia using computer controlled laser diodes or LEDs, Mostafa Hamza, Mansoura Univ. (Egypt); Mohammad H. Sayed El-Ahl, Military Medical Academy (Egypt); Ahmad M. Hamza, National Research Ctr. (Egypt); Aya M. Hamza, Yahya M. Hamza, Tabarak Children's Hospital (Egypt) [8215-29]

The evaluation model of the physiological lag parameter between the glucose concentration in blood and the glucose concentration in interstitial fluid, Ting Shi, Dachao Li, Yongjie Ji, Kexin Xu, Tianjin Univ. (China) . . [8215-30]

Multimodal Biomedical Imaging VII

Conference Chairs: **Fred S. Azar**, Philips Medical Systems (USA); **Xavier Intes**, Rensselaer Polytechnic Institute (USA)

Saturday 21 January

SESSION 1

Room: 301 (Esplanade) Sat. 8:00 to 10:10 am

Functional Diffuse Optical Imaging

Session Chairs: **Fred S. Azar**, Philips Medical Systems (USA); **Xavier Intes**, Rensselaer Polytechnic Institute (USA)

8:00 am: **Wide-field optical tomography** (*Invited Paper*), Xavier Intes, Rensselaer Polytechnic Institute (USA) [8216-01]

8:30 am: **Multimodal fluorescence DOT-SPECT/CT for in vivo sentinel lymph node imaging**, Metasebya Solomon, Washington Univ. in St. Louis (USA); Ralph E. Nothdruff, Walter J. Akers, Kexian Liang, Washington Univ. School of Medicine in St. Louis (USA); Baogang Xu, Washington Univ. in St. Louis (USA); Samuel Achilefu, Joseph P. Culver, Washington Univ. School of Medicine in St. Louis (USA) [8216-02]

8:50 am: **Heat-sensitive microbubbles for therapeutic margin assessment in liver ablation surgery**, Jiwei X. Huang, Carl Schmidt, Ronald X. Xu, The Ohio State Univ. (USA) [8216-03]

9:10 am: **Multimodality imaging using double clad fiber challenges and solutions**, Ehsan Hamidi, Hongki Yoo, Hao Wang, Joseph A. Gardecki, Paulino Vacas-Jacques, Mireille Rosenberg, Milen Shishkov, Brett E. Bouma, Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) [8216-04]

9:30 am: **PH-sensitive fluorescence detection by fluorescence diffuse optical tomography**, Jiao Li, Feng Gao, Linjing Duan, Limin Zhang, Huijuan Zhao, Tianjin Univ. (China) [8216-05]

9:50 am: **Mammogram-based diffuse optical tomography**, Hung-Chih Chiang, Jhao-Ming Yu, Liang-Yu Chen, National Central Univ. (Taiwan); Min-Cheng Pan, Tung Nan Institute of Technology (Taiwan); Min-Chun Pan, National Central Univ. (Taiwan); Sheng-Yih Sun, TaoYuan General Hospital (Taiwan) [8216-06]

Coffee Break 10:10 to 10:30 am

SESSION 2

Room: 301 (Esplanade) Sat. 10:30 am to 12:10 pm

Microscopic Imaging

Session Chairs: **Fred S. Azar**, Philips Medical Systems (USA); **Frederic Leblond**, Dartmouth College (USA)

10:30 am: **In vivo quantification of human dermal skin aging using SHG and autofluorescence**, Stefan Puschmann, Christian-Dennis Rahn, Horst Wenck, Stefan Gallinat, Frank F. Fischer, Beiersdorf AG (Germany) [8216-07]

10:50 am: **Multimodal full-field optical coherence tomography on biological tissue: toward all optical digital pathology**, Fabrice Harms, Bertrand de Poly, LLTECH SAS (France); A. Claude Boccara, ESPCI - Institut Langevin (France) and LLTECH SAS (France) [8216-08]

11:10 am: **Combined macroscopic FLIM and microscopic reflectance confocal microscopy for epithelial imaging**, Joey M. Jabbour, Shuna Cheng, Javier A. Jo, Kristen C. Maitland, Texas A&M Univ. (USA) [8216-09]

11:30 am: **Optical characters and texture maps of skin and the aging mechanism by use of multiphoton microscopy and optical coherence tomography**, Shulian Wu, Hui Li, Xiaoman Zhang, Fujian Normal Univ. (China) [8216-10]

11:50 am: **Combined SECM and OCT using a dual-band wavelength-swept laser**, Etienne De Montigny, Nadir Goulamhousen, David Banville, Ecole Polytechnique de Montréal (Canada); Mathias Strupler, Sainte-Justine Mother and Child Univ. Hospital Ctr. (Canada) and Ecole Polytechnique de Montréal (Canada); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) and Sainte-Justine Mother and Child Univ. Hospital Ctr. (Canada) [8216-11]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 3

Room: 301 (Esplanade) Sat. 1:40 to 6:10 pm

Imaging Algorithms

Session Chairs: **Xavier Intes**, Rensselaer Polytechnic Institute (USA); **Brian W. Pogue**, Thayer School of Engineering at Dartmouth (USA)

1:40 pm: **Compression-induced changes in breast hemodynamics**, David R. Busch, Univ. of Pennsylvania (USA); Regine Choe, Univ. of Rochester Medical Ctr. (USA); Wesley Baker, Univ. of Pennsylvania (USA); Turgut Durduran, ICFO - Institut de Ciències Fotòniques (Spain); Mark A. Rosen M.D., Hospital of the Univ. of Pennsylvania (USA); Arjun G. Yodh, Univ. of Pennsylvania (USA) [8216-12]

2:00 pm: **Multi-modality monitoring of response to rapamycin in colorectal neoplasia with optical-MR imaging** (*Invited Paper*), Thomas D. Wang M.D., Univ. of Michigan (USA) [8216-13]

2:30 pm: **Quantification of the cortical contribution to the NIRS signal over the motor cortex using concurrent NIRS-fMRI measurements**, Louis Gagnon, Meryem A. Yucel, Mathieu Dehaes, Robert J. Cooper, Katherine L. Perdue, Massachusetts Institute of Technology (USA); Juliette Selb, David A. Boas, Massachusetts General Hospital (USA) . . [8216-14]

2:50 pm: **Temperature-modulated fluorescence tomography**, Yuting Lin, Univ. of California, Irvine (USA); Rashmi B. Dalvi, InnoSense LLC (USA); Michael T. Ghijssen, Gultekin Gulsen, Univ. of California, Irvine (USA) [8216-15]

3:10 pm: **In vivo 3D image reconstruction from limited view projection fluorescence molecular signals by means of registration with x-ray computed tomography**, Karin Radrich, Angélique B. F. Ale, Vladimir Ermolayev, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) [8216-16]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Cerenkov emission spectroscopy during radiation therapy treatment to plan fractionation** (*Invited Paper*), Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) [8216-17]

4:30 pm: **Fluorescence-enhanced optical tomography and nuclear imaging system for small animals**, I-Chih Tan, Yujie Lu, Chinmay D. Darne, John C. Rasmussen, Banghe Zhu, Ali Azhdarinia, The Univ. of Texas Health Science Ctr. at Houston (USA); Shikui Yan, Anne Smith, Siemens Medical Solutions USA, Inc. (USA); Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA) [8216-18]

4:50 pm: **Time-reversal optical tomography: detecting and locating extended targets in a turbid medium**, Binlin Wu, Wei Cai, The City College of New York (USA); Min Xu, Fairfield Univ. (USA); Swapan K. Gayen, The City College of New York (USA) [8216-19]

5:10 pm: **Towards single snapshot multispectral skin assessment**, Janis Spigulis, Dainis Jakovels, Liene Elste, Univ. of Latvia (Latvia) [8216-20]

5:30 pm: **Co-axial electrohydrodynamic atomization for multimodal imaging and image-guided therapy**, Ting Si, Laibin Jia, Guangbin Li, Xiezheng Yin, Univ. of Science and Technology of China (China); Leilei Zhang, Ronald X. Xu, The Ohio State Univ. (USA) [8216-21]

5:50 pm: **Combined three-dimensional computer vision and epi-illumination fluorescence imaging system**, Dimitris S. Gorpas, Dido Yova, Kostas Politopoulos, National Technical Univ. of Athens (Greece) [8216-22]

Sunday 22 January

POSTERS AND COFFEE BREAK

Room: South Hall A (with BiOS Expo) . Sun. 3:00 to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday for viewing. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Sunday afternoon, in conjunction with the coffee break.

Poster authors: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday or 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Single-pass construction of the Jacobian matrix for fluorescence diffuse optical tomography using a perturbation Monte Carlo method. Xiaofeng Zhang, Duke Univ. (USA) [8216-23]

Near-infrared brain volumetric imaging for neurodegenerative diseases diagnosis: a feasibility study based on Monte Carlo simulation. Ching-Cheng Chuang, National Taiwan Univ. (Taiwan); Tsuo-Hung Lan, National Yang-Ming Univ. (Taiwan); Chung-Ming Chen, National Taiwan Univ. (Taiwan); Yao-Sheng Hsieh, Chun-Yang Wang, National Chiao Tung Univ. (Taiwan); Ching-Po Lin, Chia-Wei Sun, National Yang-Ming Univ. (Taiwan) [8216-24]

Hybrid light transport model-based bioluminescence tomography reconstruction for early gastric cancer detection. Xueli Chen, Jimin Liang, Xidian Univ. (China); Hao Hu, Fourth Military Medical Univ. (China) and Xijing Hospital (China); Xiaochao Qu, Xidian Univ. (China); Defu Yang, Duofang Chen, Shouping Zhu, Jie Tian, Xidian Univ. (China) [8216-25]

Bimodal BLT source reconstruction based on adjoint diffusion equations. Yanbin Hou, Jimin Liang, Xiaochao Qu, Duofang Chen, Shouping Zhu, Jie Tian, Xidian Univ. (China) [8216-26]

Visualization of subcutaneous veins using modulated hyperspectral imaging. Jaka Katrasnik, Franjo Pernu?, Bo?tjan Likar, Univ. of Ljubljana (Slovenia) [8216-27]

Improvement of blood perfusion signal in brain cortex by using depth selective filtering method. Hiroshi Kawamoto, Mamiko Fujii, Sophia Univ. (Japan) [8216-28]

GPU-accelerated Monte Carlo simulation for fluorescence modeling in turbid medium. Xi Yi, Weiting Chen, Linhui Wu, Wenjuan Ma, Wei Zhang, Jiao Li, Xin Wang, Feng Gao, Tianjin Univ. (China) [8216-29]

A CT-analogous mode for diffuse fluorescence tomography. Xin Wang, Jiao Li, Xi Yi, Linhui Wu, Wenjuan Ma, Wei Zhang, Feng Gao, Tianjin Univ. (China) [8216-30]

CT-analogous method for high-resolution fluorescence molecular tomography. Jiao Li, Feng Gao, Fenghui Li, Limin Zhang, Huijuan Zhao, Tianjin Univ. (China) [8216-31]

Investigations on shape-based reconstruction method for diffuse fluorescence tomography of breast cancer. Linhui Wu, Yiming Lu, Wei Zhang, Xi Yi, Wenjuan Ma, Jiao Li, Xin Wang, Huijuan Zhao, Feng Gao, Tianjin Univ. (China) [8216-32]

Time-domain diffuse fluorescence tomography of CT-analogous scheme: an experimental validation. Feng Gao, Pingping Zhu, Tianjin Univ. (China) [8216-33]

A time-domain noncontact fluorescence tomography system for breast cancer diagnosis. Huijuan Zhao, Hui Guo, Tingting Wang, Feng Gao, Tianjin Univ. (China) [8216-34]

Fluorescence-guided diffusion optical tomography based on wavelet transform and singular value decomposition. Limin Zhang, Wei Zhang, Feng Gao, Jiao Li, Huijuan Zhao, Tianjin Univ. (China) [8216-35]

Development of multimodal microscope combined with confocal imaging and two-photon imaging. Wanhee Chun, Dukho Do, Dae-Gab Gweon, KAIST (Korea, Republic of) [8216-36]

Oriental characterization of fibrillar collagen in histopathological samples by SHG microscopy and Mueller polarimetry. Noé Ortega-Quijano, Univ. de Cantabria (Spain); Bicher H. Haj Ibrahim, Stéphane Bancelin, Marie-Claire Schanne-Klein, Ecole Polytechnique (France); André Nazac, CHU Bicêtre (France); Petr Dokladal, Etienne Decencièrre, Ecole Nationale Supérieure des Mines de Paris (France); José L. Arce-Diego, Univ. de Cantabria (Spain); Antonello De Martino, Ecole Polytechnique (France) [8216-37]

Examination of a demyelinated fiber by action-potential-encoded second-harmonic generation. Xinguang Chen, Zhihui Luo, Hongqin Yang, Yimei Huang, Shusen Xie, Fujian Normal Univ. (China) [8216-38]

Combined intravascular photoacoustic and ultrasound imaging of atheromatous human artery. Wei Wei, Univ. of California, Irvine (USA); Xiang Li, Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8216-39]

Quantitative measurements and longitudinal study of retinal autofluorescence in the ABCA4 knockout mouse using the combined optical coherence tomography and scanning laser ophthalmoscopy. Ali Issaei, Lukasz Szczygiel, Nima Hossein-Javaheeri, Mei Young, Simon Fraser Univ. (Canada); Laurie L. Molday, Robert S. Molday, The Univ. of British Columbia (Canada); Marinko V. Sarunic, Simon Fraser Univ. (Canada) . [8216-40]

Simultaneous dual-band rapidly wavelength-swept laser for real-time endoscopic imaging. Nadir Goulamhousen, Ecole Polytechnique de Montréal (Canada); Mathias Strupler, Sainte-Justine Mother and Child Univ. Hospital Ctr. (Canada) and Ecole Polytechnique de Montréal (Canada); Etienne De Montigny, Ecole Polytechnique de Montréal (Canada); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) and Sainte-Justine Mother and Child Univ. Hospital Ctr. (Canada) [8216-41]

Saturday 21 January

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Endoscopic Microscopy VII

Conference Chairs: **Guillermo J. Tearney**, Wellman Ctr. for Photomedicine (USA); **Thomas D. Wang**, Univ. of Michigan (USA)

Program Committee: **David L. Dickensheets**, Montana State Univ. (USA); **Arthur F. Gmitro**, The Univ. of Arizona (USA); **Ralf Kiesslich**, Johannes Gutenberg Univ. Mainz (Germany); **Francois Lacombe**, Mauna Kea Technologies (France); **Stephen Lam**, The BC Cancer Agency Research Ctr. (Canada); **Hiroshi Mashimo**, VA Boston Healthcare System (USA); **Kenzi Murakami**, Olympus Corp. (Japan); **Norman S. Nishioka**, Massachusetts General Hospital (USA); **Wibool Piyawattanametha**, National Electronics and Computer Technology Ctr. (Thailand); **Mark J. Schnitzer**, Stanford Univ. School of Medicine (USA); **Peter T. C. So**, Massachusetts Institute of Technology (USA); **Melissa J. Suter**, Massachusetts General Hospital (USA)

Sunday 22 January

Keynote Session

Room: 304 (Esplanade) Sun. 8:10 to 8:40 am

Session Chair: **Thomas D. Wang**, Univ. of Michigan (USA)

8:10 am: **Standards in endoscopic microscopy (Invited Paper)**, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) [8217-01]

SESSION 2

Room: 304 (Esplanade) Sun. 8:40 to 10:00 am

Novel Techniques

Session Chair: **Peter T. C. So**, Massachusetts Institute of Technology (USA)

8:40 am: **Fluorescence-based SMC and OCT endoscope**, Richard A. Wall, Jennifer K. Barton, The Univ. of Arizona (USA) [8217-02]

9:00 am: **Development of a wide-field SERS imaging endoscope**, Patrick McVeigh, Univ. of Toronto (Canada); Rupananda Mallia, Israel Veilleux, Univ. Health Network (Canada); Brian Wilson, Univ. of Toronto (Canada) and Univ. Health Network (Canada) [8217-03]

9:20 am: **Self-interference fluorescence microscopy**, Mattijs de Groot, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) [8217-04]

9:40 am: **Compact clinical high-NA multiphoton endoscopy**, Martin Weinigel, Hans G. Breunig, Peter Fischer, Marcel Kellner-Hoefer, Rainer Bückle, Karsten König, JenLab GmbH (Germany) [8217-05]

Coffee Break 10:00 to 10:30 am

SESSION 3

Room: 304 (Esplanade) Sun. 10:30 to 11:50 am

Spectral Encoding

Session Chair: **Dvir Yelin**, Technion-Israel Institute of Technology (Israel)

10:30 am: **Spectrally encoded flow cytometry for high-resolution microscopy of flowing blood cells in vivo**, Lior Golan, Daniella Yeheskely-Hayon, Limor Minai, Dvir Yelin, Technion-Israel Institute of Technology (Israel) [8217-06]

10:50 am: **Esophageal endoscopic probe optics for spectrally encoded confocal microscopy**, DongKyun Kang, Parama Pal, Robert W. Carruth, Simon Schlachter, Brett E. Bouma, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) [8217-07]

11:10 am: **High-speed spectrally encoded confocal microscopy**, Simon Schlachter, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Dongkyun Kang, Parama Pal, Robert W. Carruth, Kevin Woods, Brett Bouma, Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) [8217-08]

11:30 am: **Spectrally encoded confocal microscopy using a multi-mode, large-core optical fiber**, Parama Pal, DongKyun Kang, Simon Schlachter, Robert W. Carruth, Brett E. Bouma, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) [8217-09]

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

SESSION 4

Room: 304 (Esplanade) Sun. 1:30 to 3:10 pm

OCT I

Session Chair: **Guillermo J. Tearney**, Massachusetts General Hospital (USA)

1:30 pm: **Endoscopic probes for combined optical frequency domain imaging and laser ablation therapy**, David L. Arruda, Milen Shishkov, Martin L. Villiger, Benjamin J. Vakoc, Guillermo J. Tearney M.D., Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) [8217-10]

1:50 pm: **Endoscopic probe for in vivo and in situ cellular imaging using full-field optical coherence tomography**, Anne Latrive, A. Claude Boccara, ESPCI - Institut Langevin (France) and LLTech (France) [8217-11]

2:10 pm: **Autoregulation of ciliary beat frequency in swine oviduct ex vivo: a micro-optical coherence tomography study**, Linbo Liu, Wellman Ctr. for Photomedicine (USA); Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) and Harvard-MIT Health Sciences and Technology (USA); Steven M. Rowe, The Univ. of Alabama at Birmingham (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) [8217-12]

2:30 pm: **Endoscopic spectral domain optical coherence tomography of murine colonic morphology to determine effectiveness of chemopreventive and chemotherapeutic agents in colorectal cancer**, Susan LeGendre-McGhee, Photini F. Rice, Justin Klein, Amber Luttmann, Jennifer K. Barton, The Univ. of Arizona (USA) [8217-13]

2:50 pm: **Characterization of sub-squamous intestinal metaplasia (SSIM) pre- and post-radio frequency ablation using three-dimensional optical coherence tomography**, Chao Zhou, Tsung-Han Tsai, Hsiang-Chieh Lee, Massachusetts Institute of Technology (USA); Marisa Figueiredo, Tejas Kirtane, VA Boston Healthcare System (USA); Yuankai K. Tao, Osman A. Ansen, Massachusetts Institute of Technology (USA); Desmond C. Adler, Joseph M. Schmitt, LightLab Imaging LLC (USA); Qin Huang, VA Boston Healthcare System (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA); Hiroshi Mashimo, VA Boston Healthcare System (USA) [8217-14]

Coffee Break 3:10 to 3:40 pm

SESSION 5

Room: 304 (Esplanade) Sun. 3:40 to 5:00 pm

Fluorescence Imaging

Session Chair: **Thomas D. Wang**, Univ. of Michigan (USA)

3:40 pm: **Wide-field near-infrared fluorescence endoscope for real-time in vivo imaging**, Zhongyao Liu, Sharon J. Miller, Bishnu Joshi, Thomas D. Wang M.D., Univ. of Michigan (USA) [8217-15]

4:00 pm: **Development of a miniature fibre-based rotary interstitial probe for live deep brain structures fluorescence imaging**, Joël Crépeau, Yves De Koninck, Daniel Côté, Univ. Laval (Canada) [8217-16]

4:20 pm: **MEMS-based hand-held imaging probe for multispectral fluorescence lifetime imaging**, Sebina Shrestha, Chih-Hsien Huang, Jesung Park, Javier A. Jo, Jun Zou, Brian E. Applegate, Texas A&M Univ. (USA) [8217-17]

4:40 pm: Targeted detection of murine colonic dysplasia in vivo with flexible multispectral scanning fiber endoscopy, Bishnu Joshi, Sharon J. Miller, Univ. of Michigan (USA); Cameron Lee, Univ. of Washington (USA); Adam Gustad, Univ. of Michigan (USA); Eric J. Seibel, Univ. of Washington (USA); Thomas D. Wang M.D., Univ. of Michigan (USA) [8217-18]

Conference 8217 · Room: 304 (Esplanade)

Posters - Sunday

Room: 103 (Exhibit Level)Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday 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 at <http://spie.org/x27476.xml/a>.

2D resonant in-plane MEMS scanner for dual-axes confocal microendoscope, Haijun Li, Zhen Qiu, Zhongyao Liu, Choong-Ho C. Rhee, Kenn Oldham, Katsuo Kurabayashi, Thomas D. Wang M.D., Univ. of Michigan (USA) [8217-26]

Study of tactile endoscope using silicone rubber membrane based on image processing, Kenji Yamada, Osaka Univ. (Japan); Hideya Takahashi, Osaka City Univ. (Japan); Toshiaki Nagakura, Ken Ishihara, Yuko Ohno, Osaka Univ. (Japan) [8217-27]

Monday 23 January

SESSION 6

Room: 304 (Esplanade) Mon. 8:40 to 10:00 pm

OCT II

Session Chair: **Melissa J. Suter**, Massachusetts General Hospital (USA)

8:40 pm: **Correction of astigmatism in endoscopic OCT for esophageal and coronary imaging**, Tianshi Wang, Erasmus MC (Netherlands); Antonius F. W. van der Steen, Erasmus MC (Netherlands) and Interuniversity Cardiology Institute of The Netherlands (Netherlands); Gijs van Soest, Erasmus MC (Netherlands) [8217-19]

9:00 pm: **Transnasal OFDI catheter for unsedated gastrointestinal imaging**, Michalina Gora, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Emmanuel Coron, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Univ. Hospital, Nantes (France); Kevin Gallagher, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Brett E. Bouma, Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard-MIT Health Science and Technology (USA) [8217-20]

9:20 pm: **Wide-field of view OCT needle probe**, Bryden C. Quirk, Rodney W. Kirk, Peter B. Noble, Robert A. McLaughlin, David D. Sampson, The Univ. of Western Australia (Australia) [8217-21]

9:40 pm: **Scanning fiber optic endomicroscope with precise focal-spot localization**, Kartikeya Murari, Wenxuan Liang, Yuying Y. Zhang, Jiefeng Xi, Xingde D. Li, The Johns Hopkins Univ. (USA) [8217-22]

Coffee Break 10:00 to 10:30 am

SESSION 7

Room: 304 (Esplanade) Mon. 10:30 to 11:30 am

Confocal Microscopy

Session Chair: **Arthur F. Gmitro**, The Univ. of Arizona (USA)

10:30 am: **Confocal microlaparoscope for imaging the fallopian tube**, Tzu-Yu Wu, Rachel Schafer, Andrew R. Rouse, Arthur F. Gmitro, Univ. of Arizona (USA) [8217-23]

10:50 am: **Vertical cross-sectional imaging by handheld dual-axes confocal microscope**, Zhen Qiu, Zhongyao Liu, Choong-Ho C. Rhee, Haijun Li, Kenn Oldham, Katsuo Kurabayashi, Thomas D. Wang M.D., Univ. of Michigan (USA) [8217-24]

11:10 am: **Novel peptide for in vivo confocal imaging of neoplasia in the esophagus**, Matthew B. Sturm, Bishnu Joshi, Danielle K. Turgeon, Henry D. Appelman, Thomas D. Wang M.D., Univ. of Michigan (USA) [8217-25]

Courses of Related Interest

SC1051 Fundamentals of Microscope Design (Seward) Wednesday, 8:30 am to 12:30 pm

SC978 Light Microscopy (Tkaczyk) Sunday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XII

Conference Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

Program Committee: **James P. Clarkin**, Polymicro Technologies, A Subsidiary of Molex Incorporated (USA); **Ilko K. Ilev**, U.S. Food and Drug Administration (USA); **Jin Ung Kang**, The Johns Hopkins Univ. (USA); **Karl-Friedrich Klein**, Technische Hochschule Mittelhessen (Germany); **Pierre Lucas**, The Univ. of Arizona (USA); **Yuji Matsuura**, Tohoku Univ. (Japan)

Saturday 21 January

SESSION 1

Room: 238 (Mezzanine)..... Sat. 8:30 to 10:30 am

Session Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

8:30 am: **Investigation of tapered silver/silver halide coated hollow glass waveguides for the transmission of CO₂ laser radiation**, Carlos M. Bledt III, James A. Harrington, Rutgers, The State Univ. of New Jersey (USA); Saiko Kino, Yuji Matsuura, Tohoku Univ. (Japan); Jason M. Kriesel, Opto-Knowledge Systems, Inc. (USA) [8218-01]

8:50 am: **Microsphere chain fiber tips for multimode filtering of erbium:YAG laser beam during contact tissue ablation**, Thomas Hutchens, Arash Darafsheh, The Univ. of North Carolina at Charlotte (USA); Howard S. Ying M.D., The Johns Hopkins Univ. (USA); Vasily N. Astratov, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8218-02]

9:10 am: **Uniform polymer-film formation in 100-µm-bore hollow fiber for Er:YAG laser transmission**, Katsumasa Iwai, Masanao Suzuki, Sendai National College of Technology (Japan); Mitsunobu Miyagi, School Corp. of Tohoku Gakuin (Japan); Yi-Wei Shi, Fudan Univ. (China); Yuji Matsuura, Tohoku Univ. (Japan) [8218-03]

9:30 am: **Silica hollow-core photonic crystal fibres for mid-infrared applications**, Artur Ulrich, Robert R. J. Maier, Duncan P. Hand, Heriot-Watt Univ. (United Kingdom); Jonathan Knight, Brian J. Mangan, Univ. of Bath (United Kingdom); Jonathan D. Shephard, Heriot-Watt Univ. (United Kingdom) [8218-04]

9:50 am: **Motion artifact handling of forehead photoplethysmograms using a self-mixing interferometric motion reference**, Ralph Wijshoff, Massimo Mischi, Technische Univ. Eindhoven (Netherlands); Alexander Van der Lee, Pierre Woerlee, Paul Aelen, Niek Lambert, Philips Research (Netherlands); Ronald Aarts, Technische Univ. Eindhoven (Netherlands) [8218-05]

10:10 am: **Picoliter-volume glucose concentration microsensor based on miniature abrupt-tapered Mach-Zehnder interferometer**, Zhi-Zheng Feng, Tsung-Hsun Yang, Nan-Kuang Chen, Yi-Ning Chen, National United Univ. (Taiwan); Yu-Chung Chang, National Changhua Univ. of Education (Taiwan) [8218-06]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: 238 (Mezzanine)..... Sat. 11:00 am to 1:00 pm

Session Chair: **James P. Clarkin**, Polymicro Technologies, A Subsidiary of Molex Incorporated (USA)

11:00 am: **Raman spectral imaging using hollow flexible fiber bundles**, Tatsuhiro Tomiyama, Takashi Katagiri, Yuji Matsuura, Tohoku Univ. (Japan) [8218-07]

11:20 am: **Silver/polystyrene coated hollow glass waveguides for the transmission of visible and infrared radiation**, Carlos M. Bledt III, James A. Harrington, Rutgers, The State Univ. of New Jersey (USA) [8218-08]

11:40 am: **Lifetime prediction for 405-nm single-mode delivery systems for therapeutic laser applications**, Cornell P. Gonschior, Karl-Friedrich Klein, Technische Hochschule Mittelhessen (Germany); Eric J. Seibel, Mark R. Kirshenbaum, Univ. of Washington (USA); Tong Sun, City Univ. London (United Kingdom) [8218-09]

12:00 pm: **Image-guided intervention in the human bile duct using scanning fiber endoscope system**, Eric J. Seibel, Univ. of Washington (USA); Javier A. Jo, Texas A&M Univ. (USA); Charles D. Melville, Richard S. Johnston, Christopher R. Naumann, Michael D. Saunders, Univ. of Washington (USA) [8218-10]

12:20 pm: **Infrared spectral imaging by hollow-optical fiber bundle**, Chenhui Huang, Saiko Kino, Takashi Katagiri, Yuji Matsuura, Tohoku Univ. (Japan) [8218-11]

12:40 pm: **TBD**, Israel Gannot, Tel Aviv Univ. (Israel) [8218-12]

Lunch/Exhibition Break 1:00 to 2:00 pm

SESSION 3

Room: 238 (Mezzanine)..... Sat. 2:00 to 3:20 pm

Session Chair: **Pierre Lucas**, The Univ. of Arizona (USA)

2:00 pm: **Small-diameter hollow waveguides based on silver-clad stainless steel tube for infrared laser light transmission**, Akihito Hongo, Masahiro Ohkawa, Noribumi Shiina, Shinobu Sato, Hitachi Cable, Ltd. (Japan) .. [8218-13]

2:20 pm: **Effects of high humidity and high temperature on failure of optical fiber for high-power delivery**, Xiaoguang Sun, Jie Li, OFS (USA) ... [8218-14]

2:40 pm: **Metal-assisted guided-mode resonance device for biosensing**, Sheng-Fu Lin, Wen-Yih Chen, Jenq-Yang Chang, National Central Univ. (Taiwan) [8218-15]

3:00 pm: **Multilayer silver/dielectric thin-film coated hollow waveguides for sensor and laser power delivery applications**, Carlos M. Bledt III, James A. Harrington, Rutgers, The State Univ. of New Jersey (USA); Jason M. Kriesel, Opto-Knowledge Systems, Inc. (USA) [8218-16]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: 238 (Mezzanine)..... Sat. 3:50 to 5:10 pm

Session Chair: **Jin U. Kang**, The Johns Hopkins Univ. (USA)

3:50 pm: **Microtapered long-period fiber gratings for application to a radiation dosimeter**, Young-Geun Han, Hyun-Joo Kim, Hanyang Univ. (Korea, Republic of); Younghum Ji, Korea Institute of Radiological & Medical Sciences (Korea, Republic of) [8218-17]

4:10 pm: **Design and fabrication of hollow fiber-based Raman tweezers for bioparticle measurement**, Yoshitake Morisaki, Takashi Katagiri, Yuji Matsuura, Tohoku Univ. (Japan) [8218-18]

4:30 pm: **Real-time bio(chemical)sensing with clad etched fiber Bragg grating**, Gurusiddhappa R. Prashanth, Shivananju B. Nanjunda, Sundararajan Asokan, Manoj M. Varma, Indian Institute of Science (India) [8218-20]

4:50 pm: **Highly birefringent terahertz hollow fiber: design, fabrication, and experimental characterization**, Xiao-Li Tang, Yi-Wei Shi, Fudan Univ. (China) [8218-21]

BiOS Hot Topics

Room: 134 (Exhibit Level)..... Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 5

Room: 238 (Mezzanine) Sun. 8:00 to 10:00 am

Session Chair: **Yuji Matsuura**, Tohoku Univ. (Japan)

8:00 am: **Highly efficient excitation and detection of whispering gallery modes in a dye-doped microsphere using a microstructured optical fiber**, Kristopher J. Rowland, Alexandre Francois, Tanya Monro, The Univ. of Adelaide (Australia) [8218-22]

8:20 am: **Label-free DNA biosensor based on double tilted fiber Bragg grating**, Alessandro Candiani, Michele Sozzi, Annamaria Cucinotta, Stefano Selleri, Rosanna Veneziano, Roberto Corradini, Rosangela Marchelli, Univ. degli Studi di Parma (Italy); Paul Childs, Stavros Pissadakis, Foundation for Research and Technology-Hellas (Greece) [8218-23]

8:40 am: **Miniature fiber optic force sensor for vitreoretinal microsurgery based on low-coherence Fabry-Pérot interferometry**, Xuan Liu, Iulian Iordachita, Russell H. Taylor, Jin Ung Kang, The Johns Hopkins Univ. (USA) [8218-24]

9:00 am: **Dispersive Fourier transform using few-mode fibers for real-time and high-speed spectroscopy**, Yi Qiu, Chi Zhang, Kenneth K. Y. Wong, Kevin K. Tsia, The Univ. of Hong Kong (Hong Kong, China) [8218-25]

9:20 am: **Optimal design for hollow fiber inner-coated by dielectric layers with surface roughness**, Bang-Shan Sun, Xiao-Li Tang, Yi-Wei Shi, Fudan Univ. (China); Katsumasa Iwai, Sendai National College of Technology (Japan); Mitsunobu Miyagi, School Corp. of Tohoku Gakuin (Japan) [8218-26]

9:40 am: **Dy:PbGa₂S₄ laser radiation and its delivery by hollow waveguide**, Helena Jelinkova, Michal Nemeč, Czech Technical Univ. in Prague (Czech Republic); Mitsunobu Miyagi, Katsumasa Iwai, Hiroyuki Takaku, Sendai National College of Technology (Japan); Maxim Doroshenko, Tasoltan Basiev, A. M. Prokhorov General Physics Institute (Russian Federation); Valerii Badikov, Dmitri Badikov, Kuban State Technological Univ. (Russian Federation) [8218-27]

Coffee Break 10:00 to 10:20 am

SESSION 6

Room: 238 (Mezzanine) Sun. 10:20 am to 12:40 pm

Session Chair: **Ilko K. Ilev**, U.S. Food and Drug Administration (USA)

10:20 am: **Characterization of atherosclerotic plaque depositions in vivo by fiber optic Raman spectroscopy and ex vivo by FTIR imaging**, Christian Matthäus, Sebastian Dochow, Christoph Krafft, Institut für Photonische Technologien e.V. (Germany); Annika Lattermann, Friedrich-Schiller-Univ. Jena (Germany); Bernhard R. Brehm, Universitätsklinikum Jena (Germany); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany) . . . [8218-28]

10:40 am: **Spectral ATR-sensor with variable pass lengths**, Karl-Friedrich Klein, Corneliu P. Gonschior, Technische Hochschule Mittelhessen (Germany) [8218-29]

11:00 am: **Behavior of polymer cladding materials under extremely high temperatures**, Timothy E. Clark, SSCP USA (USA); Selee Chang, SSCP Co., Ltd. (China); Jung-Hyun Oh, SSCP Co., Ltd. (Korea, Republic of) [8218-30]

11:20 am: **Fiber optic based heart-rate and pulse pressure shape monitor**, Dimitrios Kokkinos, Sunil Dehipawala, Mukhtar Musa, George Tremberger, Jr., Todd Holden, David Lieberman, Tak D. Cheung, Queensborough Community College (USA) [8218-31]

11:40 am: **Force sensing microforceps with integrated fiber Bragg grating for vitreoretinal surgery**, Xingchi He, Marcin Balicki, Jin Ung Kang, Peter Gehlbach, James Handa, Russell H. Taylor, Iulian Iordachita, The Johns Hopkins Univ. (USA) [8218-32]

12:00 pm: **Portable fiber optic ballistocardiogram sensor for home use**, Zhihao Chen, Ju Teng Teo, Soon Huat Ng, Xiufeng Yang, Institute for Infocomm Research (Singapore) [8218-33]

12:20 pm: **A prospective for new mid-infrared medical endoscopy using mid-infrared chalcogenide glass fibres**, Angela B. Seddon, The Univ. of Nottingham (United Kingdom) [8218-34]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

An implantable fiber optic surface plasmon resonance glucose sensor utilizing fiber grating for temperature compensation, Peng Wu, Dachao Li, Jia Yang, Rui Zhu, Kexin Xu, Tianjin Univ. (China) [8218-19]

Courses of Related Interest

SC981 Biomedical Fiber Optic Sensors and Applications (Mendez, McLaughlin) Monday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Biomedical Vibrational Spectroscopy VII: Advances in Research and Industry

Conference Chairs: **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA); **Wolfgang Petrich**, Roche Diagnostics GmbH (Germany)

Program Committee: **Andrew J. Berger**, Univ. of Rochester (USA); **Rohit Bhargava**, Univ. of Illinois at Urbana-Champaign (USA); **Airtion A. Martin**, Univ. do Vale do Paraiba (Brazil); **Michael D. Morris**, Univ. of Michigan (USA); **Dieter Naumann**, Robert Koch-Institut (Germany); **Jürgen Popp**, Institut für Photonische Technologien e.V. (Germany); **Nicholas Stone**, Gloucestershire Royal Hospital (United Kingdom)

Saturday 21 January

SESSION 1

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

Novel Methodologies

Session Chair: **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

1:20 pm: **Combining optoacoustics and resonance Raman spectroscopy for quantification of biomolecules in situ**, Rui Liu, Noriko Satake, Hannover (Germany) [8219-01]

1:40 pm: **High-throughput Raman and surface-enhanced Raman microscopy**, Wei-Chuan Shih, Ji Qi, Univ. of Houston (USA) [8219-02]

2:00 pm: **Multifocal laser tweezers Raman spectroscopy for high-throughput functional analysis of red blood cells**, Rui Liu, Noriko Satake, Dennis L. Matthews, James Chan, NSF Ctr. for Biophotonics Science and Technology (USA) [8219-03]

2:20 pm: **Ultralow-frequency Stokes and anti-Stokes Raman spectroscopy at 785 nm with volume holographic grating filters**, James T. Carriere, Frank Havermeier, Ondax, Inc. (USA) [8219-04]

2:40 pm: **Mid-IR laser-based vibrational circular dichroism spectroscopy**, Marcel Pfeifer, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Steffen Lüdeke, Univ. of Freiburg (Germany); Peer Fischer, Fraunhofer-Institut für Physikalische Messtechnik (Germany) [8219-05]

3:00 pm: **Transmission versus reflection diffraction gratings for detector array based spectrometers**, Romuald Pawluczyk, Arash Rohani, P&P Optica Inc. (Canada) [8219-07]

Coffee Break 3:20 to 3:50 pm

SESSION 2

Room: 226 (Mezzanine). Sat. 3:50 to 5:50 pm

Analysis Methods

Session Chair: **Wolfgang Petrich**, Roche Diagnostics GmbH (Germany)

3:50 pm: **Analyzing near infrared scattering from human skin to monitor changes in hematocrit**, Joseph Chaiken, Bin Deng, Jerry Goodisman, Syracuse Univ. (USA); George Shaheen, Rebecca J. Bussjager, LightTouch Medical, Inc. (USA) [8219-08]

4:10 pm: **Multivariate analysis methods for spectroscopic blood analysis**, Michael F. G. Wood, Arash Rohani, Rashid Ghazalah, Romuald Pawluczyk, P&P Optica Inc. (Canada) [8219-09]

4:30 pm: **Univariate and multivariate methods for chemical mapping and imaging of cervical cancer cells**, Shiyamala Duraipandian, Wei Zheng, Zhiwei Huang, National Univ. of Singapore (Singapore) [8219-10]

4:50 pm: **Thinking outside the black box regime: an alternate chemometric prediction framework for minor component quantification in biological Raman spectroscopy**, Narahara Chari Dingari, Ishan Barman, Jeon Woong Kang, Ramachandra R. Dasari, Massachusetts Institute of Technology (USA) [8219-11]

5:10 pm: **Assessing the performance of spectroscopic models for cancer diagnostics using cross-validation and permutation testing**, Gavin R. Lloyd, Joanne C. Hutchings, Catherine A. Kendall, Nicholas Stone, Gloucestershire Hospitals NHS Foundation Trust (United Kingdom) [8219-36]

5:30 pm: **Singlet oxygen induced advanced glycation end product photobleaching of in vivo human fingertip autofluorescence**, Bin Deng, Anabel Simental, Patrick S. Lutz, Syracuse Univ. (USA); George Shaheen, LightTouch Medical, Inc. (USA); Joseph Chaiken, Syracuse Univ. (USA) [8219-12]

BiOS Hot Topics

Room: 134 (Exhibit Level). Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 3

Room: 226 (Mezzanine). Sun. 8:30 to 10:10 am

Cells and Constructs

Session Chair: **Andrew J. Berger**, Univ. of Rochester (USA)

8:30 am: **Classification of Raman spectra of single cells with autofluorescence suppression by modulated wavelength excitation**, Sebastian Dochow, Norbert Bergner, Christoph Krafft, Institut für Photonische Technologien e.V. (Germany); Joachim H. Clement, Universitätsklinikum Jena (Germany); Michael Malizu, Robert F. Marchington, Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany) [8219-13]

8:50 am: **Effect of photodynamic therapy on single cancer cells studied by integrated Raman and angular scattering microscopy**, Dustin W. Shipp, Soumya Mitra, Thomas H. Foster, Andrew J. Berger, Univ. of Rochester (USA) [8219-14]

9:10 am: **Raman study of power-dependent oxygenation state transition of red blood cells in a single-beam optical trap**, Rui Liu, Lena Zheng, Dennis L. Matthews, Noriko Satake, James Chan, NSF Ctr. for Biophotonics Science and Technology (USA) [8219-15]

9:30 am: **Raman spectroscopy of fiber-optically manipulated cells**, Nelson Cardenas, The Univ. of Texas at Arlington (USA); Ishan Barman, Massachusetts Institute of Technology (USA); Bryan Black, The Univ. of Texas at Arlington (USA); Narahara Chari Dingari, Ramachandra R. Dasari, Massachusetts Institute of Technology (USA); Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8219-16]

9:50 am: **Raman spectroscopic analysis of human tissue engineered oral mucosa constructs (EVPOME) perturbed by physical and biochemical methods**, Michael D. Morris, Arindam Ganguly, Mekhala Raghavan, Shiyuhang Kuo, Jacqueline H. Cole, Cynthia L. Marcelo, Stephen E. Feinberg, Univ. of Michigan, Ann Arbor (USA); Kenji Izumi, Niigata Univ. (Japan) [8219-17]

Coffee Break 10:10 to 10:40 am

Conference 8219 · Room: 226 (Mezzanine)

SESSION 4

Room: 226 (Mezzanine) Sun. 10:40 am to 12:00 pm

Cancer Applications

Session Chair: Rohit Bhargava,
Univ. of Illinois at Urbana-Champaign (USA)

10:40 am: **In vivo Raman spectroscopy methods for oral cancers diagnosis**, S. P. Singh, Atul Deshmukh, Pankaj Chaturvedi, C. Murali Krishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India) [8219-18]

11:00 am: **Assessment of fibre-optic near-infrared Raman spectroscopy for diagnosis of early oesophageal neoplasia**, L. M. Almond, Joann Hutchings, Catherine A. Kendall, J. Day, Neil Shepherd, Gloucestershire Hospitals NHS Foundation Trust (United Kingdom); Hugh Barr M.D., Nicholas Stone, Gloucestershire Royal Hospital (United Kingdom) [8219-37]

11:20 am: **Detection of malignant lesions in vivo in the upper gastrointestinal tract using image-guided Raman endoscopy**, Mads Sylvest Bergholt, Wei Zheng, Lin Kan, National Univ. of Singapore (Singapore); Khek Yu Ho, Ming Teh, National Univ. of Singapore (Singapore) and National Univ. Hospital (Singapore); Khay Guan Yeoh, National Univ. of Singapore (Singapore); Jimmy Bok Yan So, National Univ. of Singapore (Singapore) and National Univ. Hospital (Singapore); Zhiwei Huang, National Univ. of Singapore (Singapore) [8219-20]

11:40 am: **Rapid intra-operative analysis of human brain tumor tissue with infrared spectroscopy**, Allison L. Stelling, Technische Univ. Dresden (Germany); Matthias Kirsch, Kathrin D. Geiger, Ortrud Uckerman, Univ. Hospital, Technische Univ. Dresden (Germany); Holger Cramm, Gerald Steiner, Technische Univ. Dresden (Germany) [8219-21]

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

SESSION 5

Room: 226 (Mezzanine) Sun. 1:20 to 3:40 pm

Non-Cancer Applications

Session Chair: Michael D. Morris, Univ. of Michigan (USA)

1:20 pm: **Raman spectroscopy of bone infections in diabetic foot wounds**, Karen A. Esmonde-White, Univ. of Michigan Medical School (USA); Francis W. Esmonde-White, Karen Flannagan, Univ. of Michigan (USA); Crystal Holmes, Univ. of Michigan Medical School (USA); Michael D. Morris, Univ. of Michigan (USA); Blake J. Roessler, Univ. of Michigan Medical School (USA) [8219-22]

1:40 pm: **Transcutaneous monitoring of steroid-induced osteoporosis with Raman spectroscopy**, Jason R. Maher, Hani A. Awad, Andrew J. Berger, Univ. of Rochester (USA) [8219-23]

2:00 pm: **Development of Raman spectroscopy for discrimination of inflammatory bowel disease**, Isaac J. Pence, Daniel Balikov, David Schwartz, Xiaohong Bi, Alan Herline, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [8219-24]

2:20 pm: **High-resolution mid-infrared imaging for disease diagnosis**, Michael J. Walsh, David Mayerich, Univ. of Illinois at Urbana-Champaign (USA); Andre Kajdacsy-Balla, Univ. of Illinois at Chicago (USA); Rohit Bhargava, Univ. of Illinois at Urbana-Champaign (USA) [8219-25]

2:40 pm: **Raman spectroscopy: an effective method of detecting biochemical changes of the pregnant cervix**, Elizabeth Vargis, Charles N. Webb, Kent Williams, Kelly Bennett, Jeff Reese, Vanderbilt Univ. (USA); Ayman Al-Hendy, Meharry Medical College (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [8219-26]

3:00 pm: **Vibrational Raman spectroscopic signature from skin and other biofluids in autism spectrum disorder (ASD): biomarkers in early diagnosis and prevention**, Nihal DeSilva M.D., Tipu Sultan M.D., Washington Univ. in St. Louis (USA) [8219-27]

3:20 pm: **Toward minimally invasive, continuous glucose monitoring in vivo**, Christian Vrancic, Norbert Gretz, Niels Kröger, Sabine Neudecker, Annemarie Pucci, Wolfgang Petrich, Ruprecht-Karls-Universität Heidelberg (Germany) [8219-28]

Coffee Break 3:40 to 4:00 pm

SESSION 6

Room: 226 (Mezzanine) Sun. 4:00 to 6:00 pm

Special Session on

Forensics Application of Vibrational Spectroscopy

Session Chair: Anita Mahadevan-Jansen, Vanderbilt Univ. (USA)

4:00 pm: **Raman chemical imaging of explosive-contaminated fingerprints for forensic attribution** (*Invited Paper*), Augustus W. Fountain III, Ashish Tripathi, Erik D. Emmons, Phillip G. Wilcox, Jason A. Guicheteau, Darren K. Emge, Steven D. Christesen, U.S. Army Edgewood Chemical Biological Ctr. (USA) [8219-38]

4:30 pm: **Infrared microscopy for forensic applications: an emerging technology aided by fundamental optical theory** (*Invited Paper*), Rohit Bhargava, Univ. of Illinois at Urbana-Champaign (USA); Brynmor J. Davis, Creare Inc. (USA); Thomas van Dijk, Vrije Univ. Amsterdam (Netherlands); P. Scott Carney, Univ. of Illinois at Urbana-Champaign (USA) [8219-39]

5:00 pm: **Raman spectroscopy offers a great potential for nondestructive confirmatory identification of body fluid traces** (*Invited Paper*), Vitali Sikirzhyski, Aliaksandra Sikirzhyskaya, Gregory McLaughlin, Aliea Afnan, Univ. at Albany (USA); Igor K. Lednev, Univ. of Pittsburgh (USA) [8219-40]

5:30 pm: **Forensic science perspectives for blood identification with Raman scattering** (*Invited Paper*), Samantha J. Boyd, Sarah Seashols, Virginia Commonwealth Univ. (USA); Dexian Ye, Rensselaer Polytechnic Institute (USA); Massimo F. Bertino, Virginia Commonwealth Univ. (USA) [8219-41]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

Identification of paracoccidioides brasiliensis by gold nanoprobes, Leandro J. Raniero, Maiara L. Castilho, Maria A. G. Cardoso, Renata A. Canevari, Airton A. Martin, Univ. do Vale do Paraíba (Brazil) [8219-29]

A rheumatoid arthritis study by Fourier transform infrared spectroscopy, Carolina S. Carvalho, Ana Carla A. Silva, Tatiano J. P. S. Santos, Airton A. Martin, Univ. do Vale do Paraíba (Brazil); Luis E. C. Andrade, Univ. Federal de São Paulo (Brazil); Leandro J. Raniero, Univ. do Vale do Paraíba (Brazil) [8219-30]

Biochemical differentiation of mycelium and yeast forms of paracoccidioides brasiliensis by Fourier transform infrared spectroscopy, Maiara L. Castilho, Geraldo M. Alves de Abreu, Tatiana G. F. Matos, Univ. do Vale do Paraíba (Brazil); Claudia B. L. Campos, Univ. Federal de São Paulo (Brazil); Airton A. Martin, Leandro J. Raniero, Univ. do Vale do Paraíba (Brazil) [8219-31]

Bucal microbiology analyzed by infrared spectroscopy (FT-IR), Geraldo M. Alves de Abreu, Gislene R. Oliveira, Sônia Khouri, Priscila P. Favero, Leandro J. Raniero, Airton A. Martin, Univ. do Vale do Paraíba (Brazil) [8219-32]

Gold and silver nanostructures for SERS, Madhab Pokhrel, Gangadharan Ajith Kumar, Brian G. Yust, Dhiraj K. Sardar, The Univ. of Texas at San Antonio (USA) [8219-33]

Study of aggressiveness prediction of mammary adenocarcinoma by Raman spectroscopy, Renata Andrade Bitar, Univ. Federal do ABC (Brazil); Airton A. Martin, Univ. do Vale do Paraíba (Brazil); Herculano da Silva Martinho, Univ. Federal do ABC (Brazil); Leandra N. Z. Ramalho, Univ. de São Paulo (Brazil); Arnaldo R. S. Junior, Univ. Federal do ABC (Brazil); Leandro J. Raniero, Univ. do Vale do Paraíba (Brazil); Fernando Silva Ramalho, Univ. de São Paulo (Brazil) [8219-34]

Low cost substrates for Raman spectroscopy, Olivia J. Cornell, Rohit Bhargava, Univ. of Illinois at Urbana-Champaign (USA); Bradford G. Clay, bioMérieux Industry (USA); Ron Robinson, bioMérieux, Inc. (USA) [8219-35]

Optical Biopsy X

Conference Chair: **Robert R. Alfano**, The City College of New York (USA) Conference Co-Chair: **Stavros G. Demos**, Lawrence Livermore National Lab. (USA)

Program Committee: **Stefan Andersson-Engels**, Lund Univ. (Sweden); **Christopher H. Contag**, Stanford Univ. School of Medicine (USA); **Jason M. Eichenholz**, Ocean Optics, Inc. (USA); **Amir H. Gandjbakhche**, National Institutes of Health (USA); **Israel Gannot**, Tel Aviv Univ. (Israel); **Xiao Hui Ni**, Harvard Univ. (USA); **Yang Pu**, The City College of New York (USA); **Kestutis Sutkus**, The City College of New York (USA); **Urs Utzinger**, The Univ. of Arizona (USA); **Wubao Wang**, The City College of New York (USA); **Siavash Yazdanfar**, GE Global Research (USA)

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Tuesday 24 January

SESSION 1

Room: 124 (Exhibit Level) Tues. 8:00 to 10:00 am

Scanning, Diffuse Reflectance, and Hyper-Spectral Imaging

Session Chair: **Wubao Wang**, The City College of New York (USA)

8:00 am: **Screening prostate cancer using a portable near infrared scanning imaging unit with an optical fiber-based rectal probe**, Yang Pu, Wubao Wang, Guichen Tang, Yury Budansky, Mikhail Sharonov, The City College of New York (USA); Min Xu, Fairfield Univ. (USA); Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA); James A. Eastham, Memorial Sloan-Kettering Cancer Ctr. (USA); Robert R. Alfano, The City College of New York (USA) [8220-01]

8:20 am: **Angular domain spectroscopic imaging for breast cancer margin assessment after lumpectomy**, Fartash Vasefi, Lawson Health Research Institute (Canada); Mohamadreza Najiminaini, Simon Fraser Univ. (Canada); Astrid Chamson-Reig, Muriel Brackstone, Lawson Health Research Institute (Canada); Bozena Kaminska, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) [8220-02]

8:40 am: **Diffuse reflectance imaging: a tool for guided biopsy**, J. L. Jayanthi, Subhash Narayanan, Ctr. for Earth Science Studies (India); Stephen Manju, Government Dental College, Thiruvananthapuram (India); G. U. Nisha, Ctr. for Earth Science Studies (India); V. T. Beena, Government Dental College, Thiruvananthapuram (India) [8220-03]

9:00 am: **Statistical image analysis of neo-adjuvant chemotherapy monitoring with diffuse optical tomography**, David R. Busch, Univ. of Pennsylvania (USA); Regine Choe, Univ. of Rochester (USA); Saurav Pathak, Univ. of Pennsylvania (USA); Turgut Durduran, ICFO - Institut de Ciències Fotòniques (Spain); Wensheng Guo, Mark A. Rosen M.D., Arjun G. Yodh, Univ. of Pennsylvania (USA) [8220-04]

9:20 am: **Quantification of scattering and absorption coefficients of oral mucosa with hyperspectral imaging and Monte Carlo modeling**, Hsiang-Chen Pi, Yi-Shan Li, Te-Yu Tseng, Hsi-Hsun Chen, Chun-Yu Chen, Kung-Bin Sung, National Taiwan Univ. (Taiwan) [8220-05]

9:40 am: **Analysis of soft tissue near-infrared spectra under dynamic pressure effects**, Blaž Cugmas, Franjo Pernuš, Boštjan Likar, Univ. of Ljubljana (Slovenia) [8220-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 124 (Exhibit Level) Tues. 10:30 am to 12:00 pm

Pump-Probe and Time-Resolved Imaging

Session Chair: **Stavros G. Demos**, Lawrence Livermore National Lab. (USA)

10:30 am: **Pump-probe imaging of melanoma**, Warren S. Warren, Duke Univ. (USA) [8220-07]

11:10 am: **Time-resolved optical biopsy spectroscopy of normal, benign, and malignant tissues**, Vadivel Masilamani, King Saud Univ. (Saudi Arabia); Jeff Secor, Bidyut B. Das, The City College of New York (USA); Mohamad Al Salhi, King Saud Univ. (Saudi Arabia); Suad Bint Amer, King Faisal Specialist Hospital & Research Ctr. (Saudi Arabia); Danny Rabah, K. Farhat, Princess Johara Al-Ibrahim Ctr. for Cancer Research (Saudi Arabia); Robert R. Alfano, The City College of New York (USA) [8220-08]

11:30 am: **Fluorescence lifetime techniques for tissue diagnosis: challenges and solutions (Invited Paper)**, Laura Marcu, Univ. of California, Davis (USA) [8220-09]

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

SESSION 3

Room: 124 (Exhibit Level) Tues. 1:30 to 5:20 pm

Diagnostic Spectroscopy and Endoscopy

Session Chair: **Warren S. Warren**, Duke Univ. (USA)

1:30 pm: **Clinical requirements for optical imaging in medical robotics (Invited Paper)**, Jonathan Sorger, Intuitive Surgical, Inc. (USA) [8220-10]

2:00 pm: **In vivo imaging of bladder cancer using prototype endoscope-adaptable system providing parallel RGB and NIR autofluorescence image acquisition**, Stavros G. Demos, Lawrence Livermore National Lab. (USA); Michael C. Jacobson, Ralph W. deVere White, UC Davis Medical Ctr. (USA) [8220-11]

2:20 pm: **Correction for melanin absorption in a two-layer skin model using an artificial neural network in the spatial frequency domain**, Dmitry Yudovsky, Anthony J. Durkin, Univ. of California, Irvine (USA) [8220-12]

2:40 pm: **An intraoperative probe combining positron detection and OCT imaging for ovarian cancer detection and characterization**, Yi Yang, Tianheng Wang, Nrusingh C. Biswal, Patrick D. Kumavor, Univ. of Connecticut (USA); Xiaohong Wang, Mozafareddin Karimeddini, John Vento, Melinda Sanders, Molly Brewer, Univ. of Connecticut Health Ctr. (USA); Qing Zhu, Univ. of Connecticut (USA) [8220-13]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Evaluating limb ischemia using a non-invasive multimodal spectroscopic system (Invited Paper)**, Rajiv Luthra, Nicole J. Crane, Naval Medical Research Ctr. (USA); Eric A. Elster, Naval Medical Research Ctr. (USA) and Walter Reed National Medical Ctr. (USA) and Uniformed Services Univ. Health Sciences (USA) [8220-14]

4:00 pm: **Fluorescence anisotropy characterization of oral tissues**, Sivabalan Shanmugam, Anna Univ. Chennai (India); Dornadula Koteeswaran, Meenakshi Ammal Dental College & Hospital (India); Kulandaivel Muthuvelu, Stanley Medical College and Hospital (India); Ganesan Bharanidharan, Prakasa Rao Aruna, Anna Univ. Chennai (India); Chilakapati Muralikrishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India); Singaravelu Ganesan, Anna Univ. Chennai (India) [8220-15]

4:20 pm: **Fibre optic fluorescence spectroscopy for monitoring fish freshness**, Jih-Wu Wu, Shou-Chia Chu, Tzu-Chien Hsiao, Hung-Hsi Hu, National Chiao Tung Univ. (Taiwan) [8220-16]

Conference 8220 · Room: 124 (Exhibit Level)

4:40 pm: **Compact Stokes shift and fluorescence spectroscopic diagnostics ratiometer unit with no moving parts for cancer detection**, Laura A. Sordillo, Yury Budansky, Robert R. Alfano, The City College of New York (USA) [8220-17]

5:00 pm: **Spectral grading and Gleason index of malignant prostate tissue using optical biopsy fluorescence and Stokes shift**, Mohamad Al Salhi, Vadivel Masilamani, King Saud Univ. (Saudi Arabia); Danny Rabah, K. Farhat, Princess Johara Al-Ibrahim Ctr. for Cancer Research (Saudi Arabia); Cheng-Hui Liu, Yang Pu, Robert R. Alfano, The City College of New York (USA) . . [8220-18]

Wednesday 25 January

SESSION 4

Room: 124 (Exhibit Level) Wed. 8:00 to 10:00 am

Multi-Modal Spectroscopy and Imaging for Cancer Detection I

Session Chair: **Singaravelu Ganesan**, Anna Univ. Chennai (India)

8:00 am: **Terahertz imaging of nonmelanoma skin cancers** (*Invited Paper*), Cecil S. Joseph, Univ. of Massachusetts Lowell (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) and Massachusetts General Hospital (USA); Victor A. Neel, Massachusetts General Hospital (USA); Thomas M. Goyette, Robert H. Giles, Univ. of Massachusetts Lowell (USA) [8220-19]

8:30 am: **Breast biopsy guidance with OCT: an in vivo study in a mouse model of breast cancer**, Nicusor V. Iftimia, Mircea Mujat, Daniel X. Hammer, Physical Sciences Inc. (USA) [8220-20]

8:50 am: **Use of Mueller polarimetric imaging for early detection of uterine cervix cancer**, Angelo Pierangelo, Sandeep Manhas, Maria Rosaria Antonelli, Tatiana Novikova, Antonello De Martino, Ecole Polytechnique (France); Abdelali Benali, Pierre Validire, Henri Cohen, Institut Mutualiste Montsouris (France); André Nazac, CHU Bicêtre (France) [8220-21]

9:10 am: **Advances in optogenetics**, Karl Deisseroth, Stanford Univ. [8220-22]

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 124 (Exhibit Level) Wed. 10:30 am to 12:00 pm

Multi-modal Spectroscopy and Imaging for Cancer Detection II

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

10:30 am: **Discovery in translation: near-infrared fluorescence imaging** (*Invited Paper*), Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA) [8220-23]

11:00 am: **Multimodal optical imaging for detecting breast cancer**, Rakesh Patel, Univ. of Massachusetts Lowell (USA); Ashraf Khan M.D., UMass Memorial Medical Ctr. (USA); Dennis J. Wirth, Univ. of Massachusetts Lowell (USA); Michal Kamionek M.D., Robert Quinlan M.D., UMass Memorial Medical Ctr. (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) . . . [8220-24]

11:20 am: **A dual-modality imaging approach to early diagnosis of cancer in a hamster cheek pouch model**, Paritosh Pande, Sebina Shrestha, Jesung Park, Javier A. Jo, Texas A&M Univ. (USA); Irma Gimenez-Conti, Jimi L. Brandon, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Brian E. Applegate, Texas A&M Univ. (USA) [8220-25]

11:40 am: **Monitoring the morphochemistry of laryngeal carcinoma by multimodal imaging**, Tobias Meyer, Friedrich-Schiller-Univ. Jena (Germany); Christoph Krafft, Institut für Photonische Technologien e.V. (Germany); Orlando Guntinas-Lichius, Universitätsklinikum Jena (Germany); Benjamin Dietzek, Friedrich-Schiller-Univ. Jena (Germany); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany) [8220-26]

Lunch Break 12:00 to 1:30 pm

SESSION 6

Room: 124 (Exhibit Level) Wed. 1:30 to 3:00 pm

Optical Tissue and Body Liquid Biopsy

Session Chair: **Yang Pu**, The City College of New York (USA)

1:30 pm: **Profiling wound healing with wound effluent: Raman spectroscopic indicators of infection** (*Invited Paper*), Nicole J. Crane, Rajiv Luthra, Naval Medical Research Ctr. (USA); Eric A. Elster, Naval Medical Research Ctr. (USA) and Walter Reed National Medical Ctr. (USA) and Uniformed Services Univ. of Health Sciences (USA) [8220-27]

2:00 pm: **Fluorescence emission and excitation spectroscopic characterization of blood plasma protein**, Prakasa Rao Aruna, Sivabalan Shanmugam, Anna Univ. Chennai (India); Kulandaivel Muthuvelu, Stanley Medical College and Hospital (India); Ganesan Bharanidharan, Anna Univ. Chennai (India); Dornadula Koteeswaran, Meenakshi Ammal Dental College & Hospital (India); Chilakapati Muralikrishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India); Singaravelu Ganesan, Anna Univ. Chennai (India) [8220-28]

2:20 pm: **Synchronous luminescence spectroscopic characterization of urine of normal and cancerous patients**, Rajasekaran Ramu, Yuvaraj Manoharan, Anna Univ. Chennai (India); Kulandaivel Muthuvelu, Stanley Medical College and Hospital (India); Dornadula Koteeswaran, Meenakshi Ammal Dental College & Hospital (India); Thamilkumar T., Dr. Rai Memorial Cancer Institute (India); Ganesan Bharanidharan, Prakasa Rao Aruna, Anna Univ. Chennai (India); Chilakapati Muralikrishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India); Singaravelu Ganesan, Anna Univ. Chennai (India) . . . [8220-29]

2:40 pm: **Time-resolved fluorescence spectroscopic characteristics of normal and cancerous blood**, Yuvaraj Manoharan, Udayakumar Kannappan, Anna Univ. Chennai (India); JayanthKumar Vadivel, Meenakshi Ammal Dental College & Hospital (India); Sripriya Suresh, Arignar Anna Memorial Cancer Hospital (India); Dornadula Koteeswaran, Meenakshi Ammal Dental College & Hospital (India); Kulandaivel Muthuvelu, Stanley Medical College and Hospital (India); Chidambaranathan Pravada, Sathyabama Deemed Univ. (India); Ganesan Bharanidharan, Prakasa Rao Aruna, Anna Univ. Chennai (India); Chilakapati Muralikrishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India); Singaravelu Ganesan, Anna Univ. Chennai (India) . . . [8220-30]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: 124 (Exhibit Level) Wed. 3:30 to 4:10 pm

Advanced Optical Biopsy

Session Chair: **Stavros G. Demos**, Lawrence Livermore National Lab. (USA)

3:30 pm: **Novel ratiometric imaging techniques and 280-nm-excited autofluorescence for improved visualization of adenocarcinoma in human colon specimens**, Timothy Renkoski, Logan Graves, Urs Utzinger, Vassiliki L. Tsikitis M.D., Nathaniel S. Rial, Piyush Tiwari M.D., Hemanth Gavini M.D., Bhaskar Banerjee M.D., The Univ. of Arizona (USA) [8220-31]

3:50 pm: **Time-resolved picosecond fluorescence spectroscopy for cancer detection in human breast tissues**, Yang Pu, The City College of New York (USA); Asima Pradhan, Indian Institute of Technology Kanpur (India); Guichen Tang, C.-H. Liu, Bidyut B. Das, Robert R. Alfano, The City College of New York (USA) [8220-32]

PANEL DISCUSSION

Room: 124 (Exhibit Level) Wed. 4:10 to 5:00 pm

Tools for Advanced Optical Biopsy

Panel Moderator: **Stavros G. Demos**, Lawrence Livermore National Lab. (USA)

Panelists: **Ken Kaufmann**, Hamamatsu
Jason Eichenholz, Ocean Optics
Slavash Yazdanfar, GE
Joanthan Sorger, Intuitive Surgical
Luiz B. Da Silva, Therative Inc.

POSTERS - WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 pm

Conference attendees are invited to attend the 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 at <http://spie.org/x27476.xml>.

Optical spectroscopic characteristics of lactate and mitochondrion as new biomarkers in cancer diagnosis: understanding Warburg effect, Cheng-Hui Liu, Xiao Hui Ni, Yang Pu, Yu Long Yang, Feng Zhou, Robert Zuzolo, Wubao Wang, The City College of New York (USA); Vadivel Masilamani, King Saud Univ. (Saudi Arabia); Asif Rizwan, Weill Cornell Medical College (USA); Robert R. Alfano, The City College of New York (USA) [B220-34]

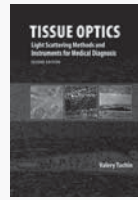
Improving the accuracy of quantifying epithelial scattering coefficient in a two-layered tissue model by using a beveled fiber bundle probe, Hsi-Hsun Chen, Yi-Shan Li, Hsiang-Chen Pi, Chun-Yu Chen, Kung-Bin Sung, National Taiwan Univ. (Taiwan) [B220-33]

Photonics West maps:

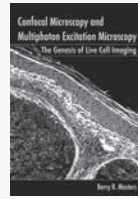
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BIOS

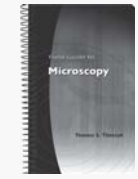
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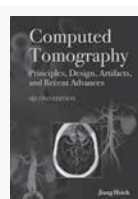
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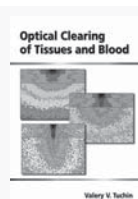
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BIOS

Optical Interactions with Tissue and Cells XXIII

Conference Chairs: **E. Duco Jansen**, Vanderbilt Univ. (USA); **Robert J. Thomas**, Air Force Research Lab. (USA)

Program Committee: **Randolph D. Glickman**, The Univ. of Texas Health Science Ctr. at San Antonio (USA); **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **Duncan J. Maitland**, The Texas A&M Univ. System (USA); **Jessica C. Ramella-Roman**, The Catholic Univ. of America (USA); **William P. Roach**, U.S. Air Force (USA); **Marissa N. Rylander**, Virginia Polytechnic Institute and State Univ. (USA); **Alfred Vogel**, Univ. zu Lübeck (Germany); **Lihong V. Wang**, Washington Univ. in St. Louis (USA); **Gerald J. Wilmink**, Air Force Research Lab. (USA)

Monday 23 January

SESSION 1

Room: 238 (Mezzanine) Mon. 8:00 to 10:00 am

Photothermal Interactions

Session Chair: **E. Duco Jansen**, Vanderbilt Univ. (USA)

8:00 am: **Optical and laser treatments: What now? What next?** (*Invited Paper*), R. Rox Anderson M.D., Massachusetts General Hospital (USA) [8221-01]

8:30 am: **Nanoparticle supported laser-tissue-soldering for closure of natural orifices for transluminal endoscopic surgery** (*Invited Paper*), Martin Frenz, Serge Bogoni, Univ. Bern (Switzerland); A. Schönächler, Bern Univ. Hospital (USA); Uwe Pielers, Bern Univ. Hospital (Switzerland); Michael Reinert, I. Vaytai, Bern Univ. Hospital (USA); M. Ortner, Univ. Hospital Zürich (USA); B. Dallamagne, Les Hôpitaux Univ. de Strasbourg (France) [8221-02]

9:00 am: **Optical and thermal effects of diode lasers in tissues at 810, 940, and 980 nm with clean and coated fiber tips**, Rudolf M. Verdaasdonk, Albert van der Veen, Martin Visser, Vrije Univ. Medical Ctr. (Netherlands); Vladimir Lemberg, Dmitri Boutousov, BIOLASE Technology, Inc. (USA) [8221-03]

9:20 am: **Comparison of excimer laser angioplasty with long-wavelength laser angioplasty**, Vahid Mosallanejad, Kerman Graduate Univ. of Technology (Iran, Islamic Republic of); Mohamad H. Z. Goharizi, Shahid Bahonar Univ. of Kerman (Iran, Islamic Republic of); Mahboubeh Hajjafar, Arjomand Hospital (Iran, Islamic Republic of); Alireza Bahrampour, Sharif Univ. of Technology (Iran, Islamic Republic of) [8221-04]

9:40 am: **Assessment of thermal lensing in ocular media using an artificial eye**, Erica L. Weber, The Univ. of Texas at Austin (USA) and Consortium Research Fellows Program (USA) and Air Force Research Lab. (USA); Mike Rickman, TASC, Inc. (USA); Andrew K. Dunn, The Univ. of Texas at Austin (USA); Robert J. Thomas, Air Force Research Lab. (USA) [8221-05]

Coffee Break 10:00 to 10:20 am

SESSION 2

Room: 238 (Mezzanine) Mon. 10:20 am to 12:00 pm

Photochemical Interactions

Session Chair: **Randolph D. Glickman**, The Univ. of Texas Health Science Ctr. at San Antonio (USA)

10:20 am: **Fundamental study on photodynamic therapy for atrial fibrillation: effect of photosensitization reaction parameters on myocardial necrosis in vitro**, Emiyu Ogawa, Arisa Ito, Tsunenori Arai, Keio Univ. (Japan) [8221-06]

10:40 am: **NF- κ B activation as a laser biomarker of injury using a transgenic mouse model**, Ginger M. Pockock, Air Force Research Lab. (USA); Adam R. Boretsky, Massoud Motamedi, The Univ. of Texas Medical Branch (USA) [8221-07]

11:00 am: **Biomedical effect in vivo photodissociation of blood oxyhemoglobin**, Mustafa M. Asimov, B.I. Stepanov Institute of Physics (Belarus); Rustam M. Asimov, Sensotronica Ltd. (Belarus); Anatoli N. Rubinov, B.I. Stepanov Institute of Physics (Belarus) [8221-08]

11:20 am: **Optical modulation of astrocyte network using ultrashort pulsed laser**, Jonghee Yoon, Taeyun Ku, Kyuha Chong, Seung-Wook Ryu, Chulhee Choi, KAIST (Korea, Republic of) [8221-09]

11:40 am: **Effect of femtosecond laser radiation on morphofunctional state of neoplasm in vitro**, Dinara Arslanova, Tatyana Gening, Ulyanovsk State Univ. (Russian Federation); Alexei Sisyolyatin, A. M. Prokhorov General Physics Institute (Russian Federation); Tatyana Abakumova, Vyacheslav Svetukhin, Inna Antoneeva, Ulyanovsk State Univ. (Russian Federation) [8221-10]

Lunch Break 12:00 to 1:50 pm

SESSION 3

Room: 238 (Mezzanine) Mon. 1:50 to 3:20 pm

Photomechanical:

Photodisruption and Photomanipulation

Session Chair: **Robert J. Thomas**, Air Force Research Lab. (USA)

1:50 pm: **Femtosecond and nanosecond laser nanosurgery: new perspectives for controlled nonlinear energy deposition exemplified on ophthalmic surgery** (*Invited Paper*), Norbert Linz, Sebastian Freidank, Xiao Xuan Liang, Sebastian Eckert, Univ. zu Lübeck (Germany); Sebastian Faust, Stefan Schwed, SCHWIND eye-tech-solutions GmbH & Co. KG (Germany); Alfred Vogel, Univ. zu Lübeck (Germany) [8221-11]

2:20 pm: **Effect of microsecond pulse length and tip shape on explosive bubble formation of 2.78 μ m Er,Cr:YSGG and 2.94 μ m Er:YAG laser**, Rudolf M. Verdaasdonk, Marja Verleng, Albert van der Veen, Vrije Univ. Medical Ctr. (Netherlands); Vladimir Lemberg, Peter Pham, Werner Landgraf, Dmitri Boutousov, BIOLASE Technology, Inc. (USA) [8221-12]

2:40 pm: **Temperature measurement during Laser Brain Ablation by Thulium fiber Laser**, Burcu Tunç, Murat Gülsoy, Bogaziçi Üniv. (Turkey) [8221-14]

3:00 pm: **Optical properties measurement of the laser-ablated tissues for the combined laser ablation with photodynamic therapy**, Norihiro Honda, Katsunori Ishii, Kunio Awazu, Osaka Univ. (Japan) [8221-15]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: 238 (Mezzanine) Mon. 3:50 to 5:30 pm

Photomechanical: Acoustics and Cellular Response

Session Chair: **Robert J. Thomas**, Air Force Research Lab. (USA)

3:50 pm: **Microtensile test of electrochemically aligned collagen fibres on MEMS device under SHG microscope**, Keisuke Yoshiki, Nobutaka Goami, Takahiro Namazu, Shozo Inoue, Univ. of Hyogo (Japan) [8221-16]

4:10 pm: **Monitoring micrometer-scale deformation of collagenous tissues under controlled mechanical strain using SHG microscopy**, Yannick Goulam Houssen, Ecole Supérieure de Physique et de Chimie Industrielles (France); Ivan Gusachenko, Stéphane Bancelin, Gaël Latour, Viet Tran, Jean-Marc Allain, Marie-Claire Schanne-Klein, Ecole Polytechnique (France) [8221-17]

4:30 pm: **Photomechanical targeting of transvascular drug delivery**, Shunichi Sato, National Defense Medical College (Japan); Kazue Oyama, Japan Self-Defense Force (Japan); Takuya Akiyama, Keio Univ. (Japan); Hiroshi Nawashiro, National Defense Medical College (Japan); Mitsuhiro Terakawa, Keio Univ. (Japan) [8221-18]

4:50 pm: **Human teeth model using photoacoustic frequency response**, Yasser H. El-Sharkawy, Cairo Univ. (Egypt) [8221-19]

5:10 pm: **Photomechanical model of tooth enamel ablation by Er-laser radiation**, Andrey Belikov, Ksenia V. Shatilova, Alexei Skrypnik, Roman Vostryakov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [8221-20]

POSTERS - MONDAY

Room: 103 (Exhibit Level) Mon. 5:30 to 7:30 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, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Simulation the temperature increase in porcine cadaver iris during direct illumination by femtosecond laser pulses, Hui Sun, Univ. of California, Irvine (USA); Nora Hosszafalusi, Semmelweis Univ. (Hungary); Eric Mikula, Univ. of California, Irvine (USA); Tibor Juhasz, LenSx Lasers, Inc. (USA) [8221-50]

Optical study of aligned collagen fiber matrix as anisotropic biological substrate, Cheng Guo, Columbia Univ. (USA) [8221-51]

Optical parameters of turbid media in a new kinetic light propagation model: extraction from diffuse reflectance measurements, Alexander V. Lappa, Artem Kulikovskiy, Anton N. Kulikovskiy, Tamara A. Makarova, Chelyabinsk State Univ. (Russian Federation) [8221-52]

Optical properties measurement of laser coagulated tissues with double integrating sphere and inverse Monte Carlo technique in the wavelength range from 350 to 2100 nm, Kunio Awazu, Norihiro Honda, Takuya Nanjo, Katsunori Ishii, Osaka Univ. (Japan) [8221-53]

Fundamental research in laser Doppler method for cerebral blood flow measurement, Hirofumi Nagano, Mamiko Fujii, Furuyama Taiki, Sophia Univ. (Japan) [8221-54]

Analysis of bacterial growth by spectroscopy and laser reflectometry, Rafael Gallegos, Mary Carmen Peña-Gomar, Gonzalo Viramontes-Gamboa, Univ. Michoacana de San Nicolás de Hidalgo (Mexico) [8221-55]

Delayed photolysis of liposomes: a strategy for the precision timing of bolus drug release using ex vivo photochemical sensitization, Raymond T. Kozikowski, Brian S. Sorg, Univ. of Florida (USA) [8221-56]

Incoherent source angular domain imaging through complex three-dimensional scattering structures, Rongen Cheng, Gary Chiang, Glenn Chapman, Simon Fraser Univ. (Canada) [8221-57]

Determine the optical properties of fibrous biological tissue using anisotropic diffuse model, Ali S. Shuaib, Gang Yao, Univ. of Missouri-Columbia (USA) [8221-58]

Optical diffusion property of cerumen from ear canal and correlation to metal content measured by synchrotron x-ray absorption, Todd Holden, Sumudu Dehipawala, Eric Cheung, Pat Schneider, Sunil Dehipawala, George Tremberger, Jr., Dimitrios Kokkinos, David Lieberman, Tak D. Cheung, Queensborough Community College (USA) [8221-59]

Protection and sensitization of benign and malignant cells against photochemical stress by a naturally occurring compound, Yuan-Hao Lee, Neeru Kumar, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Randolph D. Glickman, The Univ. of Texas Health Science Ctr. at San Antonio (USA) and The Univ. of Texas at San Antonio (USA) [8221-60]

Terahertz spectroscopy of dry, hydrated, and thermally-denatured biological macromolecules, Dawn Lipscomb, Jessica E. Grundt, Air Force Research Lab. (USA); Ibtissam Echchgadda, National Academy of Sciences (USA); Bennett L. Ibey, Marjorie A. Kuipers, Hope T. Beier, Robert J. Thomas, Gerald J. Wilmink, Air Force Research Lab. (USA) [8221-61]

MicroRNA-mediated stress responses in human cells exposed to terahertz radiation, Cesario Z. Cerna, General Dynamics Advanced Information Systems (USA); Jessica E. Grundt, Air Force Research Lab. (USA); Ibtissam Echchgadda, National Academy of Sciences; Bennett L. Ibey, Gerald J. Wilmink, Air Force Research Lab. (USA) [8221-62]

Tuesday 24 January

SESSION 5

Room: 238 (Mezzanine) Tues. 8:00 to 10:00 am

Terahertz Biomedical Imaging Applications

Session Chair: Gerald J. Wilmink, Air Force Research Lab. (USA)

8:00 am: **Cutting-edge terahertz technology and prospect of its application (Invited Paper)**, Masayoshi Tonouchi, Osaka Univ. (Japan) [8221-21]

8:40 am: **Breast cancer tissue diagnosis at terahertz frequencies (Invited Paper)**, Emma Pickwell-MacPherson, Hong Kong Univ. of Science and Technology (Hong Kong, China); Anthony Fitzgerald, Vincent Wallace, The Univ. of Western Australia (Australia) [8221-22]

9:00 am: **Feasibility demonstration of frequency domain terahertz imaging in breast cancer margin determination (Invited Paper)**, Sigrid K. Yngvesson, Univ. of Massachusetts Amherst (USA) [8221-23]

9:20 am: **Terahertz molecular imaging using nanoparticles (Invited Paper)**, Joo-Hiuk Son, The Univ. of Seoul (Korea, Republic of) [8221-24]

9:40 am: **A new chirped-pulse THz method for rapid detection of gas and condensed phase material properties (Invited Paper)**, David F. Plusquellic, Eyal Gerech, Kevin O. Douglass, Julia Scherschligt, Zeeshan Ahmed, Shin G. Chou, National Institute of Standards and Technology (USA) [8221-25]

Coffee Break 10:00 to 10:20 am

SESSION 6

Room: 238 (Mezzanine) Tues. 10:20 to 11:00 am

Terahertz Skin Interactions

Session Chair: Gerald J. Wilmink, Air Force Research Lab. (USA)

10:20 am: **The unexplored avenues of human skin: electromagnetic properties in the sub-THz band (Invited Paper)**, Yuri Feldman, Alexander Puzenko, Paul Ben Ishai, The Hebrew Univ. of Jerusalem (Israel); Andreas Caduff, The Hebrew Univ. of Jerusalem (Israel) and Biovotion AG (Switzerland); Aharon J. Agranat, The Hebrew Univ. of Jerusalem (Israel) [8221-26]

10:40 am: **Terahertz techniques for human skin measurement (Invited Paper)**, Kodo Kawase, Nagoya Univ. (Japan) and RIKEN (Japan); Shin'ichiro Hayashi, RIKEN (Japan) [8221-27]

SESSION 7

Room: 238 (Mezzanine) Tues. 11:00 am to 12:00 pm

Terahertz Spectroscopy and Interactions with Biological Macromolecules

Session Chair: Gerald J. Wilmink, Air Force Research Lab. (USA)

11:00 am: **High-resolution THz spectroscopy of nucleic-acid biomolecules and crystals (Invited Paper)**, Elliott Brown, Wright State Univ. (USA) [8221-29]

11:20 am: **Long-range hydration effect of lipid membrane studied by terahertz time-domain spectroscopy (Invited Paper)**, Koichiro Tanaka, Mafumi Hishida, Kyoto Univ. (Japan) [8221-28]

11:40 am: **Using terahertz radiation for the non-contact control and selective stimulation of biological responses**, Gerald J. Wilmink, Jessica E. Grundt, Air Force Research Lab. (USA); Caesario Cerna, Ibtissam Echchgadda, National Academy of Sciences (USA); Caleb C. Roth, General Dynamics Advanced Information Systems (USA); Dawn Lipscomb, Michael L. Doroski, Jason A. Payne, Bennett L. Ibey, Air Force Research Lab. (USA) [8221-30]

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

SESSION 8

Room: 238 (Mezzanine) Tues. 1:20 to 3:10 pm

Spectroscopy, Transport, and Imaging I

Session Chair: Jessica C. Ramella-Roman, The Catholic Univ. of America (USA)

- 1:20 pm: **Influence of optical properties on sampling depth of laser speckle contrast imaging** (*Invited Paper*), Andrew K. Dunn, The Univ. of Texas at Austin (USA) [8221-31]
- 1:50 pm: **Depolarization of light in biological tissues: affect the polarization state by flow and estimation of flow rates**, Dror Fixler, Zeev Zalevsky, Bar-Ilan Univ. (Israel) [8221-32]
- 2:10 pm: **Parametric imaging of tissue pathology based on optical properties measured with optical coherence tomography**, Blake R. Klyen, Loretta Scolaro, David D. Sampson, The Univ. of Western Australia (Australia) [8221-33]
- 2:30 pm: **Fast computation of optical coherence tomography signal using an importance sampling-based Monte Carlo method**, Ivan T. Lima, Jr., Anshul Kalra, North Dakota State Univ. (USA); Hugo E. Hernández-Figueroa, Univ. Estadual de Campinas (Brazil); Sherif S. Sherif, Univ. of Manitoba (Canada) [8221-34]
- 2:50 pm: **A hybrid method for fast Monte Carlo simulation of diffuse reflectance from a multi-layered tissue model with tumor-like heterogeneities**, Caigang Zhu, Quan Liu, Nanyang Technological Univ. (Singapore) [8221-35]
- Coffee Break 3:10 to 3:40 pm

SESSION 9

Room: 238 (Mezzanine) Tues. 3:40 to 5:20 pm

Spectroscopy and Optical Properties

Session Chair: Robert Thomas, Air Force Research Lab. (USA)

- 3:40 pm: **Coherent Raman scattering for localized thermal mapping**, Hope T. Beier, Air Force Research Lab. (USA); Gary D. Noojin, TASC, Inc. (USA); Benjamin A. Rockwell, Air Force Research Lab. (USA) [8221-36]
- 4:00 pm: **Extracting scattering coefficient and anisotropy factor of tissue using optical coherence tomography**, Niloy Choudhury, Michigan Technological Univ. (USA); Steven L. Jacques, Oregon Health & Science Univ. (USA) [8221-37]
- 4:20 pm: **Study of Fourier transform infrared spectra of cockroach nervous tissue and chitin**, Vijay H. Ghadage, Baburaoji Gholap College (India); Gauri Rajendra Kulkarni, Sudha Vasant Bhoraskar, Univ. of Pune (India) [8221-38]
- 4:40 pm: **Optical parameters of embedded abnormalities in tissues as determined by Monte Carlo simulation**, J. B. Jeeva, Megha Singh, VIT Univ. (India) [8221-39]
- 5:00 pm: **Analysis of the influences of biological variance, measurement error, and uncertainty on retinal photothermal damage threshold studies**, David Wooddell, C. Schubert-Kabban, R. Hill, Air Force Institute of Technology (USA) [8221-40]

Wednesday 25 January

SESSION 10

Room: 238 (Mezzanine) Wed. 8:00 to 10:20 am

Spectroscopy, Transport, and Imaging II

Session Chair: Robert Thomas, Air Force Research Lab. (USA)

- 8:00 am: **CUDA-MPI-FDTD implementation of Maxwell's equations in general dispersive media**, Mohammad R. Zunoubi, Kirtland Air Force Base (USA); Jason A. Payne, Air Force Research Lab. (USA); William P. Roach, Kirtland Air Force Base (USA) [8221-63]
- 8:20 am: **Optical property change of blood on an optical window boundary by 660-nm band laser irradiation**, Mei Takahashi, Arisa Ito, Tsunenori Arai, Keio Univ. (Japan) [8221-41]
- 8:40 am: **Determining light distribution in human head using 3D Monte Carlo simulations**, Christoph Böcklin, Dirk Baumann, Jürg Fröhlich, ETH Zurich (Switzerland) [8221-42]
- 9:00 am: **Monte Carlo simulation of fluorescence imaging of microvasculature**, Mitchell A. Davis, Arnold D. Estrada, Adrien Ponticorvo, Andrew K. Dunn, The Univ. of Texas at Austin (USA) [8221-43]
- 9:20 am: **Fluorescence angular domain imaging of skin tissue phantoms using intralipid-infused solids**, Rongen Cheng, Michael Phang, Rahul Thomas, Nick Pfeiffer, Glenn Chapman, Bozena Kaminska, Simon Fraser Univ. (Canada) [8221-44]
- 9:40 am: **Evaluation of fast avalanche photodiode detectors for early photon diffuse fluorescence tomography**, Mark J. Niedre, Ryan Duross, Northeastern Univ. (USA) [8221-45]
- 10:00 am: **Angle-resolved spectroscopy: a tissue-mimicking phantom study**, Yan Zhang, Simon Fraser Univ. (Canada); Fartash Vasefi, Astrid Chamson-Reig, Lawson Health Research Institute (Canada); Mohamadreza Najjiminaini, Bozena Kaminska, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) [8221-46]

Courses of Related Interest

SC029 Tissue Optics (Jacques) Sunday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Dynamics and Fluctuations in Biomedical Photonics VII

Conference Chairs: **Valery V. Tuchin**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Univ. of Oulu (Russian Federation); **Donald D. Duncan**, Portland State Univ. (USA); **Kirill V. Larin**, Univ. of Houston (USA); **Martin J. Leahy**, National Univ. of Ireland, Galway (Ireland) and National Biophotonics and Imaging Platform Ireland (Ireland) and Royal College of Surgeons (Ireland); **Ruikang Wang**, Univ. of Washington (USA)

Program Committee: **Pierre O. Bagnaninchi**, The Univ. of Edinburgh (United Kingdom); **Wei R. Chen**, Univ. of Central Oklahoma (USA); **Joseph P. Culver**, Washington Univ. in St. Louis (USA); **Ekaterina I. Galanzha**, Univ. of Arkansas for Medical Sciences (USA); **Miya Ishihara**, National Defense Medical College (Japan); **Jingying Jiang**, Tianjin Univ. (China); **Sean J. Kirkpatrick**, Michigan Technological Univ. (USA); **Jürgen M. Lademann**, Charité Universitätsmedizin Berlin (Germany); **Hong Liu**, The Univ. of Oklahoma (USA); **Qingming Luo**, Britton Chance Ctr. for Biomedical Photonics (China); **Igor Meglinski**, Univ. of Otago (New Zealand); **Brian S. Sorg**, Univ. of Florida (USA); **Vladislav Y. Toronov**, Ryerson Univ. (Canada); **Lihong V. Wang**, Washington Univ. in St. Louis (USA); **Ying Yang**, Keele Univ. (United Kingdom); **Anna N. Yaroslavsky**, Univ. of Massachusetts Lowell (USA); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences (USA)

Saturday 21 January

SESSION 1

Room: 274 (Mezzanine) Sat. 8:30 to 11:30 am

Speckle Technologies

Session Chair: **Donald D. Duncan**, Portland State Univ. (USA)

8:30 am: **Phase singularities in speckle patterns for investigating tissue dynamics and flow** (*Invited Paper*), Sean J. Kirkpatrick, Kosar Khaksari, Dennis Thomas, Michigan Technological Univ. (USA); Donald D. Duncan, Portland State Univ. (USA) [8222-01]

9:00 am: **Experimental comparison of perfusion imaging systems using multi-exposure laser speckle, single-exposure laser speckle, and full-field laser Doppler**, Oliver B. Thompson, Evan R. Hirst, Industrial Research Ltd. (New Zealand); Jimmy Bakker, Fredrik Salomonsson, Perimed AB (Sweden); Carla Kloeze, Erwin Hondbrink, Wiendelt Steenberg, Univ. Twente (Netherlands) [8222-02]

9:20 am: **Multi-exposure laser speckle perfusion imaging for retinal blood flow**, Evan R. Hirst, Michael K. Andrews, Oliver B. Thompson, Industrial Research Ltd. (New Zealand) [8222-03]

9:40 am: **Optical viscometry of biological fluids using laser speckle rheology**, Zeinab Hajjarian Kashany, Seemantini K. Nadkarni, Harvard Medical School (USA) [8222-04]

Coffee Break 10:00 to 10:30 am

10:30 am: **Optical speckles of blood proteins embedded in porous glassy substrate**, Todd Holden, Pat Schneider, Sumudu Dehipawala, Nidhi Gadura, Sunil Dehipawala, Dimitrios Kokkinos, George Tremberger, Jr., David Lieberman, Tak D. Cheung, Queensborough Community College (USA) [8222-05]

10:50 am: **Evaluation of algorithms used in tissue perfusion assessment using fast analytical calculation of laser Doppler signals**, Stanislaw Wojtkiewicz, Adam Liebert, Institute of Biocybernetics and Biomedical Engineering (Poland); Herve Rix, Univ. de Nice Sophia Antipolis (France); Roman Maniewski, Institute of Biocybernetics and Biomedical Engineering (Poland) [8222-06]

11:10 am: **Dual-wavelength endoscopic laser speckle contrast imaging system for indicating tissue blood flow and oxygenation**, Lipei Song, Daniel S. Elson, Imperial College London (United Kingdom) [8222-07]

Keynote Presentation

Room: 274 (Mezzanine) Sat. 11:30 am to 12:00 pm

Session Chair: **Valery V. Tuchin**, Univ. of Oulu (Finland) and N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

11:30 am: **The many facets of Raman spectroscopy for innovative biomedical diagnostics**, Jürgen Popp, Friedrich-Schiller Univ. (Germany) and Institut für Photonische Technologien e.V. (Germany) [8222-08]

Lunch 12:00 to 1:30 pm

SESSION 3

Room: 274 (Mezzanine) Sat. 1:30 to 6:00 pm

Tissue and Cell Dynamics

Session Chair: **Martin J. Leahy**, Royal College of Surgeons (Ireland) and National Biophotonics and Imaging Platform (Ireland) and National Univ. of Ireland, Galway (Ireland)

1:30 pm: **Illuminating tissue dynamics with real-time optoacoustic tomography** (*Invited Paper*), Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8222-09]

2:00 pm: **In vivo label-free photoacoustic flow cytometry of circulating clots** (*Invited Paper*), Ekaterina I. Galanzha, Mustafa Sarimollaoglu, Dmitry A. Nedosekin, Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (USA) [8222-10]

2:30 pm: **Absolute flow velocity measurement using spectral-domain optical coherence tomography**, Zhongwei Zhi, Ruikang Wang, Univ. of Washington (USA) [8222-11]

2:50 pm: **Dual-mode label-free methodology for non-invasive imaging of blood and lymphatic vessels**, Vyacheslav Kalchenko, Weizmann Institute of Science (Israel); Igor Meglinski, Univ. of Otago (New Zealand); Yuri Kuznetsov, Alon Harmelin, Weizmann Institute of Science (Israel) [8222-12]

Coffee Break 3:10 to 3:40 pm

3:40 pm: **Optical coherence tomography in quantifying the permeation of human plasma lipoproteins in vascular tissues**, Mohamad G. Ghosn, Baylor College of Medicine (USA); Maleeha Mashiattulla, Univ. of Houston (USA); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Univ. of Oulu (Finland); Joel D. Morrisett, Baylor College of Medicine (USA); Kirill V. Larin, Univ. of Houston (USA) [8222-13]

4:00 pm: **Wavelet-based multifractal analysis of laser biopsy imagery**, Jaidip Jagtap, Indian Institute of Technology Kanpur (India); Sayantan Ghosh, Univ. of KwaZulu-Natal (South Africa); Prasanta K. Panigrahi, Indian Institute of Science Education and Research Kolkata (India); Asima Pradhan, Indian Institute of Technology Kanpur (India) [8222-14]

4:20 pm: **Mitosis detection in 3D tissue culture using tissue dynamics spectroscopy**, Ran An, Kwan Jeong, John J. Turek, David D. Nolte, Purdue Univ. (USA) [8222-15]

4:40 pm: **Dual-beam optical coherence tomography system for quantification of flow velocity in capillary phantoms**, Susan M. Daly, Enock Jonathan, Univ. of Limerick (Ireland); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) and National Biophotonics and Imaging Platform (Ireland) and Royal College of Surgeons (Ireland) [8222-48]

5:00 pm: **Identifying brain cancers using dye-enhanced multimodal confocal imaging**, Dennis J. Wirth, Univ. of Massachusetts Lowell (USA); Matija Snuderl, Harvard Medical School (USA); Sameer A. Sheth, William Curry, Massachusetts General Hospital (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8222-49]

5:20 pm: **Dye-enhanced optical imaging for delineating breast cancer margins**, Rakesh Patel, Univ. of Massachusetts Lowell (USA); Ashraf Khan, Univ. of Massachusetts Medical School (USA); Dennis J. Wirth, Univ. of Massachusetts Lowell (USA); Michal Kamionek M.D., ; Robert Quinlan, Univ. of Massachusetts Medical School (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8222-50]

5:40 pm: **Application of multiphoton tomography for safety assessment of ZnO nanoparticles used in cosmetic products**, Jürgen M. Lademann, Charité Universitätsmedizin Berlin (Germany); Karsten König, Marcel Kellner-Hoefer, Hans G. Breunig, JenLab GmbH (Germany); Wolfgang Werncke, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Martina C. Meinke, Alexa Patzelt M.D., Wolfram Sterry, Maxim E. Darvin M.D., Charité Universitätsmedizin Berlin (Germany) [8222-51]

BIOS Hot Topics
Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm
 Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 4

Room: 274 (Mezzanine) Sun. 8:30 to 11:40 am

Clinical Imaging and Evaluation

Session Chair: Ruikang Wang, Univ. of Washington (USA)

8:30 am: **Intraoperative functional mapping of eloquent brain cortex for minimizing post-operative neurological deficit** (*Invited Paper*), Sameer A. Sheth, Churl-su Kwon, Sarah Bourne, Emad N. Eskandar, Massachusetts General Hospital (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8222-16]

9:00 am: **Real-time, non-invasive assessment of human hematocrit**, Donald D. Duncan, Portland State Univ. (USA); David Fischer, Jerry Myers, NASA Glenn Research Ctr. (USA) [8222-17]

9:20 am: **Ultrasound-resolution image of human skin using optical coherence tomography/optical microangiography**, Zhongwei Zhi, Ruikang Wang, Univ. of Washington (USA) [8222-18]

9:40 am: **In vivo 3D multifunctional imaging of human corneal-scleral limbus with spectral-domain optical coherence tomography**, Peng Li, Tueng Shen, Murray Johnstone, Ruikang Wang, Univ. of Washington (USA) . . [8222-19]

Coffee Break 10:00 to 10:30 am

10:30 am: **In vivo spectral and fluorescence imaging microscopy of tumor microvessel blood supply and oxygenation changes following vascular targeting agent treatment**, Jennifer A. Lee, Dietmar W. Siemann, Raymond T. Kozikowski, Brian S. Sorg, Univ. of Florida (USA). [8222-20]

10:50 am: **Clinical Evaluation of Psoriasis using Optical Coherence Tomography and Raman Spectroscopy**, Marie-Louise O'Connell, Univ. of Limerick (Ireland) [8222-21]

11:10 am: **OCT and 4D microcirculation imaging** (*Invited Paper*), Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) and National Biophotonics and Imaging Platform (Ireland) and Royal College of Surgeons (Ireland) [8222-22]

PANEL DISCUSSION

Room: 274 (Mezzanine) Sun. 11:40 am to 12:20 pm

3D and 4D microcirculation imaging: Where Will the Clinical Impact Be?

Session Chair: Martin J. Leahy, Royal College of Surgeons (Ireland) and National Biophotonics and Imaging Platform (Ireland) and National Univ. of Ireland, Galway (Ireland)

The number of papers on the microcirculation published in physical sciences doubled between 2006 and 2008 representing a jump from the long stable 5% of all microcirculation papers to 20%. This trend continues and means there is an explosion of interest in developing and evaluating new tools to study the microcirculation. Perhaps more than this, it heralds the arrival of 3D and 4D imaging. Biophotonics promises 3D microcirculation imaging at clinically relevant speeds and depths.

In this discussion we will ask questions like:

1. Is 3D microcirculation imaging at depths of several cm really practicable?
2. Why is photoacoustic tomography largely limited to pre-clinical use?
3. Could OCT provide microcirculation imaging at clinically useful depths and speeds?
4. How do we improve the translation of biophotonics solutions from bench to bedside?
5. Does price matter?
6. Where is the market?

Panelists: Ruikang Wang, Univ. of Washington; Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany); Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences; Jessica Ramella-Roman, The Catholic Univ. of America

Lunch 12:20 to 1:30 pm

SESSION 6

Room: 274 (Mezzanine) Sun. 1:30 to 3:20 pm

Functional Imaging and Spectroscopy

Session Chair: Sean J. Kirkpatrick, Michigan Technological Univ. (USA)

1:30 pm: **Functional imaging of freshly isolated pancreatic islets using glucose-evoked intrinsic optical signal response** (*Invited Paper*), Xincheng Yao, Wanxing Cui, Xujing Wang, Yichao Li, Wei Zhang, Rongwen Lu, The Univ. of Alabama at Birmingham (USA) [8222-23]

2:00 pm: **3-dimensional absorption-based chromophore mapping**, Paul M. McNamara, Enock Jonathan, Univ. of Limerick (Ireland); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) and National Biophotonics and Imaging Platform (Ireland) and Royal College of Surgeons (Ireland). . . [8222-24]

2:20 pm: **Signal processing in broadband functional near-infrared spectroscopy**, Irina Schelkanova, Vladislav Y. Toronov, Ryerson Univ. (Canada) [8222-25]

2:40 pm: **Use of circular polarized light for tissue diagnostics: from optical clearing to cancer diagnostics**, Igor Meglinski, Callum Macdonald, Ersin Avci, Han-Seung Yoon, Michael Eccles, Univ. of Otago (New Zealand) [8222-26]

3:00 pm: **Single-wavelength imaging polarimeter based on liquid crystal technology**, James C. Gladish, Donald D. Duncan, Portland State Univ. (USA) [8222-27]

Coffee Break 3:20 to 3:50 pm

SESSION 7

Room: 274 (Mezzanine) Sun. 3:50 to 5:00 pm

Tissue and Cell Mechanical Properties

Session Chair: Kirill V. Larin, Univ. of Houston (USA)

3:50 pm: **Using tissue mechanical properties to improve contrast and image quality in optical coherence tomography** (*Invited Paper*), Brendan F. Kennedy, Kelsey M. Kennedy, Robert A. McLaughlin, David D. Sampson, The Univ. of Western Australia (Australia) [8222-28]

4:20 pm: **Measurement of mechanical properties of individual red blood cells from a sickle cell patient using quantitative phase microscopy**, YongKeun Park, HeeSu Byun, KAIST (Korea, Republic of); John Higgins, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Timothy R. Hillman, Monica Diez-Silva, Ming Dao, Massachusetts Institute of Technology (USA) [8222-29]

4:40 pm: **The study of collagen properties on cellular behavior and the mechanical strength of the formed hydrogel**, Ying Yang, Samantha Wilson, Keele Univ. (United Kingdom); Marie Guilbert, Emilie Millerot-Serruot, Pierre Jeannesson, Univ. de Reims Champagne-Ardenne (France); Josep Sule-Suso, Keele Univ. (United Kingdom); Ganesh D. Sockalingum, Univ. de Reims Champagne-Ardenne (France) [8222-30]

SESSION 8

Room: 274 (Mezzanine) Sun. 5:00 to 6:10 pm

Terahertz Imaging and Impact

Session Chair: Valery V. Tuchin, Univ. of Oulu (Finland) and N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

5:00 pm: **The influence of the hydrogen bonding on THz and Raman spectra of biological molecules** (*Invited Paper*), Alexander P. Shkurinov, Maxim Nazarov, Lomonosov Moscow State Univ. (Russian Federation); Olga P. Cherkasova, Institute of Laser Physics (Russian Federation) . . [8222-31]

5:30 pm: **Characterization of nonmelanoma skin cancers using imaging in the optical and terahertz spectral ranges**, Cecil S. Joseph, Rakesh Patel, Univ. of Massachusetts Lowell (USA); Victor A. Neel, Massachusetts General Hospital (USA); Thomas M. Goyette, Robert H. Giles, Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8222-32]

5:50 pm: **Investigating the effects of terahertz radiation on Bacillus subtilis**, Jillian P. Giles, Brittany J. Carney, Cecil S. Joseph, Mark E. Hines, Robert H. Giles, Univ. of Massachusetts Lowell (USA) [8222-33]

Monday 23 January

POSTERS - MONDAY

Room: 103 (Exhibit Level) Mon. 5:30 to 7:30 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, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Influence of uric acid on non-invasive blood glucose sensing studied with NIR spectroscopy, Jingying Jiang, Lingling Zhang, Tianjin Univ. (China); Kai Zhang, Tianjin Chang Zheng Hospital (China); Kexin Xu, Tianjin Univ. (China) [8222-34]

Mathematical modeling on experimental protocol of glucose adjustment for non-invasive blood glucose sensing, Jingying Jiang, Xiaolin Min, Kexin Xu, Tianjin Univ. (China) [8222-35]

Investigation on how to choose measurement sites for non-invasive near-infrared blood glucose sensing, Jingying Jiang, Da Zou, Kexin Xu, Tianjin Univ. (China) [8222-36]

Monte Carlo simulation on how cholesterol influences measurement of non-invasive blood glucose sensing with NIR spectroscopy, Jingying Jiang, Lingling Zhang, Kexin Xu, Tianjin Univ. (China) [8222-37]

Influence of hemoglobin on non-invasive Bilirubin measurement, Jingying Jiang, Qiliang Gong, Kexin Xu, Tianjin Univ. (China) [8222-38]

Characterization of liquid crystal variable retarder scatter, James C. Gladish, Donald D. Duncan, Portland State Univ. (USA) [8222-39]

Wavelet-based analysis of gastric microcirculation in rats with ulcer bleedings, Alexey N. Pavlov, Mikhail A. Rodionov, Oxana V. Semyachkina-Glushkovskaya, Veronika A. Berdnikova, Yana V. Kuznetsova, Igor A. Semyachkin-Glushkovskij, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) [8222-40]

Oxidase method for glucose determination using long-period grating waveguide, Anton V. Malinin, Anastasiya A. Zanishevskaya, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Yulia S. Skibina, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and LLC SPE Nanostructured Glass Technology (Russian Federation); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Univ. of Oulu (Finland); Igor Y. Silohkin, LLC SPE Nanostructured Glass Technology (Russian Federation) [8222-41]

VIS-NIR spectrum analysis for distinguishing malignant tumor, benign tumor and normal human breast tissue, Yang Zhang, Britton Chance Ctr. for Biomedical Photonics (China); Yuan Yu, Huazhong Univ. of Science and Technology (China); Xiang Wen, Caihua Liu, Jing Wang, Britton Chance Ctr. for Biomedical Photonics (China); Xingbo Xue, Yongjun Chen, Huazhong Univ. of Science and Technology (China); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Univ. of Oulu (Finland); Dan Zhu, Britton Chance Ctr. for Biomedical Photonics (China) [8222-42]

Non-invasive monitoring of vascularization of grafted engineered human oral mucosa, David E. Wolf, Madhavi Seetamraju, Rajan S. Gurjar, Radiation Monitoring Devices, Inc. (USA); Shuihyang Kuo, Anthony Fasi, Stephen E. Feinberg, Univ. of Michigan (USA) [8222-43]

Monitoring effect of dextran on whole blood sedimentation with a pulsed photoacoustic technique, Matti Kinnunen, Univ. of Oulu (Finland) . . [8222-44]

Laser-induced thermal dynamics and temperature localization phenomenon in tissues and cells doped with nanoshells, Alexander N. Yakunin, Institute of Precision Mechanics and Control (Russian Federation); Yuri A. Avetisyan, Institute of Precision Mechanics and Control (Russian Federation) and N.G. Chernyshevsky Saratov State Univ (Russian Federation); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Institute of Precise Mechanics and Control RAS (Russian Federation) and Univ. of Oulu (Finland) [8222-45]

Temporal change of adipose tissue refractive index at photodynamic treatment: in vitro study using OCT, Irina Y. Yanina, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Institute of Precise Mechanics and Control RAS (Russian Federation) and Univ. of Oulu (Finland) [8222-46]

Assessment of transcutaneous vaccine delivery by optical coherence tomography, Tschackad Kamali, Alexander Doronin, Ersin Avci, Teerawan Rattanapak, Sarah Hook, Igor Meglinski, Univ. of Otago (New Zealand) [8222-47]

Photons Plus Ultrasound: Imaging and Sensing 2012

Conference Chairs: **Alexander A. Oraevsky**, TomoWave Labs., Inc. (USA); **Lihong V. Wang**, Washington Univ. in St. Louis (USA)

Program Committee: **Mark A. Anastasio**, Washington Univ. in St. Louis (USA); **Paul Beard**, Univ. College London (United Kingdom); **A. Claude Boccara**, Ecole Supérieure de Physique et de Chimie Industrielles (France); **Gerald J. Diebold**, Brown Univ. (USA); **Charles A DiMarzio**, Northeastern Univ. (USA); **Stanislav Y. Emelianov**, The Univ. of Texas at Austin (USA); **Rinat O. Esenaliev**, The Univ. of Texas Medical Branch (USA); **Martin Frenz**, Univ. Bern (Switzerland); **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **Robert A. Kruger**, OptoSonics, Inc. (USA); **Pai-Chi Li**, National Taiwan Univ. (Taiwan); **Andreas Mandelis**, Univ. of Toronto (Canada); **Vasilis Ntziachristos**, Helmholtz Zentrum München GmbH (Germany); **Matthew O'Donnell**, Univ. of Washington (USA); **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 (USA); **Qifa Zhou**, The Univ. of Southern California (USA); **Quing Zhu**, Univ. of Connecticut (USA)

Sunday 22 January

SESSION 1

Room: 305 (Esplanade) Sun. 8:00 to 10:00 am

Toward Clinical Use I

Session Chairs: **Robert A. Kruger**, OptoSonics, Inc. (USA); **Wiendelt Steenbergen**, Univ. Twente (Netherlands)

8:00 am: **Fast deep-tissue multispectral optoacoustic tomography (MSOT) for preclinical imaging of cancer and cardiovascular disease**, Adrian Taruttis, Daniel Razansky, Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany) [8223-01]

8:15 am: **In vivo imaging of stents using an integrated intravascular ultrasound and photoacoustic imaging catheter**, Andrei B. Karpiouk, Bo Wang, Jimmy L. Su, Douglas E. Yeager, The Univ. of Texas at Austin (USA); James H. Amirian, Richard W. Smalling, The Univ. of Texas Health Science Ctr. at Houston (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8223-02]

8:30 am: **Spectroscopic molecular photoacoustic imaging of sentinel lymph node metastases**, Geoffrey P. Luke, The Univ. of Texas at Austin (USA); Aristarchos Papagiannaros, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Justina O. Tam, The Univ. of Texas at Austin (USA); Konstantin Sokolov, Stanislav Y. Emelianov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) [8223-03]

8:45 am: **Simultaneous in vivo imaging of melanin and lipofuscin in the retina with multimodal photoacoustic ophthalmoscopy**, The Univ. of Southern California (USA); Hao F. Zhang, Northwestern Univ. (USA); Shuliang Jiao, The Univ. of Southern California (USA) [8223-04]

9:00 am: **Photoacoustic imaging of chemotherapy-induced apoptosis in squamous cell carcinoma**, Qihong Yang, Huizhong Cui, Shuang Cai, M. Laird Forrest, Xinmai Yang, The Univ. of Kansas (USA) [8223-05]

9:15 am: **In vivo photoacoustic imaging of breast cancer cellular receptors using multiplex contrast agents**, Carolyn Bayer, Yun-Sheng Chen, Iulia Graf, Geoffrey P. Luke, The Univ. of Texas at Austin (USA); Konstantin Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8223-06]

9:30 am: **Photoacoustic imaging of functional domains in primary motor cortex in Rhesus Macaques**, Janggun Jo, The Univ. of Kansas (USA); Hongyu Zhang, Paul Cheney, The Univ. of Kansas Medical Ctr. (USA); Xinmai Yang, The Univ. of Kansas (USA) [8223-07]

9:45 am: **Photoacoustic and thermoacoustic imaging with a multichannel breast scanner**, Bin Huang, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-08]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 305 (Esplanade) Sun. 10:30 am to 12:00 pm

Toward Clinical Use II

Session Chairs: **Alexander A. Oraevsky**, TomoWave Labs., Inc. (USA); **Quing Zhu**, Univ. of Connecticut (USA)

10:30 am: **Two-dimensional optoacoustic imaging combined with B-mode ultrasound: system evaluation for application in breast cancer detection and diagnostics**, Jason Zalev, Bryan Clingman, Don Herzog, Tom Miller, Seno Medical Instruments, Inc. (USA); Pamela Otto, The Univ. of Texas Health Science Ctr. at Houston (USA); Kenneth Kist, N. Carol Dornbluth, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Sergey Ermilov, Richard Su, Vyacheslav Navvoretzky, Alexander A. Oraevsky, TomoWave Labs., Inc. (USA) [8223-09]

10:45 am: **PAT of the breast using a hemispherical array and rectilinear scanning**, Robert A. Kruger, Richard B. Lam, Daniel Reinecke, Stephen P. DelRio, OptoSonics, Inc. (USA) [8223-10]

11:00 am: **Imaging breast lesions using the Twente Photoacoustic Mammoscope: ongoing clinical experience**, Michelle Heijblom, Univ. Twente (Netherlands) and Medisch Spectrum Twente (Netherlands); Daniele Piras, Wenfeng Xia, Johan van Hespden, Univ. Twente (Netherlands); Frank van den Engh, Joost Klaase, Medisch Spectrum Twente (Netherlands); Ton G. van Leeuwen, Univ. Amsterdam (Netherlands) and Univ. Twente (Netherlands); Wiendelt Steenbergen, Srirang Manohar, Univ. Twente (Netherlands) . . [8223-11]

11:15 am: **Optoacoustic angiography of peripheral vasculature for disease detection and staging**, Mario P. Zamora, Sergey Ermilov, Alexander A. Oraevsky, TomoWave Labs., Inc. (USA) [8223-12]

11:30 am: **Real-time detection of exhaled human breath using quantum cascade laser based sensor technology**, Frank K. Tittel, Rafal Lewicki, Lei Dong, Rice Univ. (USA); Terence H. Risby, The Johns Hopkins Bloomberg School of Public Health (USA); Steven Solga, Tim Schwartz, St. Luke's Hospital (USA) [8223-13]

11:45 am: **Noninvasive optoacoustic system for rapid diagnostics and management of circulatory shock**, Rinat O. Esenaliev, Irene Y. Petrov, Yuriy Y. Petrov, Michael Kinsky, Donald S. Prough, The Univ. of Texas Medical Branch (USA) [8223-14]

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

SESSION 3

Room: 305 (Esplanade) Sun. 1:30 to 3:00 pm

In Vivo Preclinical Imaging

Session Chairs: **Vasilis Ntziachristos**, Helmholtz Zentrum München GmbH (Germany); **William M. Whelan**, Univ. of Prince Edward Island (Canada)

1:30 pm: **Small-animal whole-body imaging using a photoacoustic full-ring array system**, Jun Xia, Muhammad R. Chatni, Rebecca Sohn, Jeffrey M. Arbeit, Mark A. Anastasio, Washington Univ. in St. Louis (USA); Quing Zhu, Univ. of Connecticut (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-15]

1:45 pm: **High-resolution imaging of mouse anatomy and molecular probes by means of multispectral optoacoustic tomography (MSOT)**, Andreas Buehler, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Stefan Morscher, iThera Medical GmbH (Germany); Daniel Razansky, Helmholtz Zentrum München GmbH (Germany); Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany) [8223-16]

2:00 pm: **In vivo imaging with GRIN-lens optical resolution photoacoustic micro-endoscopy**, Parsin Hajireza, Wei Shi, Peng Shao, Alexander Forbrich, Roger J. Zemp, Univ. of Alberta (Canada) [8223-17]

2:15 pm: **Photoacoustic ophthalmology in mouse eyes**, Wei Song, Northwestern Univ. (USA); Shuliang Jiao, The Univ. of Southern California (USA); Hao F. Zhang, Northwestern Univ. (USA) [8223-18]

2:30 pm: **Optoacoustic 3D visualization of changes in physiological properties of mouse tissues from live to postmortem**, Richard Su, Sergey Ermilov, Anton Liopo, Vyacheslav Nadvoretzky, Travis Hernandez, Alexander A. Oraevsky, TomoWave Labs., Inc. (USA) [8223-19]

2:45 pm: **Photoacoustic tomography of the monkey brain using virtual point detectors: experiment**, Liming Nie, Chao Huang, Zijian Guo, Mark A. Anastasio, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-20]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 305 (Esplanade) Sun. 3:30 to 5:45 pm

Quantitative Imaging and Measurements

Session Chairs: **Paul Beard**, Univ. College London (United Kingdom); **Rinat O. Esenaliev**, The Univ. of Texas Medical Branch (USA)

3:30 pm: **In vivo functional and molecular photoacoustic imaging of endogenous and exogenous chromophores using quantitative spectroscopic techniques**, Jan G. Laufer, Benjamin T. Cox, Univ. College London (United Kingdom); Bradley E. Treeby, The Australian National Univ. (Australia); Edward Zhang, Paul Beard, Univ. College London (United Kingdom) [8223-21]

3:45 pm: **Functional photoacoustic microscopy of pH**, Muhammad R. Chatni, Junjie Yao, Amos Danielli, Christopher P. Favazza, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-22]

4:00 pm: **Photoacoustic correlation spectroscopy for in vivo blood flow speed measurement**, Sung-Liang Chen, Univ. of Michigan (USA); Zhixing Xie, Paul L. Carson, Xueding Wang, Univ. of Michigan Medical School (USA); L. Jay Guo, Univ. of Michigan (USA) [8223-23]

4:15 pm: **Blood flow measurements using a pulsed time correlation photoacoustic Doppler technique: accuracy, resolution, and velocity range**, Joanna Bruncker, Paul Beard, Univ. College London (United Kingdom) . [8223-24]

4:30 pm: **Investigations into soft tissue discrimination obtainable in thermoacoustic imaging**, Olumide Ogunlade, Paul Brennan, Paul Beard, Univ. College London (United Kingdom) [8223-25]

4:45 pm: **In vivo imaging of inducible tyrosinase gene expression with an ultrasound array-based photoacoustic system**, Tyler Harrison, Robert J. Paproski, Roger J. Zemp, Univ. of Alberta (Canada) [8223-26]

5:00 pm: **Temperature mapping using photoacoustic and thermoacoustic tomography**, Haixin Ke, 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) [8223-27]

5:15 pm: **In vivo photoacoustic tomography of total blood flow and Doppler angle**, Junjie Yao, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-28]

5:30 pm: **Hemoglobin oxygen saturation measurement in rat retinal vessels by multiwavelength laser-scanning photoacoustic ophthalmoscopy**, Qing Wei, Northwestern Univ. (USA); Shuliang Jiao, The Univ. of Southern California (USA); Hao F. Zhang, Northwestern Univ. (USA) [8223-29]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

Compact fiber-Bragg-grating detector for high-sensitivity ultrasound measurements, Amir Rosenthal, Daniel Razansky, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8223-81]

The study of quantitative optical absorption imaging by using Monte Carlo simulation of combined photoacoustic tomography and ultrasound-modulated optical tomography, Chulhong Kim, Yang Li, Univ. at Buffalo (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-82]

A method for simultaneously estimating acoustic and optical properties of heterogeneous absorber using focused photoacoustic imaging based on Hilbert transform, Zhifang Li, Zhiping Zeng, Hui Li, Fujian Normal Univ. (China) [8223-83]

3D digital acousto-optical coherence tomography, Emilie Benoit, Salma Farahi, Emmanuel Bossy, Francois Ramaz, Ecole Supérieure de Physique et de Chimie Industrielles (France) [8223-84]

Photoacoustic spectral characterization of liquid perfluorocarbon droplets, Eric Strohm, Min Rui, Ryerson Univ. (Canada); Ivan Gorelikov, Naomi Matsuura, Sunnybrook Health Sciences Ctr. (Canada); Michael C. Kolios, Ryerson Univ. (Canada) [8223-85]

Photoacoustic microscopy of myocardial sheet architecture in unfixed and unstained mammalian hearts, Chi Zhang, Ya-Jian Cheng, Da-Kang Yao, Washington Univ. in St. Louis (USA); Samuel A. Wickline M.D., Washington Univ. School of Medicine in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-86]

Photoacoustic sensing of exogeneously delivered contrast agents using high-frequency ultrasonic transducers, Pavel V. Subochev, Roman V. Belyaev, Aleksey R. Katichev, Andrey N. Morozov, Anna G. Orlova, Ilya V. Turchin, Institute of Applied Physics (Russian Federation) [8223-87]

Developing a stochastic model for acousto-optic tissue imaging, Steffen G. Resink, Wiendelt Steenbergen, MIRA Institute for Biomedical Technology and Technical Medicine (Netherlands) [8223-88]

Measuring tissue blood flow using ultrasound modulated diffused light: a preclinical study, Ilan Breskin, Avihai Ron, Noam Racheli, Coby Metzger M.D., Zmira Silman, Moshe Kamar M.D., Asaph Nini M.D., Michal Balberg, Revital Shechter, Ornim Medical Ltd. (Israel) [8223-89]

Drug delivery monitoring by photoacoustic tomography with an ICG encapsulated double emulsion, Xueding Wang, Justin Rajian, Mario Fabilli, J. Brian Fowlkes, Paul L. Carson, Univ. of Michigan Medical School (USA) [8223-90]

An optical resolution photoacoustic dermoscope for port-wine stain imaging, Bin Rao, Washington Univ. in St. Louis (USA); Wangcun Jia, J. Stuart Nelson, Beckman Laser Institute and Medical Clinic (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-91]

Photoacoustic speckles: boundary dependence and experimental validation, Zijian Guo, Zhun Xu, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-92]

Photoacoustic molecular imaging on ferritin as a reporter gene, Seunghan Ha, Andrew Carson, Univ. of Pittsburgh Medical Ctr. (USA); Kang Kim, Univ. of Pittsburgh Medical Ctr. (USA) and Univ. of Pittsburgh (USA) [8223-93]

Photoacoustic tomography of the monkey brain using virtual point detectors: theory, Chao Huang, Robert W. Schoonover, Liming Nie, Zijian Guo, Lihong V. Wang, Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8223-94]

Compensation of shear waves in photoacoustic tomography with layered acoustic media, Robert W. Schoonover, Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8223-95]

Ultrasound-modulated optical tomography using slow light in spectral-hole burning materials, Huiliang Zhang, Harvard Univ. (USA); Mahmood Sabooni, Lars Rippe, Stefan Kröll, Lund Univ. (Sweden); Lihong V. Wang, Washington Univ. in St. Louis (USA); Philip R. Hemmer, Texas A&M Univ. (USA) . . . [8223-96]

Conference 8223 · Room: 305 (Esplanade)

Imaging the ultrasound field and shear-wave propagation using acousto-optic laser speckle contrast analysis (AO-LASCA), Lipei Song, Yi Cheng, Rui Li, Mengxing Tang, Daniel S. Elson, Imperial College London (United Kingdom) [8223-97]

Passive acoustic radiometer for non-invasive monitoring of internal temperature during local laser hyperthermia, Pavel V. Subochev, Institute of Applied Physics (Russian Federation); Marina A. Sirotkina, Nizhny Novgorod State Medical Academy (Russian Federation); Vladimir V. Klin'shov, Anatoly D. Mansfel'd, Institute of Applied Physics (Russian Federation) [8223-98]

Conjugate gradient preconditioning methods with symmetric algebraic reconstruction technique in photoacoustic imaging, Xueyan Liu, Northeastern Univ. (China); Jie Tian, Dong Han, Guodong Li, Institute of Automation (China); Wei Guo, Beijing Univ. of Technology (China); Chenghu Qin, Xibo Ma, Xin Yang, Institute of Automation (China) [8223-99]

Ultrafast ultrasound and photoacoustic co-registered imaging system based on FPGA parallel processing, Umar S. Alqasemi, Hai Li, Andres Aguirre, Quing Zhu, Univ. of Connecticut (USA) [8223-100]

DVD pickup head based optical resolution photoacoustic microscopy, Po-Hsun Wang, Meng-Lin Li, National Tsing Hua Univ. (Taiwan) [8223-101]

Influence of laser pulse width to the photoacoustic temporal waveform and the image resolution with a solid state excitation laser, Kaku Irisawa, Kazuhiro Hirota, Kazuhiro Tsujita, FUJIFILM Corp. (Japan); Takeshi Hirasawa, Miya Ishihara, National Defense Medical College (Japan) [8223-102]

New adaptive beamforming with spatially smoothed coherence factor for photoacoustic imaging, Jeeun Kang, Jin Ho Chang, Yangmo Yoo, Tai-Kyong Song, Sogang Univ. (Korea, Republic of) [8223-103]

Model-based image enhancement in optoacoustic tomography of the mouse brain, Amir Rosenthal, Thomas Jetzfellner, Xosé Luís Deán Ben, Daniel Razansky, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8223-104]

An algorithm for sensing venous oxygenation using ultrasound-modulated light enhanced by microbubbles, Jack E. P. Honeysett, Eleanor Stride, Terence S. Leung, Univ. College London (United Kingdom) [8223-105]

Real-time imaging of renal clearance using multispectral optoacoustic tomography, Stefan Morscher, Neal C. Burton, Adrian Taruttis, Nikolaos C. Deliolanis, Daniel Razansky, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) [8223-106]

Elasticity characterisation in turbid tissue mimicking phantoms by optical tracking of shear waves, Yi Cheng, Rui Li, Daniel S. Elson, Mengxing Tang, Imperial College London (United Kingdom) [8223-107]

On laser-induced ultrasound generated in a thin semi-transparent layered polymer structure, Erika T. Svanström, Torbjörn Löfqvist, Jerker Delsing, Luleå Univ. of Technology (Sweden) [8223-108]

Continuous wavelet-transform analysis of photoacoustic signal waveform to determine optical absorption coefficient, Takeshi Hirasawa, Miya Ishihara, National Defense Medical College (Japan); Kazuhiro Tsujita, Kazuhiro Hirota, Kaku Irisawa, FUJIFILM Corp. (Japan); Manabu Kitagaki M.D., Masanori Fujita M.D., Makoto Kikuchi, National Defense Medical College (Japan) [8223-109]

Functional photoacoustic micro-imaging of rat cerebral hemodynamic response function in single vessels during forepaw electrical stimulation, Lun-De Liao, National Chiao Tung Univ. (Taiwan); You-Yin Chen, National Yang Ming Univ. (Taiwan); Chin-Teng Lin, Jyh-Yeong Chang, National Chiao Tung Univ. (Taiwan); Meng-Lin Li, National Tsing Hua Univ. (Taiwan) [8223-110]

Photoacoustic array imaging of calcifications: phantom study, Yao-You Cheng, Tsai-Chu Hsiao, National Tsing Hua Univ. (Taiwan); Wan-Ting Tien, Shih-Bin Luo, De-Yi Chiou, Industrial Technology Research Institute (Taiwan); Meng-Lin Li, National Tsing Hua Univ. (Taiwan) [8223-111]

Signal recovered from a photoacoustic imaging based on a long-focal-zone transducer, Wenming Xie, Zhiping Zeng, Li Li, Zhifang Li, Hui Li, Fujian Normal Univ. (China) [8223-112]

Single-mode polymer fiber line detector for photoacoustic tomography, Hubert Grün, Thomas Berer, Karoline Felbermayer, RECENDT GmbH (Austria); Günther Paltauf, Karl-Franzens-Univ. Graz (Austria); Peter Burgholzer, RECENDT GmbH (Austria) [8223-113]

Optical detection of photoacoustic waves using phase sensitive low-coherence interferometry, Boris Hermann, Michelle Gabriele Sandrian, Boris Považay, Bernd Hofer, Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8223-114]

Ultrasound-guided photoacoustic image reconstruction, Pieter Kruizinga, Frits Mastik, Erasmus MC (Netherlands); Nico de Jong, Antonius F. W. van der Steen, Erasmus MC (Netherlands) and Interuniversity Cardiology Institute of The Netherlands (Netherlands); Gijs van Soest, Erasmus MC (Netherlands) [8223-115]

Photoacoustic imaging of the near-infrared fluorescent protein iRFP in vivo, Arie Krumholz, Washington Univ. in St. Louis (USA); Grigory S. Filonov, Albert Einstein College of Medicine (USA); Jun Xia, Junjie Yao, Washington Univ. in St. Louis (USA); Vladislav V. Verkhusha, Albert Einstein College of Medicine (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-116]

Image quality assessment using different types of optical diffusers for photoacoustic tomography, Do-Hyun Kim, U.S. Food and Drug Administration (USA); Sanghun Ryu, Dong-Ho Shin, Chul-Gyu Song, Chonbuk National Univ. (Korea, Republic of) [8223-115]

Monday 23 January

SESSION 5

Room: 305 (Esplanade) Mon. 8:00 to 9:45 am

Microscopy

Session Chairs: **Lihong V. Wang**, Washington Univ. in St. Louis (USA); **Qifa Zhou**, The Univ. of Southern California (USA)

8:00 am: **3D high-resolution pure optical photoacoustic microscopy**, Zhixing Xie, Univ. of Michigan Medical School (USA); Sung-Liang Chen, Tao Ling, L. Jay Guo, Univ. of Michigan (USA); Paul L. Carson, Xueding Wang, Univ. of Michigan Medical School (USA) [8223-30]

8:15 am: **In vivo imaging of larvae by photoacoustic microscopy**, Shuoqi Ye, Ran Yang, Jingwei Xiong, Peking Univ. (China); K. Kirk Shung, Qifa Zhou, Univ. of Southern California (USA); Changhui Li, Peking Univ. (China); Qiushi Ren, Peking Univ. (China) and Shanghai JiaoTong Univ. (China) [8223-31]

8:30 am: **Imaging dynamic processes using fiber laser optical-resolution photoacoustic microscopy**, Wei Shi, Parsin Hajireza, Alexander Forbrich, Roger J. Zemp, Univ. of Alberta (Canada) [8223-32]

8:45 am: **Optoacoustic microscopy system based on an off-axis parabolic reflector**, Dmitri Tsybouski, André Conjusteau, Alexander A. Oraevsky, TomoWave Labs., Inc. (USA) [8223-33]

9:00 am: **Multiparameter photoacoustic microscopy of tumor micro-environment**, Song Hu, Washington Univ. in St. Louis (USA); Rebecca Sohn, Zhi-Hong Lu, Washington Univ. School of Medicine in St. Louis (USA); Brian T. Soetikno, Qiaonan Zhong, Junjie Yao, Konstantin I. Maslov, Washington Univ. in St. Louis (USA); Jeffrey M. Arbeit, Washington Univ. School of Medicine in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-34]

9:15 am: **Mosaicing for fast wide-field-of-view optical-resolution photoacoustic microscopy**, Peng Shao, Ryan Chee, Alexander Forbrich, Roger J. Zemp, Univ. of Alberta (Canada) [8223-35]

9:30 am: **A fast multiwavelength-scanning photoacoustic microscope based on a digital mirror device**, Yu Wang, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-36]

Coffee Break 9:45 to 10:15 am

SESSION 6

Room: 305 (Esplanade) Mon. 10:15 am to 12:00 pm

Dual Modality Imaging and Monitoring

Session Chairs: **Martin Frenz**, Univ. Bern (Switzerland); **Stanislav Y. Emelianov**, The Univ. of Texas at Austin (USA)

10:15 am: **Optoacoustic temperature monitoring during HIFU impact on biological tissues: ex-vivo study and numerical simulation of 2D temperature reconstruction**, Ivan M. Pelivanov, Sergey M. Nikitin, Lomonosov Moscow State Univ. (Russian Federation); Tatiana Khokhlova, Univ. of Washington (USA) [8223-37]

10:30 am: **Combined optoacoustic and high-frequency ultrasound imaging of live mouse embryos**, Parag V. Chitnis, Riverside Research Institute (USA); Orlando Aristizábal, New York Univ. School of Medicine (USA); Erwan Filoux, Ashwinkumar Sampathkumar, Jonathan Mamou, Riverside Research Institute (USA); Daniel H. Turnbull, New York Univ. School of Medicine (USA); Jeffrey A. Ketterling, Riverside Research Institute (USA) [8223-38]

10:45 am: **In vivo combined photoacoustic and Doppler ultrasound imaging**, Yan Jiang, Tyler Harrison, Alexander Forbrich, Roger J. Zemp, Univ. of Alberta (Canada) [8223-39]

- 11:00 am: **Functional dual-modality photoacoustic and ultrasonic endoscopy in vivo**, Joon-Mo Yang, Christopher P. Favazza, Washington Univ. in St. Louis (USA); Ruimin Chen, The Univ. of Southern California (USA); Junjie Yao, Xin Cai, Konstantin I. Maslov, Washington Univ. in St. Louis (USA); Qifa Zhou, K. Kirk Shung, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-40]
- 11:15 am: **Optoacoustic generation of high-amplitude focused ultrasound by using carbon-nanotube polymer composite films**, Hyoung Won Baac, Adam Maxwell, Jong G. Ok, Kuang-Wei Lin, Zhen Xu, L. Jay Guo, Univ. of Michigan (USA) [8223-41]
- 11:30 am: **Combined optical-resolution photoacoustic and fluorescence micro-endoscopy**, Peng Shao, Parsin Hajireza, Wei Shi, Roger J. Zemp, Univ. of Alberta (Canada) [8223-42]
- 11:45 am: **Real-time intravascular ultrasound/photoacoustic imaging system with omni-directional light excitation**, Bao-Yu Hsieh, Pai-Chi Li, National Taiwan Univ. (Taiwan) [8223-43]
- Lunch Break 12:00 to 1:30 pm

SESSION 7

Room: 305 (Esplanade) Mon. 1:30 to 5:45 pm

New Methods and Novel Techniques

Session Chairs: A. Claude Boccarda, Ecole Supérieure de Physique et de Chimie Industrielles (France); **Charles A. DiMarzio**, Northeastern Univ. (USA)

- 1:30 pm: **New photoacoustic cell with diamond window cover for mid-infrared investigations on biological samples**, Jonas Kottmann, Julien M. Rey, Markus W. Sigrist, ETH Zurich (Switzerland) [8223-44]
- 1:45 pm: **Time-reversed ultrasonically encoded (TRUE) optical focusing in reflection mode: demonstrations in tissue mimicking phantoms and ex vivo tissue**, Puxiang Lai, Xiao Xu, Honglin Liu, Yuta Suzuki, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-45]
- 2:00 pm: **Non-contact photoacoustic tomography and ultrasonography for biomedical imaging**, Guy Rousseau, Daniel Lévesque, Alain Blouin, Jean-Pierre Monchalain, National Research Council Canada (Canada) [8223-46]
- 2:15 pm: **Flow-dependant photothermal modulation of the photoacoustic response**, Adi Sheinfeld, Avishay Eyal, Tel Aviv Univ. (Israel) [8223-47]
- 2:30 pm: **Multispectral photoacoustic coded excitation using pseudorandom codes**, Martin F. Beckmann, Claus-Stefan Friedrich, Martin P. Mienkina, Nils C. Gerhardt, Martin R. Hofmann, Georg Schmitz, Ruhr-Univ. Bochum (Germany) [8223-48]
- 2:45 pm: **Acoustic reflector combined with optical detection for photoacoustic section imaging**, Robert Nuster, Sibylle Gratt, Klaus Passler, Guenther Paltauf, Karl-Franzens-Univ. Graz (Austria) [8223-49]
- Coffee Break 3:00 to 3:30 pm
- 3:30 pm: **Contactless photoacoustic imaging of biological samples**, Thomas Berer, Armin Hochreiner, Hubert Grün, Peter Burgholzer, RECENDT GmbH (Austria) [8223-50]
- 3:45 pm: **Miniature fiber optic photoacoustic imaging probes for micro-endoscopic applications**, Edward Z. Zhang, Paul Beard, Univ. College London (United Kingdom) [8223-51]
- 4:00 pm: **Vibrational photoacoustic microscopy for deep tissue bond-selective imaging**, Ji-Xin Cheng, Purdue Univ. (USA) [8223-52]
- 4:15 pm: **Frequency domain photoacoustic correlation imaging: novel methodology for non-invasive imaging of biological tissues**, Sergey A. Telenkov, Rudolf Alwi, Univ. of Toronto (Canada); Willa Shi, Emily Chen, Alex I. Vitkin, Ontario Cancer Institute (Canada); Andreas Mandelis, Univ. of Toronto (Canada) [8223-142]
- 4:30 pm: **Real-time photoacoustic imaging with optical ultrasound detection**, Robert Nuster, Guenther Paltauf, Karl-Franzens-Univ. Graz (Austria) [8223-54]
- 4:45 pm: **Novel optoacoustic system for noninvasive, continuous monitoring of cerebral venous blood oxygenation**, Yuriy Y. Petrov, Irene Y. Petrov, Donald S. Prough, Rinat O. Esenaliev, The Univ. of Texas Medical Branch (USA) [8223-55]
- 5:00 pm: **Noninvasive, optoacoustic monitoring of cerebral venous blood oxygenation in newborns**, Irene Y. Petrov, Karon E. Wynne, Yuriy Y. Petrov, Rinat O. Esenaliev, C. Joan Richardson, Donald S. Prough, The Univ. of Texas Medical Branch (USA) [8223-56]

- 5:15 pm: **Impulse-based near-field thermoacoustic tomography of small animals**, Stephan Kellnberger, Daniel Razansky, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8223-57]
- 5:30 pm: **Near-field radio-frequency thermo-acoustic imaging based on transmission lines for optimized performance**, Murad Omar, Stephan Kellnberger, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); George Sergiadis, Aristotle Univ. of Thessaloniki (Greece); Daniel Razansky, Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany) [8223-58]

POSTERS - MONDAY

Room: 103 (Exhibit Level) Mon. 5:30 to 7:30 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, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

- Photoacoustic and ultrasonic image co-registration using a phased array probe and frequency domain correlation processing**, Sergey A. Telenkov, Rudolf Alwi, Univ. of Toronto (Canada); Willa Shi, Emily Chen, Alex I. Vitkin, Ontario Cancer Institute (Canada); Andreas Mandelis, Univ. of Toronto (Canada) [8223-53]
- Photoacoustic tomography of breast phantoms based on a custom-made linear array transducer**, Wenfeng Xia, Daniele Piras, Johan Van Hespren, Wiendelt Steenbergen, Ton G. van Leeuwen, Srirang Manohar, Univ. Twente (Netherlands) [8223-117]
- Detection and characterization of red blood cell (RBC) aggregation with photoacoustics**, Eno Hysi, Ratan K. Saha, Min Rui, Michael C. Kolios, Ryerson Univ. (Canada) [8223-118]
- Optimising the excitation and detection parameters for deep-tissue photoacoustic imaging applications**, Thomas J. Allen, Edward Zhang, Paul Beard, Univ. College London (United Kingdom) [8223-119]
- 3D photoacoustic imaging via staring, sparse approach at 0.7 FPS**, Michael B. Roumeliotis, Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) [8223-120]
- Laser-diode based 10MHz photoacoustic Doppler flowmetry at 830 nm**, Adi Sheinfeld, Avishay Eyal, Tel-Aviv Univ. (Israel) [8223-121]
- Wide-spectral range quantitative photoacoustic spectroscopy to measure non-linear optical absorption of hemoglobin**, Amos Danielli, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-122]
- Monitoring of streptozotocin-induced diabetes in a mouse model by photoacoustic microscopy**, Arie Krumholz, Junjie Yao, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-123]
- Image quality improvement for photoacoustic imaging systems employing linear transducer arrays**, Adam Petschke, Patrick J. La Rivière, The Univ. of Chicago Medical Ctr. (USA) [8223-124]
- Photoacoustic imaging of RF ablations in cardiac tissue**, Richard R. Bouchard, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Luigi Di Base, Andrea Natale, St. David's Medical Ctr. (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) [8223-125]
- Photoacoustic microscopy imaging of spheroids with endogenous and exogenous contrast**, Min Rui, Michael C. Kolios, Ryerson Univ. (Canada) [8223-126]
- 2.5-mm outer diameter photoacoustic endoscopic mini-probe based on highly sensitive PMN-PT ultrasonic transducer**, Joon-Mo Yang, Washington Univ. in St. Louis (USA); Ruimin Chen, The Univ. of Southern California (USA); Christopher P. Favazza, Junjie Yao, Washington Univ. in St. Louis (USA); Qifa Zhou, K. Kirk Shung, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-127]
- A hand-held, low-cost photoacoustic microscopic probe**, Bin Huang, Konstantin I. Maslov, William D. Richard, Lihong V. Wang, David M. Zar, Washington Univ. in St. Louis (USA) [8223-128]
- Tissue-mimicking phantoms for photoacoustic and ultrasonic imaging**, Richard R. Bouchard, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Jason Cook, The Univ. of Texas at Austin (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) and M.D. Anderson Cancer Ctr. (USA) . [8223-129]

Conference 8223 · Room: 305 (Esplanade)

In vivo quantitative evaluation of gold nanocages' kinetics in sentinel lymph nodes by photoacoustic imaging. Xin Cai, Weiyang Li, Washington Univ. in St. Louis (USA); Chulhong Kim, Univ. at Buffalo (USA); Yuchen Yuan, Younan Xia, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-130]

Multiphoton photoacoustic microscopic imaging of fluorescently labeled neuron populations, Gali Sela, Hod Dana, Inbar Brosh, Technion-Israel Institute of Technology (Israel); Daniel Razansky, Helmholtz Zentrum München GmbH (Germany); Shy Shoham, Technion-Israel Institute of Technology (Israel) [8223-131]

Design of an optimum ultrasound pattern to minimize multiple-scattered light reflected from inhomogeneous tissue, Pedro Pereira, Sherif S. Sherif, Univ. of Manitoba (Canada) [8223-132]

Modeling comparison of optical-resolution photoacoustic microscopy and optical coherence tomography, Yan Liu, Chi Zhang, Song Hu, Yuta Suzuki, Zhun Xu, Silvina L. Ferradal, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-133]

Dichroic photoacoustic microscopy of amyloid plaques in a transgenic mouse model, Konstantin I. Maslov, Song Hu, Ping Yan, Jin-Moo Lee, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-134]

Time-resolved transient absorption ultrasonic microscopy measurements of the ground state recovery time, Ryan L. Shelton, Brian E. Applegate, Texas A&M Univ. (USA) [8223-135]

Photoacoustic microscopy of intestinal hemodynamics following massive small bowel resection, Junjie Yao, Washington Univ. in St. Louis (USA); Kathryn J. Rowland, Washington Univ. School of Medicine in St. Louis (USA); Lidai Wang, Konstantin I. Maslov, Washington Univ. in St. Louis (USA); Brad W. Warner, Washington Univ. School of Medicine in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-136]

Molecular probes for imaging of enzyme activity by photoacoustic lifetime imaging (PALI), Ekaterina Morgounova, Qi Shao, Sajeda Abdo, Mickael Wilson, George Barany, Shai Ashkenazi, Univ. of Minnesota, Twin Cities (USA) [8223-137]

Modeling optical phase conjugation of ultrasonically encoded signal utilizing finite-difference time-domain simulations, Joseph L. Hollmann, Charles A. DiMarzio, Northeastern Univ. (USA) [8223-138]

Inducible expression of photoacoustic reporter gene tyrosinase in cells using a single plasmid, Robert J. Paproski, Roger J. Zemp, Univ. of Alberta (Canada) [8223-139]

Characterization of dual-contrast microbubbles for photoacoustic and ultrasound imaging, Robin F. Castellino, Univ. of Toronto (Canada) and Sunnybrook Health Sciences Ctr. (Canada); Amanda L. Martin, Sunnybrook Health Sciences Ctr. (Canada); F. Stuart Foster, Univ. of Toronto (Canada) and Sunnybrook Health Sciences Ctr. (Canada) [8223-140]

Signal-to-noise-ratio scaled coherence weighting for photoacoustic array imaging, Yu-Hsin Wang, Pai-Chi Li, National Taiwan Univ. (Taiwan) . . [8223-141]

Optoacoustic signal characterization of laser heated tissues, Annie Laderoute, Univ. of Prince Edward Island (Canada); Michelle P. Patterson, Univ. of Prince Edward Island (Canada) and Atlantic Veterinary College (Canada); Michael C. Kolios, Ryerson Univ. (Canada); William M. Whelan, Univ. of Prince Edward Island (Canada) and Atlantic Veterinary College (Canada) . . . [8223-143]

Measuring metabolic rate of oxygen with combined photoacoustic microscopy and optical coherent tomography in small animals, Tan Liu, Northwestern Univ. (USA); Shuliang Jiao, The Univ. of Southern California (USA); Hao F. Zhang, Northwestern Univ. (USA) [8223-144]

High-sensitivity polymer inverted-rib optical waveguide interferometric sensor for optoacoustic imaging, Daniel C. Gallego, Horacio Lamela, Univ. Carlos III de Madrid (Spain); Meng Wang, Univ. of Oulu (Finland); Jussi Hiltunen, VTT Technical Research Ctr. of Finland (Finland); Risto Myllylä, Univ. of Oulu (Finland) [8223-145]

PEG-coated gold nanorods conjugated with monoclonal antibodies for preclinical research in optoacoustic imaging and sensing, Anton Liopo, André Conjusteau, Alexander A. Oraevsky, TomoWave Labs., Inc. (USA) [8223-146]

Vessel segmentation analysis of ischemic stroke images acquired with photoacoustic microscopy, Brian T. Soetikno, Song Hu, Washington Univ. in St. Louis (USA); Ernie Gonzales, Washington Univ. School of Medicine in St. Louis (USA); Qiaonan Zhong, Konstantin I. Maslov, Washington Univ. in St. Louis (USA); Jin-Moo Lee, Washington Univ. School of Medicine in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-147]

Numerical simulation based photoacoustic design parameter optimization for deep tissue imaging, Zhaohui Wang, Seung-Han Ha, Univ. of Pittsburgh Medical Ctr. (USA); Kang Kim, Univ. of Pittsburgh Medical Ctr. (USA) and Univ. of Pittsburgh (USA) [8223-148]

Application of laser pulse stretching scheme for efficiently delivering laser energy in photoacoustic imaging, Tianheng Wang, Patrick D. Kumavor, Qing Zhu, Univ. of Connecticut (USA) [8223-149]

Photoacoustic imaging using Porphyrin derivatives as exogenous contrast agents, Akram Abuteen, Saeid Zanganeh, Joshua Akhigbe, Nrusingh C. Biswal, Andres Aguirre, Christian Brückner, Qing Zhu, Univ. of Connecticut (USA) [8223-150]

Investigation of a quantitative photoacoustic tomography fitting procedure on multiple targets in reflection geometry with diffuse optical measurement assistance, Chen Xu, Patrick D. Kumavor, Qing Zhu, Univ. of Connecticut (USA) [8223-151]

Optoacoustic monitoring of cerebral venous blood oxygenation in rats with traumatic brain injury, Karon E. Wynne, Douglas S. Dewitt, Yuriy Y. Petrov, Irene Y. Petrov, Margaret A. Parsley, Rinat O. Esenaliev, Donald S. Prough, The Univ. of Texas Medical Branch (USA) [8223-152]

Integrated scanning confocal photothermal-lens and photoacoustic microscopy, Dmitry A. Nedosekin, Ekaterina I. Galanzha, Robert J. S. Reis, Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (USA) . . . [8223-153]

Quantification of optical absorption coefficient from acoustic spectra in the optical diffusive regime using photoacoustic microscopy, Zijian Guo, Christopher P. Favazza, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-154]

Tuesday 24 January

SESSION 8

Room: 305 (Esplanade) Tues. 8:00 to 9:15 am

Imaging Nanoparticles and Contrast Agents

Session Chairs: **Pai-Chi Li**, National Taiwan Univ. (Taiwan);
Matthew O'Donnell, Univ. of Washington (USA)

8:00 am: **Ultrasound guided spectroscopic photoacoustic imaging for in vivo monitoring of mesenchymal stem cells labeled with nanotracers,** Seung Yun Nam, Laura M. Ricles, Laura J. Suggs, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8223-59]

8:15 am: **Intravascular photoacoustic imaging of gold nanorod-labeled atherosclerotic plaques,** Douglas E. Yeager, Bo Wang, Andrei B. Karpouk, The Univ. of Texas at Austin (USA); James H. Amirian, The Univ. of Texas Health Science Ctr. at Houston (USA); Konstantin Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) and The Univ. of Texas at Austin (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) [8223-60]

8:30 am: **Trapping and dynamic manipulation with magnetomotive photoacoustic imaging of targeted microspheres mimicking metastatic cancer cells trafficking in the vasculature,** Chen-Wei Wei, Jinjun Xia, Univ. of Washington (USA); Ivan M. Pelivanov, Univ. of Washington (Russian Federation); Xiaoge Hu, Xiaohu Gao, Matthew O'Donnell, Univ. of Washington (USA) [8223-61]

8:45 am: **Dual-contrast photoacoustic nanodroplets: in vivo imaging results,** Katheryne E. Wilson, Alexander Hannah, Kimberly Homan, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8223-62]

9:00 am: **In vivo photoacoustic flow cytometry in plants: direct study of nanomaterials uptake and accumulation,** Dmitry A. Nedosekin, Univ. of Arkansas for Medical Sciences (USA); Mariya V. Khodakovskaya, Alexandru S. Biris, Univ. of Arkansas at Little Rock (USA); Ekaterina I. Galanzha, Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (USA) [8223-63]

SESSION 9

Room: 305 (Esplanade) Tues. 9:15 to 10:15 am

Imaging and Sensing at Cellular Level

Session Chairs: **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences (USA)

- 9:15 am: **Photoacoustic cystography**, Chulhong Kim, Mansik Jeon, Univ. at Buffalo (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) . . [8223-64]
- 9:30 am: **Photoacoustic imaging of oxygen release from hemoglobin in single red blood cells in vivo**, Lidai Wang, Lihong V. Wang, Washington Univ. School of Medicine in St. Louis (USA) [8223-65]
- 9:45 am: **Label-free photoacoustic microscopy of cytochrome C in mitochondria**, Chi Zhang, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-66]
- 10:00 am: **In vivo imaging of cell nuclei by photoacoustic microscopy without staining**, Da-Kang Yao, Washington Univ. in St. Louis (USA); Ruimin Chen, The Univ. of Southern California (USA); Konstantin I. Maslov, Washington Univ. in St. Louis (USA); Qifa Zhou, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-67]
- Coffee Break 10:15 to 10:45 am

SESSION 10

Room: 305 (Esplanade) Tues. 10:45 am to 12:00 pm

Signal and Image Processing

Session Chairs: **Mark A. Anastasio**, Washington Univ. in St. Louis (USA); **Andreas Mandelis**, Univ. of Toronto (Canada)

- 10:45 am: **Application of iterative image reconstruction algorithms to three-dimensional optoacoustic tomography**, Kun Wang, Washington Univ. in St. Louis (USA); Alexander A. Oraevsky, TomoWave Labs., Inc. (USA); Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8223-68]
- 11:00 am: **Adapted directivity approach for photoacoustic imaging reconstruction**, Daniele Piras, Wenfeng Xia, Michelle Heijblom, Wiendelt Steenbergen, Univ. Twente (Netherlands); Ton G. van Leeuwen, Univ. Amsterdam (Netherlands) and Univ. Twente (Netherlands); Srirang Manohar, Univ. Twente (Netherlands) [8223-69]
- 11:15 am: **Analysis of the role of shear waves in transcranial photoacoustic tomography**, Robert W. Schoonover, Lihong V. Wang, Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8223-70]
- 11:30 am: **Spatial resolution and sensitivity in photoacoustic tomography taking noise into account: from point-like detectors to large integrating detectors**, Peter Burgholzer, RECENDT GmbH (Austria); Thomas Berer, RECENDT GmbH (Germany); Hubert Grün, RECENDT GmbH (Austria); Robert Nuster, Günther Paltauf, Karl-Franzens-Univ. Graz (Austria) [8223-71]
- 11:45 am: **Sparsity regularized data-space restoration in optoacoustic tomography**, Kun Wang, Washington Univ. in St. Louis (USA); Alexander A. Oraevsky, TomoWave Labs., Inc. (USA); Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8223-72]
- Lunch Break 12:00 to 1:30 pm

SESSION 11

Room: 305 (Esplanade) Tues. 1:30 to 3:00 pm

Ultrasound Modulated Optical Tomography I

Joint Session with Conference 8272

Session Chairs: **Lihong V. Wang**, Washington Univ. in St. Louis (USA); **Philip R. Hemmer**, Texas A&M Univ. (USA)

- 1:30 pm: **Signals, noises, and detection schemes in ultrasonically modulated optical imaging** (*Invited Paper*), François Ramaz, Ecole Supérieure de Physique et de Chimie Industrielles (France); Michel Gross, Univ. Montpellier 2 (France); A. Claude Boccara, Ecole Supérieure de Physique et de Chimie Industrielles (France) [8223-73]
- 1:45 pm: **Ultrasound-modulated optical tomography of biological tissue using spectral-hole burning** (*Invited Paper*), Xiao Xu, Honglin Liu, Washington Univ. in St. Louis (USA); Sri-Rajasekhar Kothapalli, Stanford Univ. (USA); Puxiang Lai, Yuta Suzuki, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-74]

- 2:00 pm: **Creating filters for shot-noise-limited Ultrasound Optical Tomography (UOT)** (*Invited Paper*), Mahmood Sabooni, Lund Univ. (Sweden); Huiliang Zhang, Texas A&M Univ. (USA); Lars Rippe, Lund Univ. (Sweden); Chulhong Kim, Washington Univ. in St. Louis (USA); Stefan Kroll, Lund Univ. (Sweden); Philip Hemmer, Texas A&M Univ. (USA) [8272-12]

- 2:15 pm: **Rare-earth-doped materials with application to optical signal processing, quantum information science, and medical imaging technology** (*Invited Paper*), Rufus L. Cone, Charles W. Thiel, Montana State Univ. (USA); Yongchen Sun, The Univ. of South Dakota (USA); Thomas Böttger, Univ. of California, San Francisco (USA); Roger M. Macfarlane, Montana State Univ. (USA) [8272-13]

- 2:30 pm: **Recent progress in ultrasound-mediated fluorescence** (*Invited Paper*), Baohong Yuan, Yuan Liu, The Univ. of Texas at Arlington (USA) [8223-75]

- 2:45 pm: **The potential of ultrasound-modulated optical sensing in clinical monitoring** (*Invited Paper*), Terence S. Leung, Univ. College London (United Kingdom) [8223-76]

Coffee Break 3:00 to 3:30 pm

SESSION 12

Room: 305 (Esplanade) Tues. 3:30 to 5:30 pm

Ultrasound Modulated Optical Tomography II

Joint Session with Conference 8272

Session Chairs: **Lihong V. Wang**, Washington Univ. in St. Louis (USA); **Philip R. Hemmer**, Texas A&M Univ. (USA)

- 3:30 pm: **Atom like centers in solids for nanophotonic and quantum devices**, Zameer U. Hasan, Temple Univ. (USA) [8272-14]

- 3:45 pm: **Acoustic radiation force assisted ultrasound modulated optical tomography** (*Invited Paper*), Mengxing Tang, Rui Li, Yi Cheng, Christopher W. Dunsby, Robert J. Eckersley, Daniel S. Elson, Imperial College London (United Kingdom) [8223-77]

- 4:00 pm: **Improving signal-to-noise ratio and spatial resolution in ultrasound modulated optical tomography** (*Invited Paper*), Stephen P. Morgan, Haowen Ruan, Nam Trung Huynh, Melissa L. Mather, Diwei He, John Crowe, Felicity R. Rose, Barrie R. Hayes-Gill, The Univ. of Nottingham (United Kingdom) [8223-78]

- 4:15 pm: **Spectral-hole burning techniques for ultrasound-modulated optical tomography** (*Invited Paper*), Huiliang Zhang, Texas A&M Univ. (USA); Mahmood Sabooni, Lars Rippe, Lund Univ. (Sweden); Chulhong Kim, Washington Univ. in St. Louis (USA); Stefan Kroll, Lund Univ. (Sweden); Lihong V. Wang, Washington Univ. in St. Louis (USA); Philip R. Hemmer, Texas A&M Univ. (USA) [8272-15]

- 4:30 pm: **Organic materials for spectral hole burning and non-hole burning narrowband optical filters** (*Invited Paper*), Anshel Gorokhovskiy, College of Staten Island (USA) [8272-16]

- 4:45 pm: **Sound light: rendering photoacoustics fluence-independent by adding acousto-optic modulation** (*Invited Paper*), Wiendelt Steenbergen, Altaf Hussain, Khalid Daoudi, Univ. Twente (Netherlands) [8223-79]

- 5:00 pm: **Efficient high-extendue four-wave mixing in a spectral hole-burning medium** (*Invited Paper*), Byoung S. Ham, Inha Univ. (Korea, Republic of); Philip R. Hemmer, Texas A&M Univ. (USA) [8272-17]

- 5:15 pm: **Non-invasive blood flow measurements using ultrasound modulated diffused light**, Noam Racheli, Avihai Ron, Coby Metzger M.D., Ilan Breskin, Michal Balberg, Revital Shechter, Ornim Medical Ltd. (Israel) . [8223-80]

Seno Medical Best Paper Awards

Room: 305 (Esplanade) Tues. 5:15 to 5:30 pm

Session Chairs: **Alexander A. Oraevsky**, TomoWave Labs., Inc. (USA); **Lihong V. Wang**, Washington Univ. in St. Louis (USA)

Prize donated by: **Seno Medical (USA)**

Courses of Related Interest

- SC029 Tissue Optics (Jacques) Sunday, 1:30 to 5:30 pm
- See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Biophotonics and Immune Responses VII

Conference Chair: **Wei R. Chen**, Univ. of Central Oklahoma (USA)

Program Committee: **Yuncheng Ge**, Beijing Glass Research Institute (China); **Sandra O. Gollnick**, Roswell Park Cancer Institute (USA); **Yueqing Gu**, China Pharmaceutical Univ. (China); **Michael R. Hamblin**, Massachusetts General Hospital (USA); **Tomas Hode**, Immunophotonics, Inc. (USA); **Zheng Huang**, Univ. of Colorado Denver (USA); **Mladen Korbelik**, The BC Cancer Agency Research Ctr. (Canada); **Mark F. Naylor**, The Univ. of Oklahoma (USA); **Karl-Goran Tranberg**, Lund Univ. (Sweden); **Xunbin Wei**, Fudan Univ. (China); **Da Xing**, South China Normal Univ. (China); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences (USA)

Monday 23 January

SESSION 1

Room: 232 (Mezzanine) Mon. 8:30 to 9:50 am

PDT and Immune Responses

Session Chairs: **Mladen Korbelik**,

The BC Cancer Agency Research Ctr. (Canada); **Michael R. Hamblin**, Massachusetts General Hospital (USA)

8:30 am: **Expression of damage-associated molecular patterns in tumors treated by photodynamic therapy**, Mladen Korbelik, The BC Cancer Agency Research Ctr. (Canada) [8224-01]

8:50 am: **Photodynamic therapy can induce non-specific protective immunity against a bacterial infection**, Masamitsu Tanaka, National Defense Medical College (Japan); Pawel Mroz, Tianhong Dai, Massachusetts General Hospital (USA); Manabu Kinoshita, Yuji Morimoto, National Defense Medical College (Japan); Michael R. Hamblin, Massachusetts General Hospital (USA) [8224-02]

9:10 am: **Study of post-PDT markers of topical photosan-mediated photodynamic therapy on DMBA-induced hamster buccal pouch precancerous and cancerous lesions**, Yih-Chih Hsu, Chung Yuan Christian Univ. (Taiwan) [8224-03]

9:30 am: **Induction of immune responses and prevention of UV-induced skin carcinoma by topical photodynamic therapy**, Xiuli Wang, Ting Lv, Hongwei Wang, Fei Miao, Jingjing Li, Shanghai Skin Diseases and STD Hospital (China); Zheng Huang, Univ. of Colorado Denver (USA) [8224-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 232 (Mezzanine) Mon. 10:30 to 11:30 am

In Situ Therapeutic Cancer Vaccine

Session Chairs: **Tomas Hode**, Immunophotonics, Inc. (USA); **Mark F. Naylor**, Dermatology Associates of San Antonio (USA)

10:30 am: **Long-term effects of laser-imiquimod combination in the treatment of late-stage melanoma patients**, Mark F. Naylor, Dermatology Associates of San Antonio (USA); Henry Le, Univ. of Central Oklahoma (USA); Hong Liu, The Univ. of Oklahoma (USA); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (USA); Tomas Hode, Immunophotonics, Inc. (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) [8224-05]

10:50 am: **Laser immunotherapy for the treatment of human breast cancer: 2-year follow-up results**, Tomas Hode, Immunophotonics, Inc. (USA); Orn Adalsteinsson, International Strategic Cancer Alliance (USA); Gabriela L. Ferrel, Hospital Nacional Edgardo Rebagliati Martins (Peru); John A. Lunn, International Strategic Cancer Alliance (USA); Maria Guerra, Immunophotonics, Inc. (USA); Xiaosong Li, Chinese PLA General Hospital (China); Robert E. Nordquist, Immunophotonics, Inc. (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) [8224-06]

11:10 am: **Interstitial laser irradiation for the treatment of metastatic mammary tumors in combination of intratumoral injection of immunoadjuvant**, Wei R. Chen, Chet Joshi, Daniel Figueroa, Kelvin Le, Hong Liu, Univ. of Central Oklahoma (USA); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (USA); Tomas Hode, Immunophotonics, Inc. (USA) [8224-07]

SESSION 3

Room: 232 (Mezzanine) Mon. 11:30 am to 12:10 pm

Monitoring of Phototherapy

Session Chairs: **Zheng Huang**, Univ. of Colorado Denver (USA); **Soumya Mitra**, Univ. of Rochester Medical Ctr. (USA)

11:30 am: **Visualizing the mediators of innate and adaptive host response to photodynamic therapy**, Soumya Mitra, Steven M. Hupcher, Thomas H. Foster, Univ. of Rochester Medical Ctr. (USA) [8224-08]

11:50 am: **Magnetic resonance thermometry using proton resonance frequency method to monitor photothermal effects of interstitial laser irradiation**, Jessica Goddard, Jessnie Jose, Daniel Figueroa, Kelvin Le, Univ. of Central Oklahoma (USA); Hong Liu, The Univ. of Oklahoma (USA); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (USA); Tomas Hode, Immunophotonics, Inc. (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) [8224-09]

Lunch Break 12:10 to 1:30 pm

SESSION 4

Room: 232 (Mezzanine) Mon. 1:30 to 2:50 pm

Novel Detection Techniques

Session Chairs: **Xunbin Wei**, Fudan Univ. (China); **Ekaterina I. Galanzha**, Univ. of Arkansas for Medical Sciences (USA)

1:30 pm: **Circulation times of cancer cells by in vivo flow cytometry**, Xunbin Wei, Jin Guo, Fudan Univ. (China) [8224-10]

1:50 pm: **In vivo high-speed photoacoustic flow cytometry of immune-related cells**, Ekaterina I. Galanzha, Mustafa Sarimollaoglu, Dmitry A. Nedosekin, Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (USA) [8224-11]

2:10 pm: **In-plane Spatial Resolution Measurements of X-ray Tomosynthesis Prototype**, Di Wu, Hui Miao, Yuhua Li, The Univ. of Oklahoma (USA); Xizeng Wu, The Univ. of Alabama at Birmingham (USA); Hong Liu, The Univ. of Oklahoma (USA) [8224-12]

2:30 pm: **An Automatic Scanning Method for High Throughput Microscopic System to Facilitate Medical Genetic Diagnosis: An Initial Study**, Yuchen Qiu, The Univ. of Oklahoma (USA); Xiaodong Chen, Tianjin Univ. (China); Zheng Li, The Univ. of Oklahoma (USA); Wei R. Chen, Univ. of Central Oklahoma (USA); Bin Zheng, Univ. of Pittsburgh Medical Ctr. (USA); Shibo Li, The Univ. of Oklahoma Health Sciences Ctr. (USA); Hong Liu, The Univ. of Oklahoma (USA) [8224-13]

SESSION 5

Room: 232 (Mezzanine) Mon. 2:50 to 3:10 pm

Low-Light Tissue Responses

Session Chairs: **Lars Hode**, Irradia AB (Sweden); **Melville B. Vaughan**, Univ. of Central Oklahoma (USA)

2:50 pm: **Effect of near-infrared lasers on myofibroblast differentiation and contraction**, Melville B. Vaughan, Chelsea Spencer, Jessica Goddard, Wei R. Chen, Univ. of Central Oklahoma (USA) [8224-14]

Coffee Break 3:10 to 4:00 pm

SESSION 6

Room: 232 (Mezzanine) Mon. 4:00 to 5:20 pm

Laser-Nanotechnology

Session Chairs: **Darrell B. Tata**, U.S. Food and Drug Administration (USA); **Wei R. Chen**, Univ. of Central Oklahoma (USA)

4:00 pm: **Cellular internalization of a membrane binding two-photon probe by forming a nanostructure composed of anionic diblock copolymer and cationic surfactant**, Okhil K. Nag, Wei R. Chen, Univ. of Central Oklahoma (USA) [8224-16]

4:20 pm: **Applications of frequency up-converting "rare-earth" nanoparticles in activating photodynamic agents through near-infrared induced visible luminescence: An in-vitro study.**, Darrell B. Tata, U.S. Food and Drug Administration (USA) [8224-17]

4:40 pm: **Imaging caveole-mediated transport of nanoparticles using super-resolution microscopy**, Zhenjia Wang, Chinnaswamy Tirupathi, Richard Minshall, Asrar B. Malik, Univ. of Illinois at Chicago (USA) [8224-18]

5:00 pm: **Thermo responsive polyelectrolyte-gold nanorod composite for NIR-light-triggered controlled release of doxorubicin**, Xuemei Chi, Jie Cao, Shunan Wan, Changli Du, Yueqing Gu, China Pharmaceutical Univ. (China) [8224-19]

Comparison of light dose on topical ALA-mediated photodynamic therapy for DMBA-induced hamster buccal pouch premalignant lesions, Yih-Chih Hsu, Deng-Fu Yang, Meng-Kai Tseng, Chung Yuan Christian Univ. (Taiwan) [8224-27]

Combination therapies in adjuvant with topical ALA-mediated photodynamic therapy for DMBA-induced hamster buccal pouch premalignant lesions, Yih-Chih Hsu, Deng-Fu Yang, Chung Yuan Christian Univ. (Taiwan) [8224-28]

Synthesis of dimeric cyclic RGD based near-infrared probe for in vivo tumor diagnosis, Jie Cao, Shunan Wan, Junmei Tian, Xuemei Chi, Changli Du, Dawei Deng, Yueqing Gu, China Pharmaceutical Univ. (China) [8224-29]

ER β regulates miR-21 expression and inhibits invasion and metastasis in cancer cells, Junmei Tian, Yueqing Gu, Zhenzhen Tu, China Pharmaceutical Univ. (China) [8224-30]

Surface modification of upconversion nanoparticles with amphiphilic chitosan for cancer cell imaging, Sisi Cui, Hongyan Zhu, Junmei Tian, Xuemei Chi, Haiyan Chen, Yueqing Gu, China Pharmaceutical Univ. (China) . . . [8224-31]

Preliminary study of PDT-102 dosimetry in vitro using Singlet Oxygen Sensor Green, Huiyun Lin, Huifen Zheng, Defu Chen, Buhong Li, Shusen Xie, Fujian Normal Univ. (China) [8224-32]

Posters - Monday

Room: 103 (Exhibit Level) Mon. 5:30 to 7:30 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, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Direct laser light enhancement of susceptibility of bacteria to gentamicin antibiotic, Yana Reznick, Ehud Banin, Anat Lipovsky, Rachel Lubart, Zeev Zalevsky, Bar-Ilan Univ. (Israel) [8224-20]

SB203580 enhances the RV-induced loss of mitochondrial membrane potential and apoptosis in A549 cells, Haiyang Li, Xiao-Ping Wang, Jinan Univ. (China); Tong-Sheng Chen, South China Normal Univ. (China) . . . [8224-21]

Artesunate induces AIF-dependent apoptosis in A549 cells, Chenjuan Zhou, Tong-Sheng Chen, South China Normal Univ. (China) [8224-22]

Low-power laser irradiation enhance macrophage phagocytic capacity through Src activation, Feifan Zhou, South China Normal Univ. (China) [8224-23]

Nanoscopy of Protein-protein Interaction in Living Cells by Combination of Bimolecular Fluorescence Complementation, Lingsong Qin, Zhenli Huang, Shaoqun Zeng, Zhihong Zhang, Britton Chance Ctr. for Biomedical Photonics (China) [8224-24]

Time-delayed mathematical model of nonlinear dynamics of interleukin-2 immunotherapy, Georgy S. Terentyuk, Tatiana S. Kondaurva, Nikita M. Ryskin, Irina L. Maksimova, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) [8224-25]

Neutrophils of the patients with cervical cancer after femtosecond laser radiation in vitro, Tatyana Abakumova, Ulyanovsk State Univ. (Russian Federation); Alexei Sysolyatin, A. M. Prokhorov General Physics Institute (Russian Federation); Vyacheslav Svetukhin, Inna Antoneeva, Dinara Arslanova, Sneganna Gening, Ulyanovsk State Univ. (Russian Federation) [8224-26]

Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues X

Conference Chairs: **Daniel L. Farkas**, Cedars-Sinai Medical Ctr. (USA); **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom); **Robert C. Leif**, Newport Instruments (USA) *Conference Co-Chairs:* **James F. Leary**, Purdue Univ. (USA); **J. Paul Robinson**, Purdue Univ. (USA); **Attila Tarnok**, Univ. Leipzig (Germany)

Program Committee: **Vincenza Andrisano**, Univ. degli Studi di Bologna (Italy); **Christopher H. Contag**, Stanford Univ. School of Medicine (USA); **Ewa M. Goldys**, Macquarie Univ. (Australia); **Dayong Jin**, Macquarie Univ. (Australia); **Charles P. Lin**, Massachusetts General Hospital (USA); **Andreas G. Nowatzky**, Cedars-Sinai Medical Ctr. (USA); **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Markus Sauer**, Univ. Bielefeld (Germany); **Takahisa Taguchi**, National Institute of Advanced Industrial Science and Technology (Japan); **Robert M. Zucker**, U.S. Environmental Protection Agency (USA)

Saturday 21 January

SESSION 1

Room: 300 (Esplanade) Sat. 8:20 am to 12:00 pm

Functional Imaging of Biomolecules, Live Cells and Tissues

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

8:20 am: **Testing the behavior of microorganisms in combinatorial microfluidics** (*Invited Paper*), Dan V. Nicolau, Univ. of Liverpool (United Kingdom) [8225-01]

8:50 am: **Light scattering of individual erythrocytes from a sickle cell anemia patient**, Youngchan Kim, Korea Advanced Institute of Science and Technology (Korea, Republic of); John Higgins, Massachusetts General Hospital (USA); YongKeun Park, Korea Advanced Institute of Science and Technology (Korea, Republic of) [8225-02]

9:10 am: **Imaging caveolae-mediated transport of nanoparticles using superresolution microscopy**, Zhenjia Wang, Chinnaswamy Tirupathi, Richard Minshall, Asrar B. Maliik, Univ. of Illinois at Chicago (USA) [8225-03]

9:30 am: **Heavy metal stress detection and monitoring via LED-induced chlorophyll fluorescence analysis of Zea mays L. seedlings aiming polluted soil phytoremediation**, Artur S. Gouveia-Neto, Elias Arcaño da Silva, Airon J. da Silva, Clístenes W. A. Nascimento, Univ. Federal Rural de Pernambuco (Brazil) [8225-04]

9:50 am: **Interferometric measurement of traveling waves in the mammalian cochlea in vivo combined with photo-deactivation of prestin: a cellular force-generating protein** (*Invited Paper*), Jonathan A. N. Fisher, Fumiaki Nin, Tobias Reichenbach, A. J. Hudpeth, The Rockefeller Univ. (USA) [8225-05]

Coffee Break 10:10 to 10:40 am

10:40 am: **Effects of cross-linkers on optical spectral properties and nano/microstructure of collagen hydrogels**, Yu Jer Hwang, Joseph Granelli, Jillian Larsen, Julia G. Lyubovitsky, Univ. of California, Riverside (USA) [8225-07]

11:00 am: **In vivo imaging of microglia response to ionizing radiation**, Clemens Alt, Judith M. Runnels, Charles P. Lin, Wellman Ctr. for Photomedicine (USA) [8225-09]

11:20 am: **Evaluation of atherosclerotic plaque development by texture analysis of multimodal CARS images of rabbit arteries**, Leila Mostaçõ-Guidolin, Alex C. T. Ko, Dan P. Popescu, Michael S. D. Smith, Elicia Kohlenberg, National Research Council Canada (Canada); Masashi Shiomi, Kobe Univ. School of Medicine (Japan); Arkady Major, Univ. of Manitoba (Canada); Michael G. Sowa, National Research Council Canada (Canada) [8225-10]

11:40 am: **Long-term measurement of spontaneous membrane fluctuations over a wide-dynamic range in the living cell by low-coherent quantitative phase microscopy**, Toyohiko Yamauchi, Hidenao Iwai, Yutaka Yamashita, Hamamatsu Photonics K.K. (Japan) [8225-11]

Lunch/BiOS Exhibition Break 12:00 to 1:10 pm

SESSION 2

Room: 300 (Esplanade) Sat. 1:50 to 3:30 pm

Optical Manipulation of Cells and Tissues

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

1:50 pm: **Rotation of microscopic objects in fiber optic trap**, Bryan Black, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8225-12]

2:10 pm: **Multispectral optical tweezers for molecular diagnostics of single biological cells** (*Invited Paper*), Shima Fardad, Alex Sincore, Matthieu Baudelet, Martin Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8225-13]

2:30 pm: **Compact cell stretcher for RBC quantitative phase information**, Mariana C. Potcoava, Dave W. M. Marr, Ralph Jimenez, JILA (USA) . . . [8225-14]

2:50 pm: **Fluorescence enhancement with glancing angle deposited nanostructured surfaces**, Swathi Suran, Haobijam J. Singh, Venkanagouda S. Goudar, Arijith Ghosh, Manoj M. Varma, Ambarish Ghosh, Indian Institute of Science (India) [8225-15]

3:10 pm: **Amplification of the signal per background in microarrays modulated by micro/nano-structures**, Dan V. Nicolau, Univ. of Liverpool (United Kingdom) [8225-16]

Coffee Break 3:30 to 4:00 pm

SESSION 3

Room: 300 (Esplanade) Sat. 4:00 to 5:40 pm

Biophotonic Techniques for Regenerative Medicine

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

4:00 pm: **Phase resolved and coherence gated en-face reflection imaging of multilayered embryonal carcinoma cells**, Toyohiko Yamauchi, Tadashi Fukami, Hidenao Iwai, Yutaka Yamashita, Hamamatsu Photonics K.K. (Japan) [8225-17]

4:20 pm: **Label-free multiphoton fluorescence imaging monitors metabolism in living primary human cells used for tissue engineering**, Leng-Chun Chen, William R. Lloyd III, Shiuhyung Kuo, Cynthia L. Marcelo, Stephen E. Feinberg, Mary-Ann Mycek, Univ. of Michigan (USA) [8225-18]

4:40 pm: **Targeting of engineered Mesenchymal stem cells to sites of inflammation as monitored using multicolor mixed mode intravital imaging**, Luke J. Mortensen, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Debanjan Sarkar, Brigham and Women's Hospital (USA) and Harvard Medical School (USA); Joseph A. Phillips, Brigham and Women's Hospital (USA); Joel A. Spencer, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Weian Zhao, Brigham and Women's Hospital (USA) and Harvard Medical School (USA); Praveen Kumar Sankaran, Brigham and Women's Hospital (USA) and Harvard Medical School (USA); Rohit Karnik, Massachusetts Institute of Technology (USA); Jeffrey M. Karp, Brigham and Women's Hospital (USA) and Harvard Medical School (USA); Charles P. Lin, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8225-19]

5:00 pm: **Investigation for the differentiation process of mouse ES cells by Raman spectroscopy**, Yoshinori Yamaguchi, Maha El-Hagrasy, Eiichi Shimizu, Masato Saito, Eiichi Tamiya, Osaka Univ. (Japan) [8225-20]

5:20 pm: **Sensing end enumeration of rare circulating cells with diffuse fluorescence light in mice in vivo**, Mark J. Niedre, Eric W. Zettergren, Northeastern Univ. (USA); Judith M. Runnels, Charles P. Lin, Wellman Ctr. for Photomedicine (USA) [8225-21]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 4

Room: 300 (Esplanade) Sun. 8:10 am to 12:30 pm

Advanced Quantitation in Cells (Cytomics) and Tissues (Histomics)-Part 1

Session Chair: Robert C. Leif, Newport Instruments (USA)

8:10 am: **A new diagnostic tool based on diffusion reflection measurements of gold nano particles**, Rinat Ankrí, Dror Fixler, Rachela Popovtzer, Bar-Ilan Univ. (Israel) [8225-08]

8:30 am: **MB-FLIM: model-based fluorescence lifetime imaging (Invited Paper)**, Ian T. Young, Qiaole Zhao, Raymond Schouten, Sjoerd Stallinga, Technische Univ. Delft (Netherlands); Rene Leenen, Harry van Kuijk, Inge Peters (Netherlands); Sander de Jong, Lambert Instruments BV (Netherlands) [8225-23]

9:00 am: **MEM-FLIM: all-solid-state camera for fluorescence lifetime imaging**, Qiaole Zhao, Ian T. Young, Raymond Schouten, Ben Schelen, Technische Univ. Delft (Netherlands); Rene Leenen, Harry van Kuijk, Inge Peters, Frank Polderdijk, Jan Bosiers, Teledyne DALSA (Netherlands); Kees Jalink, Netherlands Cancer Institute (Netherlands); Sander de Jong, Lambert van Geest, Karel Stoop, Lambert Instruments BV (Netherlands) [8225-22]

9:20 am: **Quality testing of an innovative cascade separation system for multiple cell separation**, Arkadiusz Pierzchalski, Aleksandra Moszczynska, Univ. Leipzig (Germany); Jan-Michael Heinrich, pluriSelect GmbH (Germany); Attila Tarnok, Univ. Leipzig (Germany) [8225-24]

9:40 am: **An optical platform for in vivo cell tracking and quantification in adult zebrafish**, Li Zhang, Wellman Ctr. for Photomedicine (USA) and Fudan Univ. (China); Clemens Alt, Wellman Ctr. for Photomedicine (USA); Pulin Li, Richard M. White, Leonard I. Zon, Harvard Medical School (USA); Xunbin Wei, Shanghai Jiaotong Univ. (China) and Fudan Univ. (China); Charles P. Lin, Wellman Ctr. for Photomedicine (USA) [8225-25]

10:00 am: **Optofluidic tomographic microscopy: a new tool for optofluidics**, Serhan O. Isikman, Waheb Bishara, Hongying Zhu, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8225-26]

10:20 am: **Structural imaging of cell membranes using polarimetric fluorescence microscopy**, Sophie Brasselet, Patrick Ferrand, Xiao Wang, Alla Kress, Hubert Ranchon, Hervé Rigneault, Institut Fresnel (France) [8225-27]

Coffee Break 10:40 to 11:10 am

11:10 am: **Optical coherence phase microscopy with a dual beam allows intracellular phase imaging**, Frank Helderma, Mattijs de Groot, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) [8225-28]

11:30 am: **Monitoring protein-protein interactions in vivo: FLIM and FIDSAM as powerful time-resolved fluorescence techniques for quantitative FRET-analysis**, Frank Schleifenbaum, Eberhard Karls Univ. Tübingen (Germany); Kirstin Elgass, La Trobe Univ. (Australia); Sebastien Peter, Alfred J. Meixner, Klaus Harter, Eberhard Karls Univ. Tübingen (Germany) [8225-29]

11:50 am: **Delay time spectroscopy: a novel method for measuring nanoscale disorder in a biological cell and its application to early cancer detection**, Prabhakar Pradhan, Daniel Park, Hariharan Subramanian, Dhwanil Damania, Lusik Cherkezyan, Vadim Backman, Northwestern Univ. (USA) [8225-30]

12:10 pm: **Chemometric analysis of multispectral FLIM data based on nonnegative matrix factorization methods**, Paritosh Pande, Javier A. Jo, Texas A&M Univ. (USA) [8225-31]

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

SESSION 5

Room: 300 (Esplanade) Sun. 1:30 to 3:10 pm

Advanced Quantitation in Cells (Cytomics) and Tissues (Histomics)-Part 2

Session Chair: Attila Tarnok, Univ. Leipzig (Germany)

1:30 pm: **Quantitative FRET measurements in live cell by fluorescence lifetime excitation-emission matrix imaging**, Ming Zhao, Run Huang, Leilei Peng, College of Optical Sciences, The Univ. of Arizona (USA) . . [8225-32]

1:50 pm: **Autofluorescence removal in images captured with multispectral line confocal microscope**, Mark M. Meyers, GE Global Research (USA) [8225-33]

2:10 pm: **Lensfree incoherent color imaging using compressive decoding**, Ikbal Sencan, Ahmet F. Coskun, Ting-Wei Su, David G. Herman, YeongSeok Suh, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8225-34]

2:30 pm: **A cost-effective analog method to produce time-gated luminescence images**, Robert C. Leif, Sean Yang, Newport Instruments (USA); Yiqing Lu, Dayong Jin, Macquarie Univ. (Australia); Steven Chambers, Artemis CCD Ltd. (United Kingdom) [8225-35]

2:50 pm: **Toward a colony counting system using hyperspectral imaging**, Bart Masschelein, IMEC (Belgium); Antonio Robles-Kelly, National ICT Australia (Australia); Shuyang Liu, Nicolaas Tack, Andy Lambrechts, IMEC (Belgium); Bill Simpson-Young, National ICT Australia (Australia); Francesco Pessolano, IMEC (Belgium) [8225-36]

Coffee Break 3:10 to 3:40 pm

SESSION 6

Room: 300 (Esplanade) Sun. 3:40 to 5:00 pm

Image and Data Processing, Quantification, Standards, and Display Methods

Session Chair: Ian T. Young, Technische Univ. Delft (Netherlands)

3:40 pm: **The effects of different gold standards on the assessment of the accuracy of different resampling techniques for optical coherence tomography**, Christopher Copeland, Audrey K. Ellerbee, Stanford Univ. (USA) [8225-37]

4:00 pm: **Comparison of measured and calculated quantitative flow cytometric data provided by panels with lower and increased color number**, Jozsef Bocsi, Univ. Leipzig (Germany) and Leipzig Research Ctr. for Civilization Diseases (Germany); Anja Mittag, Arkadiusz Pierzchalski, Adolf Baumgartner, Ingo Dähnert, Attila Tarnok, Univ. Leipzig (Germany) . . . [8225-38]

4:20 pm: **Diffusion properties of single FoF1-ATP synthases in a living bacterium unraveled by superlocalization microscopy**, Torsten Rendler, Univ. of Stuttgart (Germany); Marc Renz, Jena Univ. Hospital (Germany); Stefan Ernst, Jena Univ. Hospital (Germany) and Univ. of Stuttgart (Germany); Andrea Zappe, Univ. of Stuttgart (Germany); Michael Börsch, Jena Univ. Hospital (Germany) and Univ. of Stuttgart (Germany) [8225-39]

4:40 pm: **Sparsity reconstruction for bioluminescence tomography based on an augmented lagrangian method**, Wei Guo, Kebin Jia, Beijing Univ. of Technology (China); Jie Tian, Dong Han, Institute of Automation (China); Xueyan Liu, Northeastern Univ. (China); Kai Liu, Qian Zhang, Chenghu Qin, Institute of Automation (China) [8225-40]

Monday 23 January

SESSION 7

Room: 300 (Esplanade) Mon. 8:20 am to 12:00 pm

Spectral Imaging (Microscopic and Macroscopic)

Session Chair: Daniel L. Farkas, SMI (USA)

8:20 am: **Raman imaging of alkyne as a small tag for biological molecules** (*Invited Paper*), Katsumasa Fujita, Osaka Univ. (Japan); Hiroyuki Yamakoshi, Japan Science and Technology Agency (Japan); Kosuke Dodo, RIKEN (Japan); Almar Palonpon, Japan Science and Technology Agency (Japan); Masaya Okada, Osaka Univ. (Japan); Jun Ando, Japan Science and Technology Agency (Japan); Satoshi Kawata, Osaka Univ. (Japan); Mikiko Sodeoka, RIKEN (Japan) [8225-41]

8:50 am: **Two-photon cryomicroscope**, Karsten König, Karoline Köhler, Hans G. Breunig, JenLab GmbH (Germany) [8225-42]

9:10 am: **Extraction of masked fluorescence peaks through polarized synchronous fluorescence spectroscopy**, Meghdoot Mozumder, Seema Devi, Indian Institute of Technology Kanpur (India); Nirmalya Ghosh, Indian Institute of Science Education and Research Kolkata (India); Asima Pradhan, Indian Institute of Technology Kanpur (India); Asha Agarwal, Kiran Pandey, Ganesh Shanker Vidhyarthi Memorial Medical College (India) [8225-43]

9:30 am: **Water's contribution and enzyme's work: a KITA study**, Benjamin P. Born, Ruhr-Univ. Bochum (Germany) and The Weizmann Institute of Science (Israel); Irit Sagi, The Weizmann Institute of Science (Israel); Martina Havenith, Ruhr-Univ. Bochum (Germany) [8225-44]

9:50 am: **Chloroplast fluorescence excitation and emission spectroscopy in live plant cells**, Sebastien Peter, Eberhard Karls Univ. Tübingen (Germany); Martina Zell, Univ. zu Köln (Germany); Christian Blum, Univ. Twente (Netherlands); Kirstin Elgass, La Trobe Univ. (Australia); Veronica G. Maurino, Univ. zu Köln (Germany); Alfred J. Meixner, Eberhard Karls Univ. Tübingen (Germany); Vinod Subramaniam, Univ. Twente (Netherlands); Frank Schleifenbaum, Eberhard Karls Univ. Tübingen (Germany) [8225-45]

10:10 am: **Examining aortic valvular interstitial cells live utilizing Raman spectroscopy**, Kristy Cloyd, Ismail El-Hamamsy, Padmini Sarathchandra, Eileen Gentleman, Magdi H. Yacoub, Adrian H. Chester, Molly M. Stevens, Imperial College London (United Kingdom) [8225-46]

Coffee Break 10:30 to 11:00 am

11:00 am: **Inhomogeneous Monte Carlo simulations of dermoscopic spectroscopy**, Daniel S. Gareau, Ting Li, Steven Jacques, James Krueger, Oregon Health & Science Univ. (USA) [8225-47]

11:20 am: **Raman spectroscopic study of keratin 8 knockdown oral squamous cell carcinoma derived cells**, Surya P. Singh, Hunain Alam, Crismita Dmello, Milind M. Vaidya, C. Murali Krishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India) [8225-48]

11:40 am: **Multiphoton spectroscopy in human skin in vivo**, Hans G. Breunig, Karsten König, JenLab GmbH (Germany) [8225-49]

Lunch Break 12:00 to 1:30 pm

SESSION 8

Room: 300 (Esplanade) Mon. 1:30 to 3:10 pm

Multiparameter Measurements

Session Chair: Daniel L. Farkas, SMI (USA)

1:30 pm: **A non-iterative exact solution to the phase problem in optical imaging**, Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel) [8225-50]

1:50 pm: **Multimodal in-vivo MRI and NIRF imaging of bladder tumors using peptide conjugated glycol chitosan nanoparticles**, Jaehong Key, Deepika Dhawan, Deborah K. Knapp, Purdue Univ. (USA); Kwangmeyung Kim, Ick Chan Kwon, Kuiwon Choi, Korean Institute of Science and Technology (Korea, Republic of); James F. Leary, Purdue Univ. (USA) [8225-51]

2:10 pm: **Optical dry mass measurement in live cells: phase delay versus Raman scattering**, Jeon Woong Kang, Niyom Lue, Yongjin Sung, Ishan Barman, Narahara Chari Dingari, Chae-Ryon Kong, Ramachandra R. Dasari, Michael S. Feld, Massachusetts Institute of Technology (USA) [8225-52]

2:30 pm: **Dual imaging with fluorescence and full-field optical coherence microscopy**, Egidijus Auksorius, Yaron Bromberg, Emmanuel Coron, Linbo Liu, Joseph A. Gardecki, Brett E. Bouma, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) [8225-53]

2:50 pm: **Multimodal optical setup for nonlinear and fluorescence lifetime imaging microscopies: improvement on a commercial confocal inverted microscope**, Vitor B. Pelegati, Javier Adur, André A. de Thomaz, Diogo B. Almeida, Mariana O. Baratti, Hernandez F. Carvalho, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) [8225-54]

Coffee Break 3:10 to 3:40 pm

SESSION 9

Room: 300 (Esplanade) Mon. 3:40 to 5:00 pm

Biomedical Imaging and Cell Manipulation using a Digital Micromirror Device I

Joint Session with Conference 8254

Session Chairs: Calum E. MacAulay, The BC Cancer Agency Research Ctr. (Canada); Michael R. Douglass, Texas Instruments Inc. (USA)

3:40 pm: **Multivariate optical computing using a digital micromirror device for Raman and fluorescence spectroscopy**, Zachary J. Smith, Sven Strombom, Sebastian Wachsmann-Hogiu, UC Davis Medical Ctr. (USA) [8225-55]

4:00 pm: **Realization of an endoscope equipped with microprojection system for optogenetics**, Ramin Pashaie, Univ. of Wisconsin-Milwaukee (USA) [8225-56]

4:20 pm: **Design and development of a wide-field structured illumination fluorescence imaging system for breast tumor margin assessment**, Henry L. Fu, Nimmi Ramanujam, J. Quincy Brown, Duke Univ. (USA) [8225-57]

4:40 pm: **Investigation of in situ fluorescence optical detection based on a programmable spatial light modulator**, Jong-ryul Choi, Kyujung Kim, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8225-58]

SESSION 10

Room: 300 (Esplanade) Mon. 5:00 to 5:40 pm

Advanced Quantitation in Cells (Cytomics) and Tissues (Histomics)-Part 3

Session Chair: Robert C. Leif, Newport Instruments (USA)

5:00 pm: **Distributed light delivery system (DLDS) for optogenetics**, Ramin Pashaie, Univ. of Wisconsin-Milwaukee (USA) [8225-59]

5:20 pm: **Multimodal intravital microscopy for studying cellular dynamics of wound healing in mouse skin**, Benedikt W. Graf, Maria C. Valero, Eric J. Chaney, Marina Marjanovic, Marni D. Boppart, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8225-66]

POSTERS - MONDAY

Room: 103 (Exhibit Level) Mon. 5:30 to 7:30 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, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

LED-induced chlorophyll fluorescence signatures from leaves of saccharum officinarum seedlings under water deficit stress, Artur S. Gouveia-Neto, Elias Arcanjo da Silva, Jr., Patrícia C. Cunha, Ronaldo A. Oliveira-Filho, Ernande B. Costa, Terezinha J. R. Câmara, Lilia G. Willadino, Univ. Federal Rural de Pernambuco (Brazil) [8225-60]

Hydrogen peroxide induces a rapid loss of mitochondrial membrane potential and apoptosis in chondrocytes, Zhuang Caiping, Wang Xiaoping, The First Affiliated Hospital of Jinan Univ. (China); Tong-Sheng Chen, South China Normal Univ. (China) [8225-61]

Combining nanoscale optical phenomena with atomic force microscopy for cellular studies, Sina Amini, Texas A&M Univ. (USA); Zhe Sun, Gerald A. Meininger, Univ. of Missouri-Columbia (USA); Kenith E. Meissner, Texas A&M Univ. (USA) [8225-62]

Analysis of time-gated FLIM data by means of the phasor approach, Farzad Fereidouni, Dave van den Heuvel, Jarno Voortman, Erik Hofman, Hans C. Gerritsen, Utrecht Univ. (Netherlands) [8225-63]

A study of the characteristics of the analog mean delay (AMD) method for fluorescence lifetime measurements, Young Jae Won, Dug Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [8225-64]

The relationship between metabolic activity and collagen deposition during osteoblastic differentiation of mesenchymal stem cells, Kyle P. Quinn, Rebecca Scholl Hayden, David L. Kaplan, Irene Georgakoudi, Tufts Univ. (USA) [8225-67]

Milk phospholipid's protective effects against UV damage in skin equivalent models, Lily H. Laiho, Ashley A. Russell, Zyra Achay, Carl Dargitz, Michael Bingham, California Polytechnic State Univ., San Luis Obispo (USA) [8225-69]

High-density microarrays using lithographically patterned polelectrolytes, Gurusiddhappa R. Prashanth, Venkanagouda S. Goudar, Swathi Suran, Manoj M. Varma, Indian Institute of Science (India) [8225-70]

Biological imaging with high-dynamic range using compressive imaging technique, Mehrdad Abolbashari, Faramarz Farahi, Awad S. Gerges, Gelareh Babaie, The Univ. of North Carolina at Charlotte (USA); Filipe Magalhães, Miguel V. Correia, Francisco M. Araújo, INESC Porto (Portugal) [8225-71]

Measurement of depth-dependent elastic properties of breast tissue phantoms by holographic imaging of surface waves, Karan D. Mohan, William W. Sanders, Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) [8225-72]

Single optical fiber probe for optogenetics, Ramin Pashaie, Univ. of Wisconsin-Milwaukee (USA) [8225-73]

Fast and efficient phase extraction method for real-time quantitative phase imaging, Sanjit Kumar Debnath, YongKeun Park, KAIST (Korea, Republic of) [8225-74]

Validating novel melanoma treatments via S100 protein, Ashley A. Russell, Carl Dargitz, Aaron Rowley, Zyra Achay, Michael Bingham, Rafael Jimenez, Lily H. Laiho, California Polytechnic State Univ., San Luis Obispo (USA) [8225-75]

Dual coupled radiative transfer equation and diffusion approximation for the solution of the forward problem in fluorescence molecular imaging, Dimitris S. Gorpas, Technological Educational Institute of Messolonghi (Greece); Stefan Andersson-Engels, Lund Univ. (Sweden) [8225-76]

Spectrally resolved visualization of fluorescent dyes permeating into skin, Ulf Maeder, Thorsten Bergmann, Sebastian Beer, Jan Michael Burg, Thomas Schmidts, Frank Runkel, Martin Fiebich, Technische Hochschule Mittelhessen (Germany) [8225-77]

Live cardiomyocyte imaging via hybrid SHG-TPEF microscopy, Wan Qin, Honghai Liu, Clemson Univ. (USA); Yonghong Shao, Shenzhen Univ. (China); Qiuying Liu, Zhen Ma, Clemson Univ. (USA); Thomas K. Borg, Medical Univ. of South Carolina (USA); Bruce Gao, Clemson Univ. (USA) [8225-78]

Quantitative measurements of dielectrophoretic forces using a single-beam optical tweezer, Se Hee Park, Edwin Lee, Korea Univ. (Korea, Republic of); Suho Jung, Sang Woo Lee, Dae Sung Yoon, Yonsei Univ. (Korea, Republic of); Beop-Min Kim, Korea Univ. (Korea, Republic of) [8225-79]

Quantification and classification of retinopathic injury using image cytometry and vasculature feature extraction, Kevin Staniszewski, Reyhaneh Sepehr, Christine Sorenson, Nader Sheibani, Mahsa Ranji, Univ. of Wisconsin-Milwaukee (USA) [8225-80]

Multiplexed fluorescence detection using joint spectral and temporal data sets for small animal molecular imaging, David A. Weinberg, Mark Nieder, Northeastern Univ. (USA) [8225-81]

Imaging of Protoporphyrin IX (PPIX) in neural cell culture, Benjamin Lai, Carl J. Fisher, Yonghong Chen, Lothar Lilge, Ontario Cancer Institute s (Canada) [8225-82]

Threshold-free method for three-dimensional segmentation of organelles, Yee-Hung M. Chan, Wallace F. Marshall, Univ. of California, San Francisco (USA) [8225-83]

Optical cryo-imaging of kidney mitochondrial redox state during diabetes, Sepideh Maleki, Reyhaneh Sepehr, Kevin Staniszewski, Nader Sheibani, Christine Sorenson, Mahsa Ranji, Univ. of Wisconsin-Milwaukee (USA) [8225-84]

Investigation of shape memory of red blood cells using optical tweezers and quantitative phase microscopy, Nelson Cardenas, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8225-85]

Multispectral angular domain imaging with a tunable pulsed laser light source, Eldon Ng, Fartash Vasefi, The Univ. of Western Ontario (Canada) and Lawson Health Research Institute (Canada); Jeffrey J. L. Carson, The Univ. of Western Ontario (Canada) [8225-86]

3D high-resolution visualization of the biodistribution of fluorescence with multispectral cryosection imaging and unmixing, Nikolaos C. Deliolanis, Athanasios Sarantopoulos, Nadia Terziyska, Irmela Jeremias, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) . . [8225-87]

Tissue imaging with a stigmatic mass microscope using laser desorption/ionization, Kunio Awazu, Hisanao Hazama, Osaka Univ. (Japan) and JST, CREST (Japan); Tomonori Hamanaka, Osaka Univ. (Japan); Jun Aoki, Michisato Toyoda, Osaka Univ. (Japan) and JST, CREST (Japan); Yasuhide Naito, The Graduate School for the Creation of New Photonics Industries (Japan) and JST, CREST (Japan) [8225-88]

Novel florescent scaffolds to study embryonic stem cell behaviors, Jillian Larsen, Yu Jer Hwang, Nicole zur Nieden, Julia G. Lyubovitsky, Univ. of California, Riverside (USA) [8225-89]

Validating novel melanoma treatments via cancer stem cells, Ashley A. Russell, Carl Dargitz, Aaron Rowley, Michael Bingham, Zyra Achay, Rafael Jimenez, Lily H. Laiho, California Polytechnic State Univ., San Luis Obispo (USA) [8225-90]

Image-based analysis of cell death by metabolic stress-induced autophagy, Frank Chuang, Austin Changou, Hsing-Jien Kung, NSF Ctr. for Biophotonics Science and Technology (USA) [8225-91]

Dry-matter follow-up and mitotic index determination from quantitative phase imaging, Pierre Bon, Benoit F. Wattellier, PHASICS S.A. (France); Serge Monneret, Julien Savatier, Institut Fresnel (France); Didier Marguet, Cyrille Billaudeau, Ctr. d'Immunologie de Marseille-Luminy (France) [8225-92]

Dynamic focus optical coherence tomography for improved investigation of basal cell carcinoma, Mohammad R. N. Avanaki, Ali Hojjatoleslami, Adrian G. Podoleanu, Univ. of Kent (United Kingdom) [8225-93]

Kynetic resazurin assay (KRA) for bacterial quantification of foodborne pathogens, Yaxal Arenas, Arkady Mandel, Theralase, Inc. (Canada); Lothar Lilge, Ontario Cancer Institute (Canada) [8225-94]

Chemically etched axicon fiber for cell trapping without physical contact, Kozo Taguchi, Shinji Hirota, Junpei Sugiyama, Ritsumeikan Univ. (Japan) [8225-95]

Cell manipulation and isolation using dynamically etched fiber tip, Kozo Taguchi, Jun Okada, Ritsumeikan Univ. (Japan) [8225-96]

Spectral Imaging of Brain Cancer by Using Terahertz Waves, Seung Jae Oh, Yong-Min Huh, Sang-Hoon Kim, Jaemoon Yang, Kiyoung Jeong, Myeung Hwan Hwang, Yonsei Univ. College of Medicine (Korea, Republic of); Joo-Hiuk Son, The Univ. of Seoul (Korea, Republic of); Jin-Suck Suh, Yonsei Univ. College of Medicine (Korea, Republic of) [8225-97]

Kynetic resazurin assay (KRA) for bacterial quantification of foodborne and recurrent nosocomial infection pathogens., Nicté Yaxal Arenas Heredia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Lothar Lilge, Univ. of Toronto (Canada); Arkady Mandel, Theralase, Inc. (Canada) . . [8225-99]

Tuesday 24 January

SESSION 11

Room: 300 (Esplanade) Tues. 1:30 to 3:10 pm

Biomedical Imaging and Cell Manipulation using a Digital Micromirror Device II

Joint Session with Conference 8254

Session Chairs: **Karel J. Zuzak**, Digital Light Innovations (USA); **James F. Leary**, Purdue Univ. (USA)

1:30 pm: **Hyperspectral imaging in the operating room: what a surgeon wants (Invited Paper)**, Sara L. Best, Univ. of Wisconsin School of Medicine and Public Health (USA) [8254-02]

2:00 pm: **Evaluation of a novel laparoscopic camera for characterization of renal ischemia in a porcine model using DLP® hyperspectral imaging (Invited Paper)**, Ephrem O. Olweny, Sara L. Best, Neil Jackson, Eleanor F. Wehner, Samuel K. Park, Yung K. Tan, Abhas Thapa, Jeffrey A. Cadeddu, Karel J. Zuzak, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) [8254-03]

2:30 pm: **Instrument validation and applications of a clinic-friendly spatial frequency domain imaging (SFDI) device**, David J. Cuccia, Modulated Imaging, Inc. (USA) [8254-04]

Conference 8225 · Room: 300 (Esplanade)

2:50 pm: **Advances in optical tomography using spatial frequency domain imaging**, Soren D. Konecky, Tyler B. Rice, Alexander Lin, Amaan Mazhar, Rolf B. Saager, Beckman Laser Institute and Medical Clinic (USA); David J. Cuccia, Modulated Imaging, Inc. (USA); Anthony J. Durkin, Bernard Choi, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8254-05]
Coffee Break 3:10 to 3:40 pm

SESSION 12

Room: 300 (Esplanade) Tues. 3:40 to 5:20 pm

Biomedical Imaging and Cell Manipulation using a Digital Micromirror Device III

Joint Session with Conference 8254

Session Chairs: **Michael R. Douglass**, Texas Instruments Inc. (USA);
James F. Leary, Purdue Univ. (USA)

3:40 pm: **Digital micromirror device based confocal 4D-microscopy** (*Invited Paper*), Walter Neu, Markus Schellenberg, Fachhochschule Oldenburg/Ostfriesland/Wilhelmshaven (Germany) [8254-06]

4:10 pm: **A pico projector source for confocal fluorescence and ophthalmic imaging** (*Invited Paper*), Matthew Muller, Aeon Imaging, LLC (USA) . . . [8254-07]

4:40 pm: **Medical devices in dermatology using DLP® technology from Texas Instruments**, Friedrich Lüllau, Lüllau Engineering GmbH (Germany) [8254-08]

5:00 pm: **Implementation of an LED based clinical Spatial Frequency Domain Imaging (SFDI) system**, Amaan Mazhar, Seyed A. Sharif, Beckman Laser Institute and Medical Clinic (USA); Steve Saggese, David J. Cuccia, Modulated Imaging, Inc. (USA); Bernard Choi, Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (USA) [8254-09]

Courses of Related Interest

- SC1013 Choosing the Correct Optical Filter for Your Application (Reichel)
Tuesday, 1:30 to 5:30 pm
- SC1054 Bio-Interferometry (Nolte) Sunday, 8:30 am to 12:30 pm
- SC868 Optical Design for Biomedical Imaging (Liang) Tuesday, 1:30 to 5:30 pm
- SC532 Micro- and Nanofluidics - Technology and Applications (Gärtner)
Wednesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Multiphoton Microscopy in the Biomedical Sciences XII

Conference Chairs: Ammasi Periasamy, Univ. of Virginia (USA); Karsten König, JenLab GmbH (Germany); Peter T. C. So, Massachusetts Institute of Technology (USA)

Program Committee: Wolfgang Becker, Becker & Hickl GmbH (Germany); Keith M. Berland, Emory Univ. (USA); Guy C. Cox, The Univ. of Sydney (Australia); Alberto Diaspro, Istituto Italiano di Tecnologia (Italy); Chen-Yuan Dong, National Taiwan Univ. (Taiwan); Kevin W. Eliceiri, Univ. of Wisconsin-Madison (USA); Scott E. Fraser, California Institute of Technology (USA); Paul M. W. French, Imperial College London (United Kingdom); Hans C. Gerritsen, Utrecht Univ. (Netherlands); Stefan W. Hell, Max-Planck-Institut für biophysikalische Chemie (Germany); Brian A. Herman, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Satoshi Kawata, Osaka Univ. (Japan); Arnd K. Krueger, Spectra-Physics®, a Newport Corp. Brand (USA); Joseph R. Lakowicz, Univ. of Maryland School of Medicine (USA); Steve M. McDonald, Coherent, Inc. (USA); Angelika C. Rueck, Univ. Ulm (Germany); Steven S. Vogel, National Institutes of Health (USA); Paul W. Wiseman, McGill Univ. (Canada); X. Sunney Xie, Harvard Univ. (USA); Warren R. Zipfel, Cornell Univ. (USA)

Sunday 22 January

Opening Remarks

Room: 308 (Esplanade) Sun. 8:15 to 8:30 am

Session Chair: Ammasi Periasamy, Univ. of Virginia (USA)

KEYNOTE SESSION

Room: 308 (Esplanade) Sun. 8:30 to 10:00 am

Session Chair: Ammasi Periasamy, Univ. of Virginia (USA)

8:30 am: **Innovative microscopes and labels for intravital imaging** (*Invited Paper*), Scott E. Fraser, California Institute of Technology (USA) . . [8226-01]

9:00 am: **Fluorescence lifetime imaging and metrology for cell biology, drug discovery and label-free diagnosis** (*Invited Paper, Presentation Only*), Paul M. W. French, Imperial College London (United Kingdom) . . . [8226-02]

9:30 am: **The phasor approach to FLIM: exploiting phasor linear properties** (*Invited Paper*), Enrico Gratton, Michelle A. Digman, Univ. of California, Irvine (USA) [8226-03]

Coffee Break 10:00 to 10:30 am

SESSION 1

Room: 308 (Esplanade) Sun. 10:30 am to 12:15 pm

FRET, FLIM, FCS I

Session Chair: Angelika C. Rueck, Univ. Ulm (Germany)

10:30 am: **Polarized fluorescence correlation spectroscopy (pFCS): a single-molecule method for simultaneously measuring homo-FRET, brightness, and the diffusion of protein complexes in living cells** (*Invited Paper, Presentation Only*), Tuan Nguyen, Pabak Sarkar, National Institutes of Health (USA); Jithesh V. Veetil, National Institutes of Health; Srinagesh V. Koushik, Christopher Thaler, National Institutes of Health (USA); Anna Seeman, National Institutes of Health; Steven S. Vogel, National Institutes of Health (USA) [8226-04]

10:50 am: **Monitoring nuclear protein interactions using FRET-FLIM** (*Invited Paper*), Amanda P. Siegel, Nichole Hays, Richard N. Day, Indiana Univ. (USA) [8226-05]

11:10 am: **Spatially resolved recording of transient fluorescence-lifetime effects by line-scanning TCSPC** (*Invited Paper*), Wolfgang Becker, Bertram Su, Becker & Hickl GmbH (Germany) [8226-06]

11:30 am: **Phasor FLIM metabolic mapping of stem cells and cancer cells in live tissues**, Chiara Stringari, Peter Donovan, Enrico Gratton, Univ. of California, Irvine (USA) [8226-07]

11:45 am: **Fluorescence lifetime imaging microscopy (FLIM) studies of living primary human cells for applications in tissue regeneration**, William R. Lloyd III, Leng-Chun Chen, Shihyang Kuo, Cynthia L. Marcelo, Stephen E. Feinberg, Mary-Ann Mycek, Univ. of Michigan (USA) [8226-08]

12:00 pm: **High speed 3D-resolved fluorescence and phosphorescence heterodyned wide field lifetime imaging**, Heejin Choi, Dimitrios Tzeranis, Jaewon Cha, Peter T. C. So, Massachusetts Institute of Technology (USA) [8226-09]

Lunch/Exhibition Break 12:15 to 1:25 pm

SESSION 2

Room: 308 (Esplanade) Sun. 1:25 to 3:05 pm

FRET, FLIM, FCS II

Session Chair: Steven S. Vogel, National Institutes of Health (USA)

1:25 pm: **Multiwavelength FLIM: new concept for fluorescence diagnosis** (*Invited Paper*), Angelika C. Rueck, Univ. Ulm (Germany) [8226-10]

1:45 pm: **Clinical multiphoton FLIM tomography** (*Invited Paper*), Karsten König, JenLab GmbH (Germany) [8226-11]

2:05 pm: **Monitoring transient elastic energy storage within the rotary motors of single FoF1-ATP synthase by DCO-ALEX FRET**, Stefan Ernst, Jena Univ. Hospital (Germany) and Univ. Stuttgart (Germany); Monika G. Düser, Nawid Zarrabi, Univ. Stuttgart (Germany); Michael Börsch, Jena Univ. Hospital (Germany) and Univ. Stuttgart (Germany) [8226-12]

2:20 pm: **Three-color FRET expands the ability to quantify the interactions of several proteins involved in actin nucleation**, Horst K. Wallrabe, Yuansheng Sun, Ammasi Periasamy, Xiaolan Fang, George S. Bloom, Univ. of Virginia (USA) [8226-13]

2:35 pm: **New detection and analysis FLIM and FCS techniques for confocal laser scanning microscopes**, Samantha Fore, PicoQuant Photonics North America, Inc. (USA); Benedikt Krämer, Felix Koberling, Marcelle König, Volker Buschmann, Michael Wahl, Uwe Ortmann, Sandra Orthaus, Rainer Erdmann, PicoQuant GmbH (Germany) [8226-14]

2:50 pm: **In vivo, high resolution measurement of cerebral oxygen tension and NADH using phosphorescence- and fluorescence- lifetime imaging**, Mohammad A. Yaseen, Sava Sakad?ic, Jonghwan Lee, Athinoula A. Martinos Ctr. for Biomedical Imaging (USA); Sergei Vinogradov, Univ. of Pennsylvania (USA); Wolfgang Becker, Becker & Hickl GmbH (Germany); David A. Boas, Athinoula A. Martinos Ctr. for Biomedical Imaging (USA) [8226-15]

Coffee Break 3:05 to 3:30 pm

SESSION 3

Room: 308 (Esplanade) Sun. 3:30 to 5:30 pm

FRET, FLIM, FCS III

Session Chair: Karsten König, JenLab GmbH (Germany)

3:30 pm: **An automated approach for the analysis of multispectral multiphoton FLIM data and its application to the diagnosis of skin cancer**, Yuriy Alexandrov, Rakesh Patalay, Clifford B. Talbot, Sean Warren, Ian Munro, Imperial College London (United Kingdom); Hans G. Breunig, Karsten König, JenLab GmbH (Germany); Mark A. A. Neil, Paul M. W. French, Imperial College London (United Kingdom); Anthony Chu, Imperial College Healthcare NHS Trust (United Kingdom); Gordon W. Stamp, The Royal Marsden Hospital NHS Trust (United Kingdom); Christopher W. Dunsby, Imperial College London (United Kingdom) [8226-16]

3:45 pm: **Multiphoton fluorescence lifetime imaging of cleared mouse organs**, Sam Vesuna, Richard Torres, Michael J. Levene, Yale Univ. (USA) [8226-17]

4:00 pm: **Ion-beam sputtered (IBS) thin-film interference filters for nonlinear optical imaging**, Neil Anderson, Prashant Prabhat, Turan Erdogan, Semrock Inc. (USA) [8226-18]

4:15 pm: **Recent development in ultrafast lasers for multimodal nonlinear imaging**, Marco F. Arrigoni, David Armstrong, Coherent, Inc. (USA) . . . [8226-19]

4:30 pm: **Latest advances in ultrafast laser sources for multiphoton microscopy**, Phil G. Smith, Spectra-Physics®, a Newport Corp. Brand (USA) [8226-20]

Conference 8226 · Room: 308 (Esplanade)

4:45 pm: **Pulse shaping multiphoton FRET microscopy**, Meredith H. Brenner, Univ. of Michigan (USA); Sarah R. Nichols, Whitman College (USA); Samuel W. Straight, Univ. of Michigan Medical School (USA); Adam D. Hoppe, South Dakota State Univ. (USA); Joel A. Swanson, Univ. of Michigan Medical School (USA); Jennifer P. Ogilvie, Univ. of Michigan (USA) [8226-21]

5:00 pm: **Analysis of human aorta using fluorescence lifetime imaging (FLIM)**, Gislaine Vieira-Damiani, Javier F. Adur M.D., Daniela Peixoto Ferro, Randall L. Adam, Vitor B. Pelegati, André A. de Thomaz, Carlos Lenz Cesar, Konradin Metzger M.D., Univ. Estadual de Campinas (Brazil) [8226-22]

5:15 pm: **Fluorescence lifetime and fluorescence correlation spectroscopy in colloidal quantum dots**, André A. de Thomaz, Diogo B. Almeida, Univ. Estadual de Campinas (Brazil); Ernesto Jimenez Villar, Univ. de València (Spain); Vitor B. Pelegati, Univ. Estadual de Campinas (Brazil); Javier F. Adur, Univ. Estadual de Campinas (Brazil) and Univ. Nacional de Entre Ríos (Argentina); Hernandes F. Carvalho, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) [8226-23]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Session Chairs: **Aisada Uchugonova**, Univ. des Saarlandes (Germany);

Holly L. Aaron, Univ. of California, Berkeley (USA);

Michael Börsch, Univ. Stuttgart (Germany);

Conor L. Evans, Wellman Ctr. for Photomedicine (USA);

Paul J. Campagnola, Univ. of Wisconsin-Madison (USA)

Conference attendees are invited to attend the BIOS poster session on Sunday 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 at <http://spie.org/x27476.xml#a>.

Three-color FRET expands the ability to quantify the interactions of several proteins involved in actin nucleation, Horst K. Wallrabe, Yuansheng Sun, Ammasi Periasamy, Xiaolan Fang, George S. Bloom, Univ. of Virginia (USA) [8226 12]

Rapid volumetric temporal focusing multiphoton microscopy of neural activity: theory, image processing, and experimental realization, Hod Dana, Anat Marom, Nairouz Farah, Shy Shoham, Technion-Israel Institute of Technology (Israel) [8226-82]

In-vivo pump-probe microscopy of melanoma and pigmented lesions, Jesse W. Wilson, Thomas E. Matthews, Simone Degan, Jennifer Y. Zhang, Mary Jane Simpson, Warren S. Warren, Duke Univ. (USA) [8226-83]

Carcinogenic risk from nonlinear optical imaging: comparison between skin and internal organs tissues, Giju Thomas, Erasmus MC (Netherlands); Oleg Nadyarnykh, Johan van Voskuilen, Utrecht Univ. (Netherlands); Angelique van der Ploeg, Erasmus MC (Netherlands); Hans C. Gerritsen, Utrecht Univ. (Netherlands); Henricus J. C. M. Sterenborg, Erasmus MC (Netherlands) [8226-84]

Second-harmonic generation and fluorescence lifetime imaging microscopy through a rodent mammary imaging window, Pamela A. Young, Patricia J. Keely, Kevin W. Eliceiri, Univ. of Wisconsin-Madison (USA) . [8226-85]

Vibrational molecular interferometry, Erik T. Garbacik, Jeroen P. Korterik, Cornelis Otto, Jennifer L. Herek, Herman L. Offerhaus, Univ. Twente (Netherlands) [8226-86]

Stimulated-Raman scattering microscopy by spectral focussing and fiber-generated Stokes pulse, Esben R. Andresen, Pascal Berto, Sarah Saint-Jalm, Hervé Rigneault, Institut Fresnel (France) [8226-87]

In vivo multiphoton imaging of the cornea: polarization-resolved second-harmonic generation from corneal collagen, Gaël Latour, Ivan Gusachenko, Ecole Polytechnique (France); Laura Kowalczyk, Ecole Nationale Supérieure de Techniques Avancées (France); Isabelle Lamarre, Marie-Claire Schanne-Klein, Ecole Polytechnique (France) [8226-46]

MPTflex®: a flexible clinical multiphoton tomograph for early melanoma detection, skin analysis, testing of anti-age products, and in situ nanoparticle tracking, Martin Weinigel, Hans G. Breunig, Peter Fischer, Marcel Kellner-Hoefler, Rainer Bückle, Karsten König, JenLab GmbH (Germany) [8226-88]

Custom-made Cr:LiCAF laser for a nonlinear microscope, Sebastiao Pratavieira, Clovis Grecco, Alessandro Cosci, Vanderlei Bagnato, Lino Misoguti, Cristina Kurachi, Univ. de São Paulo (Brazil) [8226-89]

Quantifying colonic cancer progression with multiphoton microscopy, Shuangmu Zhuo, Fujian Normal Univ. (China) [8226-90]

Recommendations for the design and the installation of large laser scanning microscopy systems, P. Johannes Helm, Univ. of Oslo (Norway) [8226-91]

The use of microstructures for high-resolution axial axis imaging, Stuart H. McIntyre, Jonathan M. Cooper, Godfrey Smith, Univ. of Glasgow (United Kingdom) [8226-92]

Comparison of calcium imaging in dorsal root ganglion neurons by using laser scanning confocal and two-photon microscopy, Yimei Huang, Hongqin Yang, Jiangxu Chen, Xiuqiu Shen, Liqin Zheng, Yuhua Wang, Shusen Xie, Fujian Normal Univ. (China) [8226-93]

Development of photon detectors for picosecond resolution, high rate, multi-channel life science applications, Thomas Conneely, Photek Ltd. (United Kingdom) and University of Leicester (United Kingdom); Jon Lapington, Univ. of Leicester (United Kingdom); James Milnes, Photek Ltd. (United Kingdom) [8226-94]

Characterization of optical properties of ZnO nanoparticles for quantitative assessment of transdermal transport, Zhen Song, Timothy A. Kelf, Macquarie Univ. (Australia); Washington H. Sanchez, Michael S. Roberts, The Univ. of Queensland (Australia); Martin Frenz, Jaroslav Ricka, Univ. Bern (Switzerland); Andrei V. Zvyagin, Macquarie Univ. (Australia) [8226-95]

Multifocus nonlinear optical microscopy based on SLM and AO deflector, Wan Qin, Clemson Univ. (USA); Yonghong Shao, Shenzhen Univ. (China); Honghai Liu, Clemson Univ. (USA); Junle Qu, Xiang Peng, Hanben Niu, Shenzhen Univ. (China); Bruce Gao, Clemson Univ. (USA) [8226-96]

Two-photon excited fluorescence spectroscopy and imaging of melanin in vivo, Tatiana B. Krasieva, Beckman Laser Institute and Medical Clinic (USA); Feng Liu, Univ. of California, Irvine (USA); Mihaela Balu, Chung-Ho Sun, Beckman Laser Institute and Medical Clinic (USA); Frank L. Meyskens, Univ. of California, Irvine (USA); Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8226-97]

Long-distance fluorescence lifetime imaging with stimulated emission, Po-Yen Lin, Thilo Dellwig, Fu-Jen Kao, National Yang-Ming Univ. (Taiwan) [8226-98]

Investigating nucleation, growth, and structural diversity of self-assembled nanomaterials, Neil R. Anthony, Anthony J. Bisignano, David G. Lynn, Keith M. Berland, Emory Univ. (USA) [8226-99]

Multiphoton ultraviolet microscopy reveals dopamine dynamics in live brain tissue, Bidyut Sarkar, Tata Institute of Fundamental Research (India); Arkarup Bandyopadhyay, Cold Spring Harbor Lab. (USA); Suman Nag, Tata Institute of Fundamental Research (India); Sanjeev K. Kaushalya, Max-Planck-Institut für medizinische Forschung (Germany); Anand K. Das, Sudipta Maiti, Tata Institute of Fundamental Research (India) [8226-100]

Non-invasive monitoring of redox state to assess cell differentiation in engineered adipose tissues, Kyle P. Quinn, Evangelia Bellas, Nikolaos Fourligas, David L. Kaplan, Irene Georgakoudi, Tufts Univ. (USA) [8226-101]

Investigation of laser-induced cyclobutane-pyrimidin-dimers damage to cellular DNA in nonlinear optical imaging, Oleg Nadyarnykh, Utrecht Univ. (Netherlands); Giju Thomas, Erasmus MC (Netherlands); Johan van Voskuilen, Utrecht Univ. (Netherlands); Henricus J. C. M. Sterenborg, Erasmus MC (Netherlands); Hans C. Gerritsen, Utrecht Univ. (Netherlands) [8226-102]

Low-cost laser system exhibiting 27 fs pulse duration, 30 kW peak power, and tunability from 850 to 1250 nm for multiphoton microscopy, Bojan Resan, Felix Brunner, Andreas Rohrbacher, Hubert Ammann, Kurt J. Weingarten, Time-Bandwidth Products AG (Switzerland) [8226-103]

Correlation scanning microscopy techniques to quantify DNA repair protein kinetics using confocal microscopy and two-photon microscopy, Salim Abdissalaam, The Univ. of Texas at Arlington (USA) [8226-104]

Photodamage in whole living organisms under imaging conditions as a function of pulse duration, Marcos M. Dantus, Ilyas Saytashev, Nelson S. Winkler, Kristen L. Zuraski, Sergey N. Arkipov, Vadim V. Lozovoy, Michigan State Univ. (USA) [8226-105]

Design and performance of a wide field-of-view multiphoton microscope, Gregory J. Kintz, Laser Biopsy, Inc. (USA); Warren R. Zipfel, Cornell Univ. (USA) [8226-106]

Real-time action potential recording from multiple neurons, Leonardo Sacconi, Jacopo Lotti, Univ. degli Studi di Firenze (Italy); Ping Yan, Leslie M. Loew, Univ. of Connecticut Health Ctr. (USA); Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) [8226-107]

- Random access multiphoton (RAMP) microscopy for investigation of cerebral blood flow regulation mechanisms**, Daniel J. Christensen, Univ. of Rochester (USA); Maiken Nedergaard, Univ. of Rochester Medical Ctr. (USA) [8226-108]
- Effect of pulse duration on photodamage in living organisms**, Marcos M. Dantus, Ilyas Saytashev, Nelson S. Winkler, Kristen L. Zuraski, Sergey N. Arkipov, Vadim V. Lozovoy, Michigan State Univ. (USA) [8226-109]
- Toward nonlinear microscopy with few-cycle laser pulses**, Gabriel Tempea, FEMTOLASERS Produktions GmbH (Austria); Stefan Gomes da Costa, Hui Wan, Andreas Volkmer, Univ. Stuttgart (Germany) [8226-110]
- Sensitive fluorescence detection using a camera from the gaming industry**, Brian L. Van Hoozen, Jr., Jeroen P. Korterik, Univ. Twente (Netherlands); Karla de Bruin, Netherlands Forensic Institute (Netherlands); Wouter Nagengast, Univ. Medical Ctr. Groningen (Netherlands); Jennifer L. Herek, Herman L. Offerhaus, Univ. Twente (Netherlands) [8226-111]
- Three-photon fluorescence imaging of melanin with a CW laser and a dual-wedge scanning system**, Yair J. Mega, Charles A. DiMarzio, Northeastern Univ. (USA) [8226-112]
- Improvement of the spatial resolution in two-photon excitation fluorescence microscopy by saturated excitation (SAX)**, Masahito Yamanaka, Yasuo Yonemaru, Nicholas I. Smith, Satoshi Kawata, Katsumasa Fujita, Osaka Univ. (Japan) [8226-114]
- Totally integrated linear and nonlinear optics multimodal microscopy platform to understand single cell processes**, Vitor B. Pelegati, André A. de Thomaz, Diogo B. Almeida, Javier F. Adur, Mariana O. Baratti, Hernandes F. Carvalho, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) . . . [8226-115]
- Automated control of optical polarization for nonlinear microscopy**, Craig Briseau, Ileana Micu, Peter K. Stys M.D., Univ. of Calgary (Canada) . . [8226-116]
- Oxygen-glucose deprivation (OGD) induced changes in the microtubules structure of cultured rat cortical neurons' axons studied using polarization SHG imaging**, Sotiris Psilodimitrakopoulos, ICFO - Institut de Ciències Fotòniques (Spain); Valerie Petegnief, Nuria de Vera, IBIB, Consejo Superior de Investigaciones Científicas (Spain); Oscar Hernandez, ICFO - Institut de Ciències Fotòniques (Spain); David Artigas, ICFO - Institut de Ciències Fotòniques (Spain) and Univ. Politècnica de Catalunya (Spain); Anna M. Planas, IBIB, Consejo Superior de Investigaciones Científicas (Spain); Pablo Loza-Alvarez, ICFO - Institut de Ciències Fotòniques (Spain) [8226-117]
- Probing live samples in second-harmonic generation microscopy using specific markers and fluorescent proteins**, Evelien De Meulenaere, Katholieke Univ. Leuven (Belgium); Sotiris Psilodimitrakopoulos, Pablo Loza-Alvarez, ICFO - Institut de Ciències Fotòniques (Spain); Koen Clays, Jozef Vanderleyden, Katholieke Univ. Leuven (Belgium) [8226-118]
- The structural origin of second-harmonic generation in fascia**, Maxime Rivard, Mathieu Laliberté, Antony Bertrand-Grenier, Catalin Harnagea, Institut National de la Recherche Scientifique (Canada); Christian P. Pfeffer, Harvard Medical School (USA); Martin Vallières, Yves St-Pierre, Alain Pignolet, My Ali El Khakani, François Légaré, Institut National de la Recherche Scientifique (Canada) [8226-119]
- Application of second-harmonic generation microscopy for in vivo observation of structural change in human dermal collagen fiber caused by aging and/or UV exposure**, Takeshi Yasui, Univ. of Tokushima (Japan); Makoto Yonetsu, Ryosuke Tanaka, Shu-ichiro Fukushima, Osaka Univ. (Japan); Toyonobu Yamashita, Yuki Ogura, Tetsuji Hirao, Shiseido Co., Ltd. (Japan); Tsutomu Araki, Osaka Univ. (Japan) [8226-120]
- Second harmonic generation microscopy differentiates collagen Type I and Type III in diseased lung tissues**, Thomas Abraham, Masaru Suzuki M.D., W. Mark Elliott, The Univ. of British Columbia (Canada); James C. Hogg M.D., St. Paul's Hospital (Canada) [8226-121]
- Second-harmonic generation microscopy used to evaluate the effect of the Dimethyl sulfoxide in the cryopreservation process of collagen fibers to differentiated chondrocytes**, Marilisa F. Andreoli-Risso, Adriana S. S. Duarte, Thiago B. Ribeiro, Pedro Bordeaux-Rego, Angela Luzo, Mariana O. Baratti, Javier F. Adur M.D., André A. de Thomaz, Vitor B. Pelegati, Hernandes F. Carvalho, Carlos Lenz Cesar, Fernando F. Costa, Sara T. Olalla-Saad, Univ. Estadual de Campinas (Brazil) [8226-122]
- Three-dimensional analysis of muscle fiber orientation in a single-shot through polarization-resolved second-harmonic generation holography**, David Smith, Philip Schlup, Randy Bartels, Colorado State Univ. (USA) [8226-123]
- Hilbert-transform phase shifting second-harmonic generation holographic imaging**, David Smith, Philip Schlup, Randy Bartels, Colorado State Univ. (USA) [8226-124]
- Nonlinear optics for the study of human scar tissue**, Daniela Peixoto Ferro, Gislaire Vieira-Damiani, Randall L. Adam, André A. de Thomaz, Vitor B. Pelegati, Carlos Lenz Cesar, Konradin Metzke M.D., Univ. Estadual de Campinas (Brazil) [8226-125]
- Multiphoton imaging with 10 fs pulses: comparing signal strength and photo damage**, Lisa Krapf, Regina Orzekowsky-Schröder, Norbert Koop, Heyke Diddens-Tschoeke, Gereon Hüttmann, Univ. zu Lübeck (Germany) [8226-126]
- Breast pathology assessment using two-photon microscopy**, Yuankai K. Tao, Osman O. Ahsen, Massachusetts Institute of Technology (USA); Peter Fendel, Idesta Quantum Electronics (USA); Alex E. Cable, Thorlabs Inc. (USA); Dejun Shen, James L. Connolly, Beth Israel Deaconess Medical Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) . . . [8226-127]
- SHG microscopy of articular cartilage to image osteoarthritis**, Marie-Andrée Houle, Institut National de la Recherche Scientifique (Canada); Cameron P. Brown, Univ. of Oxford (United Kingdom); Mischa Nicklaus, Institut National de la Recherche Scientifique (Canada); Andrew Price, Univ. of Oxford (United Kingdom); Andreas Ruediger, Institut National de la Recherche Scientifique (Canada); Harinderjit Gill, Univ. of Oxford (United Kingdom); François Légaré, Institut National de la Recherche Scientifique (Canada) [8226-128]
- Second-harmonic generation microscopy used to evaluate chondrogenic differentiation of mesenchymal stem cells for cartilage repair**, Pedro Bordeaux-Rego, Marilisa F. Andreoli-Risso, Adriana S. S. Duarte, Thiago B. Ribeiro, Mariana O. Baratti, Benedicto de Campos Vidal, J. B. Miranda, Javier F. Adur, André A. de Thomaz, Vitor B. Pelegati, Fernando F. Costa, Hernandes F. Carvalho, Carlos Lenz Cesar, Angela Luzo, P. Kharmadayan, Sara T. Olalla-Saad, Univ. Estadual de Campinas (Brazil) [8226-129]
- In vivo multiphoton microscopy associated to 3D image processing for human skin characterization**, Thérèse Baldeweck, L'Oréal Recherche et Innovation (France); Emmanuelle Tancrède, L'Oréal Recherche et Innovation (France) and Service de dermatologie Hôpital St. Louis (France); Petr Dokladal, Serge Koudoro, Vincent Morard, Fernand Meyer, Etienne Decencièrre, Ecole Nationale Supérieure des Mines de Paris (France); Ana-Maria Pena, L'Oréal Recherche et Innovation (France) [8226-130]
- Quantitative second-harmonic generation imaging to detect osteogenesis imperfecta in human skin samples**, Javier F. Adur, Univ. Estadual de Campinas (Brazil) and National Univ. of Entre Rios (Argentina); Ana Ferreira, Lilia D'Souza-Li, Vitor B. Pelegati, André A. de Thomaz, Diogo B. Almeida, Mariana O. Baratti, Hernandes F. Carvalho, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) [8226-131]
- Applications of second-harmonic (SHG) and third-harmonic generation (THG) in diagnostic cytology and histology**, Daniela Peixoto Ferro, Gislaire Vieira-Damiani, Javier F. Adur, Randall L. Adam, Irene Lorand-Metze, Vitor B. Pelegati, André A. de Thomaz, Carlos Lenz Cesar, Konradin Metzke M.D., Univ. Estadual de Campinas (Brazil) [8226-132]
- A study on the spectral dependence of SHG generation from collagen tissues**, Mengzhe Shen, The Univ. of British Columbia (Canada); Hequn Wang, Anthony M. D. Lee, Jianhua Zhao, Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada); Shuo Tang, The Univ. of British Columbia (Canada) [8226-133]
- Two-photon imaging and spectroscopy of fresh human colon biopsies**, Riccardo Cicchi, Alessandro Sturiale, Gabriella Nesi, Francesco Tonelli, Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) [8226-134]
- Investigating protein-protein interactions in living cells with FRET, FLIM, FCCS and ICCS**, Yuansheng Sun, Ammasi Periasamy, Univ. of Virginia (USA) [8226-135]
- Spectral FLIM detection and new analysis schemes for confocal laser scanning microscopes**, Felix Koberling, Benedikt Krämer, Marcelle König, Volker Buschmann, Michael Wahl, Hans-Jürgen Rahn, Uwe Ortmann, Rainer Erdmann, PicoQuant GmbH (Germany); Samantha Fore, PicoQuant Photonics North America, Inc. (USA); Gregor Weiß, PicoQuant GmbH (Germany); Ingo Gregor, Jörg Enderlein, Georg-August-Univ. Göttingen (Germany) . . . [8226-136]
- Fluorescence lifetime imaging microscopy with acousto-optic deflectors**, Kaige Wang, Jing Qi, Yonghong Shao, Junle Qu, Hanben Niu, Shenzhen Univ. (China) [8226-137]
- A simple laser Ti:Sapphire system upgrade for multimodal nonlinear optical microscopy**, Mathieu Laliberté, Antony Bertrand-Grenier, Institut National de la Recherche Scientifique (Canada); Youngjae Kim, Bryan Burgoyne, Alain Villeneuve, Jr., Genia Photonics Inc. (Canada); François Légaré, Institut National de la Recherche Scientifique (Canada) [8226-138]
- Integrated multimodality microscope for functional imaging of engineered and natural tissues**, Youbo Zhao, Benedikt W. Graf, Ross Devolder, Hyunjoon Kong, Ziad Mahmassani, Marni D. Boppert, Stephen A. Boppert M.D., Univ. of Illinois at Urbana-Champaign (USA) [8226-139]

Building an “affordable” coherent Raman scattering (CRS) microscope, Christian W. Freudiger, Harvard Univ. (USA); Khanh Q. Kieu, College of Optical Sciences, The Univ. of Arizona (USA); Gary R. Holtom, Harvard Univ. (USA); Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA); X. Sunney Xie, Harvard Univ. (USA) [8226-141]

Multicolor stimulated Raman scattering (SRS) microscopy, Fa-Ke F. Lu, Dan Fu, Minbiao Ji, Christian W. Freudiger, Xu Zhang, Xiaohui Ni, Gary R. Holtom, X. Sunney Xie, Harvard Univ. (USA) [8226-142]

Evaluation of atherosclerotic plaque development by texture analysis of multimodal CARS images of rabbit arteries, Alex C. T. Ko, National Research Council Canada (Canada) [8226-143]

Application of hyperspectral coherent anti-Stokes Raman scattering microscopy to pharmaceuticals, Andrew L. Fussell, Erik T. Garbacik, Univ. Twente (Netherlands); Sinan Guerres, Heinrich-Heine-Univ. Düsseldorf (Germany); Clare Strachan, Univ. of Otago (New Zealand); Peter Kleinebudde, Heinrich-Heine-Univ. Düsseldorf (Germany); Herman L. Offerhaus, Univ. Twente (Netherlands) [8226-144]

The use of two-photon microscopy to study the biological effects of focused ultrasound on the brain, Alison Burgess, Eunice E. Cho, Leila Shaffaf, Tam Nhan, Charissa Poon, Kullervo H. Hynynen, Sunnybrook Health Sciences Ctr. (Canada) [8226-145]

Dynamic nuclear protein interactions investigated using FRET-FLIM and FCS, Amanda P. Siegel, Nicole Hays, Richard N. Day, Indiana Univ. (USA) [8226-146]

Monitoring changes in endogenous fluorophores through FLIM and spectral imaging, Vinod Jyothikumar, Yuansheng Sun, Ammasi Periasamy, Univ. of Virginia (USA) [8226-150]

Monday 23 January

SESSION 4

Room: 308 (Esplanade) Mon. 8:00 to 9:40 am

Technology Development & Applications I

Session Chair: Peter T. C. So,
Massachusetts Institute of Technology (USA)

8:00 am: **Multiphoton tomography in animal research** (*Invited Paper*), Karsten König, JenLab GmbH (Germany) and Saarland Univ. (Germany) [8226-24]

8:20 am: **Looking stem cells at work with a flexible multiphoton tomograph** (*Invited Paper*), Aisada Uchugonova, Univ. des Saarlandes (Germany); Robert M. Hoffman, Anticancer Inc. (USA); Martin Weinigel, Karsten König, JenLab GmbH (Germany) [8226-25]

8:40 am: **Spectral phasor analysis allows rapid and easy unmixing of fluorescence microscopy spectral images**, Farzad Fereidouni, Arjen Bader, Hans C. Gerritsen, Utrecht Univ. (Netherlands) [8226-26]

8:55 am: **Photon reassignment for structured light imaging based microscopy**, Vijay Raj Singh, Singapore-MIT Alliance (Singapore); Jagath Rajapakse, Nanyang Technological Univ. (Singapore); Peter T. C. So, Massachusetts Institute of Technology (USA) [8226-27]

9:10 am: **Single-shot 3D multi-photon microscopy**, Elijah Y. S. Yew, Singapore-MIT Alliance (Singapore); Peter T. C. So, Massachusetts Institute of Technology (USA) [8226-28]

9:25 am: **Multimodal polarimetric nonlinear microscopy in tissues**, Sophie Brasselet, Hervé Rigneault, Julien Duboisset, Patrick Ferrand, Dora Ait-Belkacem, Sophie Brustlein, Fatma-Zhora Bloud, Fabiana Munhoz, Institut Fresnel (France) [8226-29]

JenLab Young Investigator Award Paper Presentations
Room: 308 (Esplanade) Mon. 9:40 am

Coffee Break 10:10 to 10:40 am

SESSION 5

Room: 308 (Esplanade) Mon. 10:40 am to 12:10 pm

Technology Development & Applications II

Session Chair: Richard N. Day, Indiana Univ. (USA)

10:40 am: **Ray-tracing study on the post-scanner variable beam expansion optics of a two-photon microscopy system**, Do-Hyun Kim, Cristin Welle, Victor Krauthamer, U.S. Food and Drug Administration (USA) [8226-30]

10:55 am: **Scanning fiber optic two-photon excitation endomicroscopy with reduced photo damage and precision focal position localization**, Wenxuan Liang, Yuying Y. Zhang, Kartikeya Murari, Yong-Ping Chen, The Johns Hopkins Univ. (USA); Ming-Jun Li, Corning Incorporated (USA); Xingde D. Li, The Johns Hopkins Univ. (USA) [8226-31]

11:10 am: **Two-photon imaging based on both tryptophan autofluorescence and exogenous fluorescence**, HyoSeok Nam, Kwang Hoon Song, Bosu Jeong, Taejun Wang, Min Sung Jang, Junsang Doh, Bo Gi Yang, Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8226-32]

11:25 am: **Targeted nanosensor aided three-dimensional pH mapping in tumor spheroids using two-photon microscopy**, Aniruddha Ray, Yong-Eun L. Koo, Remy Elbez, Raoul Kopelman, Univ. of Michigan (USA) [8226-33]

11:40 am: **Implementation and characterization of an axicon-based nonlinear digital line-scanning microscope**, Omar E. Olarte, ICFO - Institut de Ciències Fotòniques (Spain); Jacob Licea-Rodriguez, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); Jonathan A. Palero, Emilio J. Gualda, ICFO - Institut de Ciències Fotòniques (Spain); David Artigas, ICFO - Institut de Ciències Fotòniques (Spain) and Univ. Politècnica de Catalunya (Spain); Pablo Loza-Alvarez, ICFO - Institut de Ciències Fotòniques (Spain) [8226-34]

11:55 am: **Chronic, simultaneous multiphoton imaging of cortical layers I to V with microprism implants**, Nathan B. Gilfoy, Robert N. S. Sachdev, David A. McCormick, Michael J. Levene, Yale Univ. (USA) [8226-35]

Lunch Break 12:10 to 1:15 pm

SESSION 6

Room: 308 (Esplanade) Mon. 1:15 to 3:05 pm

Harmonic Generation Microscopy I

Session Chair: Chen-Yuan Dong, National Taiwan Univ. (Taiwan)

1:15 pm: **Polarization resolved SHG as a robust means to quantify changes in collagen in fibrotic diseases** (*Invited Paper*), Paul J. Campagnola, Visar Ajeti, Karissa B. Tilbury, Kirby Campbell, Sameer Mathur, Nizar Jarjour, Suzanne M. Ponik, Patricia J. Keely, Kevin W. Eliceiri, Univ. of Wisconsin-Madison (USA) [8226-36]

1:35 pm: **Analysis of collagen structure changes in ovarian tumor development**, Jennifer M. Watson, Photini F. Rice, Samuel L. Marion, The Univ. of Arizona (USA); Molly Brewer, Neag Cancer Ctr. (USA); John Davis, Urs Utzinger, Patricia B. Hoyer, Jennifer K. Barton, The Univ. of Arizona (USA) [8226-37]

1:50 pm: **In vivo characterization of organizational and orientation changes in precancerous submucosal collagen via polarization SHG**, Kert Edward, Tuya Shilagard, Jinping Yang, Suimin Qiu M.D., Gracie Vargas, The Univ. of Texas Medical Branch (USA) [8226-38]

2:05 pm: **Polarization-resolved SHG microscopy of collagenous tissues with controlled mechanical strain**, Ivan Gusachenko, Yannick Goulam Houssen, Gaël Latour, Stéphane Bancelin, Viet Tran, Jean-Marc Allain, Marie-Laure Schanne-Klein, Ecole Polytechnique (France) [8226-39]

2:20 pm: **Combined nonlinear laser imaging (two-photon excitation fluorescence, second and third-harmonic generation, and fluorescence lifetime imaging microscopies) in ovarian tumors**, Javier F. Adur, Univ. Estadual de Campinas (Brazil) and National Univ. of Entre Rios (Argentina); Vitor B. Pelegati, André A. de Thomaz, Fatima Bottcher-Luiz, Liliana Andrade, Diogo B. Almeida, Hernandes F. Carvalho, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) [8226-40]

2:35 pm: **Third-harmonic (THG) and four-wave mixing microscopy (FWM) of cells and biological tissues**, Pierre Mahou, Ecole Polytechnique (France); Nicolas Olivier, Ecole Polytechnique Fédérale de Lausanne (France); Guillaume Labroille, Maxwell Zimmerley, Delphine Débarre, Emmanuel Beaurepaire, Ecole Polytechnique (France) [8226-41]

2:50 pm: **Second-harmonic generation endomicroscopy imaging system for preterm birth imaging**, Yuying Y. Zhang, Kartikeya Murari, Wenxuan Liang, The Johns Hopkins Univ. (USA); Meredith L. Akins, Katherine Luby-Phelps, Mala Mahendroo, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Ming-Jun Li, Corning Incorporated (USA); Xingde D. Li, The Johns Hopkins Univ. (USA) [8226-42]

5:20 pm: **Structure of collagen fibers revealed with polarization dependent second-harmonic generation microscopy**, Virginijus Barzda, Adam E. Tuer, Sergey I. Kruglov, Nicole Prent, Richard Cisek, Daaf Sandkuijl, Univ. of Toronto Mississauga (Canada) [8226-51]

5:35 pm: **Coupling two-photon excitation with optical nanoscopy and light-sheet illumination microscopy**, Alberto Diaspro, Paolo Bianchini, Istituto Italiano di Tecnologia (Italy); Francesca Cella-Zanacchi, Univ. degli Studi di Genova (Italy); Benjamin Harke, Istituto Italiano di Tecnologia (Italy); Giuseppe Vicidomini, Univ. degli Studi di Genova (Italy); Silvia Galiani, Istituto Italiano di Tecnologia (Italy); Jenu V. Chacko, Cochin Univ. of Science & Technology (India); Zeno Lavagnino, Istituto Italiano di Tecnologia (Italy) [8226-147]

Tuesday 24 January

SESSION 8

Room: 308 (Esplanade) Tues. 8:00 to 10:05 am

Hyperspectral Imaging with CRS

Session Chair: X. Sunney Xie, Harvard Univ. (USA)

8:00 am: **Lock-in free stimulated Raman microscopy (Invited Paper)**, Ji-Xin Cheng, Mikhail N. Slipchenko, Purdue Univ. (USA) [8226-52]

8:30 am: **High-speed spectral tuning CARS microscopy using AOTF laser**, Mamoru Hashimoto, Junichi Iwatsuka, Hirohiko Niioka, Tsutomu Araki, Osaka Univ. (Japan) [8226-53]

8:45 am: **Ultra-broadband time-resolved coherent anti-Stokes Raman scattering microspectroscopy**, Jun Yin, Shenzhen Univ. (China) [8226-54]

9:00 am: **Broadband CARS microscopy: phenotypic and functional imaging for biology**, Marcus T. Cicerone, Young Jong Lee, Khaled H. Aamer, National Institute of Standards and Technology (USA) [8226-55]

9:15 am: **High-resolution, high-speed tunable grating filter for stimulated Raman spectral imaging**, Wataru Umemura, Yasuyuki Ozeki, Kenta Fujita, Kazuhiko Sumimura, Osaka Univ. (Japan); Norihiko Nishizawa, Nagoya Univ. (Japan); Kazuyoshi Itoh, Osaka Univ. (Japan) [8226-56]

9:30 am: **A spectrally modulated stimulated Raman scattering microscope**, Delong Zhang, Mikhail N. Slipchenko, Daniel E. Leaird, Rui Wu, Andrew M. Weiner, Ji-Xin Cheng, Purdue Univ. (USA) [8226-57]

9:45 am: **From coherent Raman microscopy to quantitative coherent Raman spectral imaging (Invited Paper)**, Dan Fu, Fa-Ke F. Lu, Xu Zhang, Gary R. Holtom, Christian W. Freudiger, Minbiao Ji, Xiaohui Ni, X. Sunney Xie, Harvard Univ. (USA) [8226-58]

Coffee Break 10:05 to 10:25 am

SESSION 9

Room: 308 (Esplanade) Tues. 10:25 am to 12:35 pm

Applications of CRS Microscopy

Session Chair: Ji-Xin Cheng, Purdue Univ. (USA)

10:25 am: **CARS for catalysis (Invited Paper)**, Mischa Bonn, FOM Institute for Atomic and Molecular Physics (Netherlands) [8226-59]

10:45 am: **CARS spectro-microscopy of cell patterns in Drosophila melanogaster wing imaginal disc**, Mischa Bonn, Gianluca Rago, FOM Institute for Atomic and Molecular Physics (Netherlands); Florian Marty, Univ. of Zürich (Switzerland); Gert Eijkel, James P. R. Day, Ron M. A. Heeren, FOM Institute for Atomic and Molecular Physics (Netherlands); Konrad Basler, Erich Brunner, Univ. of Zürich (Switzerland) [8226-60]

11:00 am: **Coherent Raman scattering microscopy for label-free imaging of live amphioxus**, Tao Chen, Zhilong Yu, Xiannian Zhang, Jie Shen, Peking Univ. (China); Junyuan Chen, Nanjing Univ. (China); Yanyi Huang, Peking Univ. (China) [8226-61]

11:15 am: **Neuronal cell growth on polymeric scaffolds studied by CARS microscopy**, Annika M. Enejder, Helen Fink, Malin Jonsson, Christian Brackmann, Paul Gatenholm, Andrew Ewing, Chalmers Univ. of Technology (Sweden); Hans-Georg Kuhn, Univ. of Gothenburg (Sweden) [8226-62]

11:30 am: **Study of signal relay and chemotaxis of neutrophils using broadband CARS microscopy**, Young Jong Lee, National Institute of Standards and Technology (USA); Philippe Afonso, Carole A. Parent, National Institutes of Health (USA); Khaled H. Aamer, Marcus T. Cicerone, National Institute of Standards and Technology (USA) [8226-63]

JenLab Young Investigator Award

Room: 308 (Esplanade) Mon. 3:05 to 3:15 pm

We are pleased to announce that a prize in the amount of \$2000.00 will be awarded to a graduate student, postdoc, or scientist under the age of 32 within conference 8223: Multiphoton Microscopy in the Biomedical Sciences XII. To receive award, participants must 1) be both the primary author and presenter of an accepted abstract, and 2) the associated proceedings paper must be submitted at least 2 weeks prior to the meeting start dates for review by the selection committee.

Prize donated by **Jen Lab GmbH (Germany)**

Student Poster Session Competition

Graduate students and postdoctoral fellows with accepted posters can participate in the poster session competition of the conference on Multiphoton Microscopy in the Biomedical Sciences. There is a cash award for the winner(s). The participants should mention that their submission is for the "Students Poster Session Competition (SPSCMP)." The participants should follow the rules and regulations of SPIE for submission of their abstract and manuscript.

Coffee Break 3:15 to 3:35 pm

SESSION 7

Room: 308 (Esplanade) Mon. 3:35 to 5:50 pm

Harmonic Generation Microscopy II

Session Chair: Paul J. Campagnola, Univ. of Wisconsin-Madison (USA)

3:35 pm: **Studies of human skin glycation by the use of multiphoton microscopy and spectroscopy**, Ara Ghazaryan, Hans Hu, National Taiwan Univ. (Taiwan); Shean-Jen Chen, National Cheng Kung Univ. (Taiwan); Hsin-Yuan Tan, Chang Gung Memorial Hospital (Taiwan) and Department of Biomedical Engineering, National Taiwan University (Taiwan); Chen-Yuan Dong, National Taiwan Univ. (Taiwan) and Center for Quantum Science and Engineering, National Taiwan University, Taipei (Taiwan) and Biomedical Molecular Imaging Core, Div. of Genomic Medicine, Research Center for Med. Exc., NTU (Taiwan) [8226-43]

3:50 pm: **High-speed vibrational sum frequency generation microscopy**, Varun Raghunathan, Yang Han, Nien-Hui Ge, Eric O. Potma, Univ. of California, Irvine (USA) [8226-44]

4:05 pm: **Generic model for the biomolecular organization probed by second-harmonic generation polarization microscopy**, Julien Duboisset, Philippe Refregier, Hervé Rigneault, Muriel Roche, Patrick Ferrand, Dora Ait-Belkacem, Sophie Brasselet, Institut Fresnel (France) [8226-45]

4:20 pm: **Investigation of the wavelength dependence of SHG from various tissues**, Stephen J. Matcher, Hannah Askew, The Univ. of Sheffield (United Kingdom) [8226-47]

4:35 pm: **Adaptive multiphoton and harmonic generation microscopy for whole tissue imaging**, Marie Caroline Muellenbroich, Univ. of Strathclyde (United Kingdom); Ewan J. McGhee, Kurt I. Anderson, Beatson Institute for Cancer Research (United Kingdom); Amanda J. Wright, Univ. of Strathclyde (United Kingdom) [8226-48]

4:50 pm: **The use of a sub-25 fs Yb fiber laser for multiphoton SHG and THG imaging**, Marcos M. Dantus, Ilyas Saytashev, Bai Nie, Sergey N. Arkipov, Michigan State Univ. (USA); Andy Chong, Hui Liu, Frank W. Wise, Cornell Univ. (USA) [8226-49]

5:05 pm: **Video-rate, label-free second-harmonic generation holographic imaging of biological specimens**, David Smith, David G. Winters, Randy Bartels, Colorado State Univ. (USA) [8226-50]

Conference 8226 · Room: 308 (Esplanade)

11:45 am: **Live animal nervous system imaging with video-rate multimodal coherent anti-Stokes Raman scattering microendoscopy**, Erik Bélanger, Joël Crépeau, Sophie Laffray, Réal Vallée, Daniel Côté, Univ. Laval (Canada) [8226-64]

12:00 pm: **Surface-mediated four-wave mixing microscopy (Invited Paper)**, Eric O. Potma, Yong Wang, Xuejun Liu, Univ. of California, Irvine (USA) [8226-65]

12:20 pm: **Toward a tunable fiber source for coherent Raman imaging**, Frank W. Wise, Simon Lefrançois, Cornell Univ. (USA). [8226-148]

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

SESSION 10

Room: 308 (Esplanade) Tues. 1:40 to 3:00 pm

CRS for Medical Diagnostics

Session Chair: Annika M. Enejder, Chalmers Univ. of Technology (Sweden)

1:40 pm: **Early demyelinating lesions of the nervous system: a multimodal approach with CARS imaging (Invited Paper)**, Daniel Côté, Ctr. de Recherche de l'Univ. Laval Robert-Giffard (Canada) [8226-66]

2:00 pm: **Chemically selective spectral imaging of bone mineral density and the collagen manifold in bulk bone using CARS and SHG**, Aaron D. Slepkov, National Research Council Canada (Canada) and Trent Univ. (Canada); Adrian F. Pegoraro, Andrew Ridsdale, Douglas J. Moffatt, Albert Stolow, National Research Council Canada (Canada) [8226-67]

2:15 pm: **Clinical multiphoton CARS**, Hans G. Breunig, Karsten König, Martin Weinigel, JenLab GmbH (Germany). [8226-68]

2:30 pm: **In vivo monitoring specialized hepatocyte-like cells in Drosophila by coherent anti-Stokes Raman scattering (CARS) and two-photon excitation fluorescence (TPE-F) microscopy**, Cheng-Hao Chien, Wei-Wen Chen, Academia Sinica (Taiwan); June-Tai Wu, National Taiwan Univ. (Taiwan); Ta-Chau Chang, Academia Sinica (Taiwan) [8226-69]

2:45 pm: **An integrated coherent anti-Stokes Raman scattering and multiphoton imaging technique for liver disease diagnosis**, Jian Lin, Fa-Ke F. Lu, Wei Zheng, National Univ. of Singapore (Singapore); Hanry Yu, National Univ. of Singapore (Taiwan); Colin Sheppard, Zhiwei Huang, National Univ. of Singapore (Singapore). [8226-70]

Coffee Break 3:00 to 3:20 pm

SESSION 11

Room: 308 (Esplanade) Tues. 3:20 to 4:30 pm

Fiber Laser Technology for CRS

Session Chair: Eric O. Potma, Univ. of California, Irvine (USA)

3:20 pm: **All-fiber tunable picosecond laser source for coherent Raman scattering microscopy (Invited Paper)**, Khanh Q. Kieu, College of Optical Sciences, The Univ. of Arizona (USA); Christian W. Freudiger, Gary Holtom, Harvard Univ. (USA); Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA); X. Sunney Xie, Harvard Univ. (USA). [8226-71]

3:40 pm: **Active and passive photonic crystal fibers for compact coherent Raman scattering (CRS) microscope and endoscopes**, Hervé Rigneault, Sophie Brustlein, Institut Fresnel (France); Alistair Muir, Univ. of Bath (United Kingdom); Pascal Berto, Esben R. Andresen, Patrick Ferrand, Institut Fresnel (France); Cyrille Billaudeau, Didier Marguet, CIML, Univ. de la Méditerranée (France); Jonathan Knight, Univ. of Bath (United Kingdom) [8226-72]

3:55 pm: **Fiber delivered two-color picosecond source for coherent Raman scattering imaging (Invited Paper)**, Ke Wang, Chris Xu, Cornell Univ. (USA) [8226-73]

4:15 pm: **A novel multimodal CARS miniaturized microscope**, Brett D. W. Smith, Majid Naji, Sangeeta Murugkar, Univ. of Ottawa (Canada); Craig Brideau, Peter K. Stys M.D., Univ. of Calgary (Canada); Hanan Anis, Univ. of Ottawa (Canada) [8226-74]

SESSION 12

Room: 308 (Esplanade) Tues. 4:30 to 6:15 pm

Advanced CRS Microscopy Instrumentation

Session Chair: Christian W. Freudiger, Harvard Univ. (USA)

4:30 pm: **SLM-aided wide-field CARS microscopy**, Alexander Jesacher, Clemens Roeder, Saranjam Khan, Stefan Bernet, Monika A. Ritsch-Marte, Innsbruck Medical Univ. (Austria) [8226-75]

4:45 pm: **Computational optimization of phase shaped CARS**, Alexander C. W. van Rhijn, Aliakbar S. Jafarpour, Martin Jurna, Jennifer L. Herek, Herman L. Offerhaus, Univ. Twente (Netherlands) [8226-76]

5:00 pm: **Stimulated Raman scattering based multimodal nonlinear optical microscopy**, Dong Li, Hong Kong Univ. of Science and Technology (Hong Kong, China) [8226-77]

5:15 pm: **In-vivo SRS microscopy in biomedical applications by using longer wavelength excitation**, Minbiao Ji, Harvard Univ. (USA); Terumasa Ito, Sony Corp. (Japan); Gary Holtom, Harvard Univ. (USA); Manoj Misra, Unilever HPC USA (USA); X. Sunney Xie, Harvard Univ. (USA) [8226-78]

5:30 pm: **Parallel CARS and OCT imaging**, Angelika Unterhuber, Boris Považay, Medizinische Univ. Wien (Austria); Tuan Le, FEMTOLASERS Produktions GmbH (Austria); Tschackad Kamali, Bernd Hofer, Medizinische Univ. Wien (Austria); Gabriel Tempea, FEMTOLASERS Produktions GmbH (Austria); Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8226-79]

5:45 pm: **Simple and robust interferometric non-resonant background removal for broadband coherent anti-Stokes Raman scattering**, Bradley Littleton, David R. Richards, King's College London (United Kingdom) . [8226-80]

6:00 pm: **Phase contrast in wide-field coherent anti-Stokes Raman scattering (CARS) microscopy**, Pascal Berto, David Gachet, Serge Monneret, Hervé Rigneault, Institut Fresnel (France) [8226-81]

Courses of Related Interest

SC1051 Fundamentals of Microscope Design (Seward) Wednesday, 8:30 am to 12:30 pm

SC978 Light Microscopy (Tkaczyk) Sunday, 1:30 to 5:30 pm

SC1013 Choosing the Correct Optical Filter for Your Application (Reichel) Tuesday, 1:30 to 5:30 pm

SC1053 Ultrafast Laser Pulse Shaping and Adaptive Pulse Compression (Dantus) Tuesday, 1:30 to 5:30 pm

SC1054 Bio-Interferometry (Nolte) Sunday, 8:30 am to 12:30 pm

SC868 Optical Design for Biomedical Imaging (Liang) Tuesday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XIX

Conference Chairs: **Jose-Angel Conchello**, Harvard Univ. (USA); **Carol J. Cogswell**, Univ. of Colorado at Boulder (USA); **Tony Wilson**, Univ. of Oxford (United Kingdom); **Thomas G. Brown**, Univ. of Rochester Medical Ctr. (USA)

Program Committee: **G. J. Brakenhoff**, Univ. van Amsterdam (Netherlands); **Charles A DiMarzio**, Northeastern Univ. (USA); **Raimund J. Ober**, The Univ. of Texas at Dallas (USA); **Chrysanthe Preza**, The Univ. of Memphis (USA); **Monika A. Ritsch-Marte**, Innsbruck Medical Univ. (Austria)

Tuesday 24 January

SESSION 1

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

Wavefront Shaping

Session Chair: **Charles A DiMarzio**, Northeastern Univ. (USA)

8:00 am: **Measuring aberrations in the rat brain by a new coherence-gated wavefront sensor using a Linnik interferometer**, Jinyu Wang, Ecole Supérieure de Physique et de Chimie Industrielles (France) and Institut Langevin, ESPCI ParisTech, CNRS UMR 7587, ESPCI, 10 rue Vauquelin, 75005 Paris, France (France); Jean-Francois Leger, Ecole Normale Supérieure (France); Jonas Binding, Ecole Supérieure de Physique et de Chimie Industrielles (France) and Institut Langevin, ESPCI ParisTech, CNRS UMR 7587, ESPCI, 10 rue Vauquelin, 75005 Paris, France (France); A. Claude Boccara, Sylvain Gigan, Ecole Supérieure de Physique et de Chimie Industrielles (France); Laurent Bourdieu, Ecole Normale Supérieure (France) [8227-01]

8:20 am: **Performance evaluation of point-spread function engineering to reduce the impact of depth-induced aberrations on extended depth-of-field microscopy**, Shuai Yuan, Chrysanthe Preza, The Univ. of Memphis (USA) [8227-02]

8:40 am: **Imaging sharper and deeper in a spinning disk microscope by using adaptive optics**, Jordi Andilla, Imagine Optic SA (France); Vincent Fraisier, Tristan Piolot, Institut Curie (France); Jerome Ballesta, Imagine Optic Inc. (USA); Xavier Levecq, Imagine Optic SA (France); Jean Salamero, Institut Curie (France) [8227-03]

9:00 am: **Real-time 3D microscopy made possible through PSF engineering designs that simultaneously record depth locations while extending the depth of focus of live cell features**, Ramzi N. Zahreddine, Robert H. Cormack, Carol J. Cogswell, Univ. of Colorado at Boulder (USA) [8227-04]

9:20 am: **Comparison of varying pupil configurations in line-scanning confocal reflectance microscopy**, Yogesh G. Patel, Northeastern Univ. (USA); Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA); Charles A. DiMarzio, Northeastern Univ. (USA) [8227-36]

9:40 am: **Measurement and correction of spatially dependent aberrations in adaptive optical microscopy**, Martin Booth, Univ. of Oxford (United Kingdom) [8227-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

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

Fluorescence and Non-linear Microscopy

Session Chair: **Chrysanthe Preza**, The Univ. of Memphis (USA)

10:30 am: **Calibration of an adaptive microscope using phase diversity**, Delphine Débarre, Thibault Vieille, Emmanuel Beurepaire, Ecole Polytechnique (France) [8227-07]

10:50 am: **Correction precision in image-based adaptive optics for nonlinear microscopy**, Delphine Débarre, Aurélie Facomprez, Emmanuel Beurepaire, Ecole Polytechnique (France) [8227-08]

11:10 am: **Real-time visualization of cardiomyocytes contractions resolved with multidepth nonlinear optical microscopy**, Masood Samim, Univ. of Toronto (Canada); Ian Tretyakov, Nicole Prent, Richard Cisek, Daaf Sandkuij, Sergey Musikhin, Virginijus Barzda, Univ. of Toronto Mississauga (Canada) [8227-09]

11:30 am: **A new calibration tool for fluorescence microscopy**, Arnaud Royon, Philippe Legros, Gautier Papon, Thierry Cardinal, Lionel S. Canioni, Argolight (France) [8227-10]

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

SESSION 3

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

Computational Microscopy

Session Chair: **Raimund J. Ober**, The Univ. of Texas at Dallas (USA)

1:20 pm: **Comparison of 3D imaging of the blood drops and splatters using multiframe microscopy and structured light profilometry**, Wojciech Walecki, Fanny Szondy, Peter S. Walecki, Sunrise Optical LLC (USA) [8227-11]

1:40 pm: **Hyperspectral fluorescence microscopy based on compressed sensing**, Vincent Studer, Interdisciplinary Institute for Neuroscience (France); Jérôme Bobin, Commissariat à l'Énergie Atomique (France); Makhlad Chahid, Hamed Mousavi, Interdisciplinary Institute for Neuroscience (France); Emmanuel J. Candès, Stanford Univ. (USA); Maxime Dahan, Lab. Kastler Brossel (France) [8227-12]

2:00 pm: **Optimisation of the diffractive optical element for snapshot spectral imaging used in fluorescence microscopy**, Raimund Leitner, Martin De Biasio, Thomas Arnold, Gerald McGunnigle, Carinthian Tech Research AG (Austria) [8227-13]

2:20 pm: **Double helix PSF engineering for computational fluorescence microscopy imaging**, Sreya Ghosh, The Univ. of Memphis (USA); Sean A. Quirin, Ginni Grover, Rafael Piestun, Univ. of Colorado at Boulder (USA); Chrysanthe Preza, The Univ. of Memphis (USA) [8227-14]

2:40 pm: **Three-dimensional refractive index imaging with differential interference contrast microscopy**, Htet Aung, Jared Buckley, Piotr Kostyk, Braulio Rodriguez, Shelley Phelan, Min Xu, Fairfield Univ. (USA) [8227-15]

3:00 pm: **Performance evaluation of an image estimation method based on principal component analysis (PCA) developed for quantitative depth-variant fluorescence microscopy imaging**, Shuai Yuan, Chrysanthe Preza, The Univ. of Memphis (USA) [8227-16]

Coffee Break 3:20 to 3:50 pm

SESSION 4

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

Modulated Illumination Microscopy

Session Chair: **Monika A. Ritsch-Marte**, Innsbruck Medical Univ. (Austria)

3:50 pm: **Multicolor focal modulation microscopy**, Guangjun Gao, Shau Poh Chong, Nanguan Chen, National Univ. of Singapore (Singapore) [8227-17]

4:10 pm: **Melanin fluorescence spectra by step-wise three photon excitation**, Zhenhua Lai, Josef Kerimo, Charles A. DiMarzio, Northeastern Univ. (USA) [8227-18]

4:30 pm: **Holographic linear imaging with a single-pixel using spatial frequency modulated microscopy**, Daniel Higley, David G. Winters, Randy Bartels, Colorado State Univ. (USA) [8227-19]

Wednesday 25 January

SESSION 5

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

Phase and Polarization Microscopy

Session Chair: Jose-Angel Conchello, Harvard Univ. (USA)

8:00 am: **Tomographic phase microscopy combined with light scattering measurements to investigate the structure and light scattering properties of live epithelial cells for early cancer detection**, Jing-Wei Su, Wei-Chen Hsu, Kung-Bin Sung, National Taiwan Univ. (Taiwan) [8227-21]

8:20 am: **Dynamic phase imaging and processing of biological processes and moving organisms**, Katherine Creath, Goldie Goldstein, 4D Technology Corp. (USA) and College of Optical Sciences, The Univ. of Arizona (USA) [8227-22]

8:40 am: **Low-coherence reflection tomography**, Yongjin Sung, Massachusetts Institute of Technology (USA); Dan Fu, Harvard Univ. (USA); Wonshik Choi, Korea Univ. (Korea, Republic of); Ramachandra R. Dasari, Zahid Yaqoob, Massachusetts Institute of Technology (USA) [8227-23]

9:00 am: **Low-coherence quantitative phase microscopy with a rapidly tunable broadband source**, Matthew T. Rinehart, Francisco E. Robles, Yizheng Zhu, Michael G. Giacomelli, Adam P. Wax, Duke Univ. (USA) [8227-24]

9:20 am: **Polarimetric microscopy of Si:Ga nanostructures**, Michael Theisen, Brian McIntyre, Thomas G. Brown, Univ. of Rochester (USA) [8227-25]

9:40 am: **Point spread function polarimetry using stressed engineered optical elements**, Roshita Ramkhalawon, Amber M. Beckley, Thomas G. Brown, Univ. of Rochester (USA) [8227-26]

Coffee Break 10:00 to 10:30 am

SESSION 6

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

Holographic Microscopy

Session Chair: Thomas G. Brown, Univ. of Rochester Medical Ctr. (USA)

10:30 am: **Lensless holographic volume imaging using a pseudo-random phase mask**, Walter H. Harm, Alexander Jesacher, Stefan Bernet, Monika A. Ritsch-Marte, Innsbruck Medical Univ. (Austria) [8227-27]

10:50 am: **Digital holographic microscopy for the cytomorphological imaging of cells under zero gravity**, Muhammed Fatih Toy, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Stéphane Richard, ETH Zurich (Switzerland); Jonas Kühn, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Alfredo Franco-Obregón, Marcel Egli, ETH Zurich (Switzerland); Christian Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8227-28]

11:10 am: **Lensless holographic microscopy with high-resolving power for 4D measurement of micro-organism swimming in water**, Mayu Otani, Kunihiro Sato, Univ. of Hyogo (Japan) [8227-29]

11:30 am: **Resolving 3D trajectories of sperms on a chip using multi-angle lensfree digital holography**, Ting-Wei Su, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8227-30]

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

SESSION 7

Room: 226 (Mezzanine) Wed. 1:50 to 3:10 pm

Tomographic Microscopy

Session Chair: G. J. Brakenhoff, Univ. van Amsterdam (Netherlands)

1:50 pm: **Lensfree optical tomographic microscopy: from bench-top to field use**, Serhan O. Isikman, Waheb Bishara, Oguzhan Yaglidere, Uzair Y. Sikora, John Yeah, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8227-31]

2:10 pm: **A quantitative analysis of the effects of different resampling techniques for optical coherence tomography**, Christopher Copeland, Audrey K. Ellerbee, Stanford Univ. (USA) [8227-32]

2:30 pm: **Multi-angle view of lung using optical coherence tomography(OCT)**, Ali Golabchi, Charles A. DiMarzio, Northeastern Univ. (USA) [8227-33]

2:50 pm: **Optical projection tomography for imaging zebrafish vascular network in vivo**, Andrea Bassi, Luca Fieramonti, Cosimo D'Andrea, Gianluca Valentini, Politecnico di Milano (Italy) [8227-34]

POSTERS - WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 pm

Conference attendees are invited to attend the BIOS 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 at <http://spie.org/x27476.xml>.

Two-photon scanned light sheet microscopy reveals spatio-temporal organization of cells and proteins in developing embryos, Thai V. Truong, Xiquan Cui, Scott E. Fraser, California Institute of Technology (USA) . . [8227-20]

Generalized pulse spectrum technique for diffuse optical tomography based on the third-order spherical harmonics approximation to radiative transfer equation, Wenjuan Ma, Feng Gao, Linhui Wu, Xi Yi, Huijuan Zhao, Tianjin Univ. (China) [8227-44]

Time-resolved single-molecule microscopy coupled with atomic force microscopy, Samantha Fore, PicoQuant Photonics North America, Inc. (USA); Marcus Sackrow, Uwe Ortmann, Felix Koberling, Rainer Erdmann, PicoQuant GmbH (Germany) [8227-45]

Restoration of high-resolution AFM images captured with broken probes, Yun feng Wang, Trinity College Dublin (Ireland) [8227-46]

A novel, fast approach to light-sheet microscopy to perform scattering-free, high-resolution fluorescence imaging on whole brains, Ludovico Silvestri, Leonardo Sacconi, Univ. degli Studi di Firenze (Italy); Alessandro Bria, Giulio Iannello, Univ. Campus Bio-Medico (Italy); Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) [8227-47]

Determination of cellular mass, volume, and density using differential interference contrast microscopy, Kevin G. Phillips, Oregon Health & Science Univ. (USA); Anand Koltkar, The Scripps Research Institute (USA); Cassie Loren, Allie McClain, William Potter, Steven L. Jacques, Oregon Health & Science Univ. (USA); Peter Kuhn, The Scripps Research Institute (USA); Owen J. T. McCarty, Oregon Health & Science Univ. (USA) [8227-48]

Depth aberrations characterization in linear and nonlinear microscopy schemes using a shack-Hartmann wavefront sensor, Rodrigo Aviles-Espinosa, ICFO - Institut de Ciències Fotòniques (Spain); Jordi Andilla, Rafael Porcar-Guezenc, Xavier Leveco, Imagine Optic SA (France); David Artigas, ICFO - Institut de Ciències Fotòniques (Spain) and Univ. Politècnica de Catalunya (Spain); Pablo Loza-Alvarez, ICFO - Institut de Ciències Fotòniques (Spain) [8227-49]

Phase-sensitive optical coherence reflectometer using a supercontinuum source, Hoseong Song, Dong-Uk Kim, Seung Bum Cho, Sung-Ho Jeong, Gwangju Institute of Science and Technology (Korea, Republic of); Dug Young Kim, Yonsei Univ. (Korea, Republic of) [8227-50]

A custom-built two-photon microscopy based on a mode-locked Yb³⁺ doped fiber laser, Dong-Uk Kim, Hoseong Song, Woosub Song III, Hyuk-Sang Kwon, Gwangju Institute of Science and Technology (Korea, Republic of); Dug Young Kim, Yonsei Univ. (Korea, Republic of) [8227-51]

Quantifying fluorescence signals in confocal image stacks deep in turbid media, Sebastian Beer, Ulf Maeder, Thorsten Bergmann, Jan Michael Burg, Martin Fiebich, Technische Hochschule Mittelhessen (Germany); Frank Runkel, Fachhochschule Giessen-Friedberg (Germany) [8227-52]

Multimodal light-sheet microscopy for fluorescence live imaging, Yusuke Oshima, Ehime University (Japan) and National Institute for Basic Biology (Japan); Hiroko Kajiura, Shigenori Nonaka, National Institute for Basic Biology (Japan) [8227-53]

Cell morphology classification in phase contrast microscopy image reducing halo artifact, Mi-Sun Kang, SooMin Song, Hana Lee, Myoung-Hee Kim, Ewha Womans Univ. (Korea, Republic of) [8227-54]

Full-field OCT combined with optical tweezer, Woo June Choi, Kwan Seob Park, Tae Joong Eom, Byeong-Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [8227-55]

Three-dimensional imaging of the mouse pituitary: reconstructing a mammalian organ at cellular resolution, Emmet J. O'Reilly, Francois Molino, Institut de Génomique Fonctionnelle (France); Tia E. Keyes, Dublin City Univ. (Ireland); Patrice Mollard, Chrystel Lafont, Institut de Génomique Fonctionnelle (France) [8227-56]

Spatial coherence and transfer function analysis of structured illumination superresolution microscopy, Shwetadwip Chowdhury, Al-Hafeez Z. Dhalla, Joseph A. Izatt, Duke Univ. (USA) [8227-57]

Thursday 26 January

SESSION 9

Room: 226 (Mezzanine). Thurs. 8:50 to 10:10 am

Nomarski, Quantitative, and Diagnostic Imaging

Session Chair: Tony Wilson, Univ. of Oxford (United Kingdom)

8:50 am: **Background and speckle suppression with a divided pupil and Nomarski prism for reflectance line-scanning confocal microscopy of human tissues**, Christopher Glazowski, Memorial Sloan-Kettering Cancer Ctr. (USA); James M. Zavislan, Univ. of Rochester (USA); Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA) [8227-37]

9:10 am: **Real-time quantitative differential interference contrast microscopy implemented using novel liquid crystal prisms**, Ramzi N. Zahreddine, Univ. of Colorado at Boulder (USA); Sharon V. King, Hugh Masterson, Boulder Nonlinear Systems (USA); Robert H. Cormack, Carol J. Cogswell, Univ. of Colorado at Boulder (USA) [8227-38]

9:30 am: **Dynamic quantitative microscopy and nanoscopy of red blood cells in sickle cell disease**, Natan T. Shaked, Tel Aviv Univ. (Israel) and Duke Univ. (USA); Lisa L. Satterwhite, Duke Univ. (USA); Marilyn J. Telen, Duke Univ. Medical Ctr. (USA); George A. Truskey, Adam P. Wax, Duke Univ. (USA) [8227-39]

9:50 am: **Analyze fluorescent characteristic of cancer cell using hyperspectroscopic imaging system (HIS)**, Yao-Fang Hsieh, National Central Univ. (Taiwan); Ou-Yang Mang, National Chiao Tung Univ. (Taiwan); Jeng-Ren Duann, China Medical Univ. (China); Chih-Hsien Chen, Jin-Chern Chiou, National Chiao Tung Univ. (Taiwan); Yong-Jun Lin, China Medical Univ. (USA); Ming-Hsui Tsai, China Medical Univ. (China); Shun-De Wu, National Taiwan Normal Univ. (Taiwan) [8227-40]

Coffee Break 10:10 to 10:40 am

SESSION 10

Room: 226 (Mezzanine). Thurs. 10:40 am to 12:00 pm

Scanning and New Microscopies

Session Chair: Carol J. Cogswell, Univ. of Colorado at Boulder (USA)

10:40 am: **Parallel depth resolved spectral encoded high-speed reflectometry of biological tissue**, Boris Považay, Abishek Kumar, Daniel Fechtig, Angelika Unterhuber, Medizinische Univ. Wien (Austria); Tuan Le, FEMTOLASERS Produktions GmbH (Austria); James R. Fergusson, Cardiff Univ. (United Kingdom); Matthias Eibl, Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8227-41]

11:00 am: **Deep-focus compound-eye camera with polarization filters for 3D endoscopes**, Keiichiro Kagawa, Shizuoka Univ. (Japan); Eiji Tanaka, Panasonic Electronic Devices Co., Ltd. (Japan); Kenji Yamada, Osaka Univ. (Japan); Shoji Kawahito, Shizuoka Univ. (Japan); Jun Tanida, Osaka Univ. (Japan) [8227-42]

11:20 am: **Improved contrast by modal illumination in scanning reflectance confocal microscopy**, Christopher Glazowski, James M. Zavislan, Univ. of Rochester (USA) [8227-43]

11:40 am: **Prospective gating for 3D imaging of the beating zebrafish heart in embryonic development studies**, Jonathan M. Taylor, John M. Girkin, Gordon D. Love, Durham Univ. (United Kingdom) [8227-63]

Courses of Related Interest

- SC978 Light Microscopy (Tkaczyk) Sunday, 1:30 to 5:30 pm
- SC1051 Fundamentals of Microscope Design (Seward) Wednesday, 8:30 am to 12:30 pm
- SC1013 Choosing the Correct Optical Filter for Your Application (Reichel) Tuesday, 1:30 to 5:30 pm
- SC1054 Bio-Interferometry (Nolte) Sunday, 8:30 am to 12:30 pm
- SC868 Optical Design for Biomedical Imaging (Liang) Tuesday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Optical sectioning properties of single-pixel line imaging with spatial frequency modulated microscopy, David G. Winters, Daniel Higley, Randy A. Bartels, Colorado State Univ. (USA) [8227-58]

High-speed single-pixel line-scan imaging with a time sequence of intensity masks reconstructed through compressed sensing, Wenbing Dang, David G. Winters, Daniel Higley, Ali Pezeshki, Randy A. Bartels, Colorado State Univ. (USA) [8227-59]

A wavelet-SVM based Bayesian framework for 3D object segmentation in microscopy, Kangyu Pan, Anil C. Kokaram, Mani Ramaswami, Jens Hillebrand, Trinity College Dublin (Ireland) [8227-60]

Localization accuracy in single-molecule microscopy using electron-multiplying charge-coupled device cameras, Jerry Chao, The Univ. of Texas at Dallas (USA); Elizabeth S. Ward, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Raimund J. Ober, The Univ. of Texas at Dallas (USA) [8227-61]

Comparison of analysis methods for fluorescence lifetime imaging, Tavis Hall, Dustin Dorroh, Elizabeth Robertson, David Schaafsma, California Optical Engineering, Inc. (USA) [8227-62]

Modeling the effect of refraction on OCT imaging of lung tissue: a ray-tracing approach, Fatemeh Noushin Golabchi, Dana H. Brooks, Andrew Gouldstone, Charles A. DiMarzio, Northeastern Univ. (USA) [8227-64]

Common-path, wide-field reflection phase microscopy, Yongjin Sung, Timothy R. Hillman, Niyom Lue, Ramachandra R. Dasari, Peter T. C. So, Zahid Yaqoob, Massachusetts Institute of Technology (USA) [8227-65]

A reflection-mode configuration for enhanced light delivery through turbidity, Youngwoon Choi, Timothy R. Hillman, Niyom Lue, Yongjin Sung, Ramachandra R. Dasari, Massachusetts Institute of Technology (USA); Wonshik Choi, Korea Univ. (Korea, Republic of); Zahid Yaqoob, Massachusetts Institute of Technology (USA) [8227-66]

Image registration and refractive index measurement based on combined optical coherence tomography and multiphoton microscopy, Yifeng Zhou, The Univ. of British Columbia (Canada) [8227-67]

Manipulating and visualizing non-adherent cells in four dimensions, Deanna L. Thompson, NSF Ctr. for Biophotonics Science and Technology (USA); Gregory P. Mc Nerney, Univ. of California, Davis (USA); Martin P. Persson, Mattias Goksör, Göteborg Univ. (Sweden); Thomas R. Huser, Univ. Bielefeld (Germany) [8227-68]

Single Molecule Spectroscopy and Superresolution Imaging V

Conference Chairs: **Jörg Enderlein**, Georg-August-Univ. Göttingen (Germany); **Zygmunt Karol Gryczynski**, Texas Christian Univ. (USA); **Rainer Erdmann**, PicoQuant GmbH (Germany); **Felix Koberling**, PicoQuant GmbH (Germany); **Ingo Gregor**, Georg-August-Univ. Göttingen (Germany)

Program Committee: **Michael Börsch**, Univ. Stuttgart (Germany); **Christian Eggeling**, Max-Planck-Institut für biophysikalische Chemie (Germany); **Paul M. W. French**, Imperial College London (United Kingdom); **Ewa M. Goldys**, Macquarie Univ. (Australia); **Ingo Gregor**, Georg-August-Univ. Göttingen (Germany); **Johan Hofkens**, Katholieke Univ. Leuven (Belgium); **Thomas R. Huser**, Univ. of California, Davis (USA); **Maria Teresa Neves-Petersen**, Aalborg Univ. (Denmark); **Markus Sauer**, Univ. Bielefeld (Germany); **Shimon Weiss**, Univ. of California, Los Angeles (USA); **Andong Xia**, Institute of Chemistry (China)

Saturday 21 January

Welcome and Introduction

Room: Room: 307 (Esplanade) Sat. 9:15 to 9:25 am

SESSION 1

Room: 307 (Esplanade) Sat. 9:25 to 10:25 am

FLIM / FRET / FCS I

Session Chair: **Rainer Erdmann**, PicoQuant GmbH (Germany)

9:25 am: **Fluorescence antibunching microscopy**, Osip Schwartz, Jonathan Levitt, Dan Oron, Weizmann Institute of Science (Israel) [8228-02]

9:45 am: **Giant unilamellar vesicle (GUV) as model system in advanced 3D orientation determination**, Richard Börner, Univ. zu Lübeck (Germany); Nicky Ehrlich, Univ. of Copenhagen (Denmark); Christian G. Hübner, Univ. zu Lübeck (Germany) [8228-03]

10:05 am: **Monitor single-lipid dynamics during ligand-induced signaling in living cells with FCS and STED nanoscopy**, Chia-Fen Hsieh, Li-Ling Yang, Academia Sinica (Taiwan); Yii-Lih Lin, National Taiwan Univ. (Taiwan); Jie-Pan Shen, Yi-Ren Chang, Academia Sinica (Taiwan); Yu-Chung Chang, National Changhua Univ. of Education (Taiwan); Chia-Fu Chou, Academia Sinica (Taiwan) [8228-04]

Coffee Break 10:25 to 10:55 am

SESSION 2

Room: 307 (Esplanade) Sat. 10:55 am to 12:35 pm

Single Molecule Spectroscopy in Biology

Session Chair: **Ingo Gregor**, Georg-August-Univ. Göttingen (Germany)

10:55 am: **Conformational dynamics of single G protein-coupled receptors in solution**, Samuel Bockenbauer, Alexandre Fuerstenberg, Xiao Jie Yao, Brian Kobilka, W. E. Moerner, Stanford Univ. (USA) [8228-05]

11:15 am: **Biological structure from precise and accurate estimation of fluorophore orientations and distances: proof-of-principle using internally labeled dsDNA**, Kim I. Mortensen, Jongmin Sung, Stanford Univ. (USA); Henrik Flyvbjerg, Technical Univ. of Denmark (Denmark); James A. Spudich, Stanford Univ. (USA) [8228-07]

11:35 am: **Novel bimolecular fluorescence complementation (BiFC) protein complexes as innovative tools for in vivo interaction studies and their characterization by single-molecule spectroscopy**, Sven zur Oven-Krockhaus, Sebastien Peter, Alfred J. Meixner, Klaus Harter, Frank Schleifenbaum, Eberhard Karls Univ. Tübingen (Germany) [8228-08]

11:55 am: **New tools for discovering the role sRNA plays in cell regulation**, Douglas P. Shepherd, Nan Li, Elizabeth Hong-Geller, Brian Munsky, James Werner, Los Alamos National Lab. (USA) [8228-09]

12:15 pm: **Fluorescent saxitoxins for live cell imaging of single voltage-gated sodium ion channels beyond the optical diffraction limit**, Hsiaolu D. Lee, Alison Ondrus, Stanford Univ. (USA); Shigeki Iwanaga, Sysmex Corp. (Japan); Justin Dubois, W. E. Moerner, Stanford Univ. (USA) [8228-10]

Lunch/Exhibition Break 12:35 to 2:15 pm

SESSION 3

Room: 307 (Esplanade) Sat. 2:15 to 3:40 pm

FLIM / FRET / FCS II

Session Chair: **Zygmunt Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth (USA)

2:15 pm: **Stepsize of the rotary proton motor in single FoF1-ATP synthase from a thermophilic bacterium by DCO-ALEX FRET** (*Invited Paper*), Eva Hammann, Andrea Zappe, Univ. Stuttgart (Germany); Stefanie Keis, Univ. of Otago (New Zealand); Stefan Ernst, Jena Univ. Hospital (Germany) and Univ. of Stuttgart (Germany); Gregory M. Cook, Univ. of Otago (New Zealand); Michael Börsch, Jena Univ. Hospital (Germany) and Univ. of Stuttgart (Germany) [8228-11]

2:40 pm: **Parallel multispot smFRET analysis using an 8-pixel SPAD array**, Antonino Ingargiola, Univ. of California, Los Angeles (USA) and Politecnico di Milano (Italy); Ryan Colyer, Univ. of California, Los Angeles (USA); Dongsik Kim, Neshor Technologies, Inc. (USA); Ron Lin, Univ. of California, Los Angeles (USA); Angelo Gulinatti, Ivan Rech, Massimo Ghioni, Politecnico di Milano (Italy); Shimon Weiss, Xavier Michalet, Univ. of California, Los Angeles (USA). [8228-12]

3:00 pm: **Development of time-resolved Mueller polarization microscopy through time-correlated single-photon counting**, Jianjun Qiu, Nirmal Mazumder, Tsung-Lin Kuo, Po-Yen Lin, Han-Ruei Tsai, Chih-Wei Hu, Fu-Jen Kao, National Yang-Ming Univ. (Taiwan). [8228-13]

3:20 pm: **Multiplexing and confinement in fluorescence correlation spectroscopy with an array of optical fibers**, Fiona Quinlan-Pluck, L'Institut Langevin (France) and CNRS (France); Quentin Wilmar, L'Institut Langevin (France); Emmanuel Fort, L'Institut Langevin (France) and Univ. Denis Diderot (France); Sandrine Leveque-Fort, Univ. Paris-Sud 11 (France) and CNRS (France); Neso Sojic, Univ. Bordeaux 1 (France) and ENSCBP (France); Samuel Gresillon, L'Institut Langevin (France) and Univ. Pierre and Marie Curie (France) [8228-14]

Coffee Break 3:40 to 4:10 pm

SESSION 4

Room: 307 (Esplanade) Sat. 4:10 to 5:30 pm

New Developments in Methods and Systems

Session Chair: **Rainer Erdmann**, PicoQuant GmbH (Germany)

4:10 pm: **Next-generation TCSPC detection** (*Invited Paper*), Felix Koberling, Uwe Ortmann, Hans-Jürgen Rahn, Benedikt Kraemer, Marcelle König, Peter Kapusta, Michael Wahl, Rainer Erdmann, PicoQuant GmbH (Germany) [8228-15]

4:30 pm: **Multiplex tumor marker quantification with spectrally-resolved fluorescence lifetime imaging**, Ingo Gregor, Georg-August-Univ. Göttingen (Germany); Anastasia Loman, Fred S. Wouters, Univ. Medicine Göttingen (Germany); Jörg Enderlein, Georg-August-Univ. Göttingen (Germany); Gertrude Bunt, Univ. Medicine Göttingen (Germany). [8228-16]

4:50 pm: **Ultrasensitive fluorescence correlation spectroscopy of highly parallelized microfluidic devices**, Brian K. Canfield, William N. Robinson, Jason K. King, William H. Hofmeister, Lloyd M. Davis, The Univ. of Tennessee Space Institute (USA) [8228-17]

5:10 pm: **High-performance SPAD array detectors for parallel photon timing applications**, Ivan Rech, Angelo Gulinatti, Corrado Cammi, Massimo Ghioni, Politecnico di Milano (Italy) [8228-18]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 5

Room: 307 (Esplanade) Sun. 8:40 to 10:25 am

FLIM / FRET / FCS III

*Session Chair: Ingo Gregor, Georg-August-Univ. Göttingen (Germany)*8:40 am: **Fluorescence intensity fluctuations in single-molecule polarization sensitive measurements**, Lior Turgeman, Dror Fixler, Bar-Ilan Univ. (Israel) [8228-01]9:00 am: **'Sizing' the oligomers of Azami green fluorescent protein with FCS and antibunching** (*Invited Paper*), Jamshid Temirov, St. Jude Children's Research Hospital (USA); James Werner, Peter Goodwin, Andrew Bradbury, Los Alamos National Lab. (USA) [8228-19]9:25 am: **A designed DNA probe to evaluate counting single molecules by photon antibunching**, Anton Kurz, Univ. of Heidelberg (Germany); Haisen Ta, Max-Planck-Institut für biophysikalische Chemie (Germany) and Univ. of Göttingen (Germany); Dirk-Peter Herten, Univ. of Heidelberg (Germany) [8228-20]9:45 am: **Fluorescence correlation spectroscopy and scanning correlation spectroscopy techniques to quantify dynamics and kinetics of EGFR in vivo before and after γ -irradiation**, Salim Abdalsalaam, The Univ. of Texas at Arlington (USA) [8228-21]10:05 am: **Understanding the synapse at nanoscale using hyperresolved molecular interaction imaging**, Christian Tardif, Hugues Dufour, Daniel Côté, Paul De Koninck, Laval Univ. (Canada) [8228-22]

Coffee Break 10:25 to 10:55 am

SESSION 6

Room: 307 (Esplanade) Sun. 10:55 am to 12:45 pm

Nanoscapy and Superresolution Microscopy I

*Session Chairs: Rainer Erdmann, PicoQuant GmbH (Germany); Felix Koberling, PicoQuant GmbH (Germany)*10:55 am: **Nanoscapy with focused light**, Stefan W. Hell, Max-Planck-Institut für biophysikalische Chemie (Germany) [8228-23]11:45 am: **Full-field stimulated emission depletion (STED) imaging by surface plasmon resonance (SPR) enhancement**, Han Zhang, Ming Zhao, Leilei Peng, College of Optical Sciences, The Univ. of Arizona (USA) . . [8228-24]12:05 pm: **Superresolution imaging of diffusing analyte in surface-enhanced Raman scattering hotspots**, Katherine A. Willets, Sarah M. Stranahan, Maggie L. Weber, The Univ. of Texas at Austin (USA) [8228-25]12:25 pm: **Optimal acquisition schemes for superresolution localization microscopy of bleachable fluorophores**, Alexander R. Small, Edward Shore, California State Polytechnic Univ., Pomona (USA) [8228-26]

Lunch/Exhibition Break 12:45 to 2:05 pm

SESSION 7

Room: 307 (Esplanade) Sun. 2:05 to 3:25 pm

Nanoscapy and Superresolution Microscopy II

*Session Chair: Rainer Erdmann, PicoQuant GmbH (Germany)*2:05 pm: **Recent developments in GSDIM microscopy**, Marcus Dyba, Jonas Fölling, Leica Microsystems CMS GmbH (Germany) [8228-27]2:25 pm: **SIM and PALM as tools to study protein structural organization, numbers, interaction and dynamics**, Klaus Weisshart, Carl Zeiss MicroImaging GmbH (Germany) [8228-28]2:45 pm: **Optimization of precision localization microscopy using CMOS camera technology**, Eiji Toda, Teruo Takahashi, Tadashi Maruno, Jiro Yamashita, Hamamatsu Photonics K.K. (Japan); Stephanie M. Fullerton, Hamamatsu Corp. (USA) [8228-29]3:05 pm: **Advances in super resolution technology and application in biomedical research**, Stephen Ross, Nikon Instruments Inc. (USA) . . [8228-30]

Coffee Break 3:25 to 3:55 pm

SESSION 8

Room: 307 (Esplanade) Sun. 3:55 to 5:35 pm

Nanoscapy and Superresolution Microscopy III

*Session Chair: Zygmunt Karol Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA)*3:55 pm: **Superresolution imaging using fluctuations**, Felix Koberling, Volker Buschmann, Rainer Erdmann, Marcelle König, PicoQuant GmbH (Germany); Thomas Dertinger, Univ. of California, Los Angeles (USA); Sebastian van de Line, Julius-Maximilians-Univ. Würzburg (Germany); Samantha Fore, PicoQuant Photonics North America, Inc. (USA); Markus Sauer, Julius-Maximilians-Univ. Würzburg (Germany); Jörg Enderlein, Georg-August-Univ. (Germany) . [8228-31]4:15 pm: **Latest advances in commercially available STED microscopy**, Wernher Fouquet, Arnold Giske, Leica Microsystems CMS GmbH (Germany) [8228-32]4:35 pm: **Improvement of 3D localization in PALM, STORM, and single particle tracking by using adaptive optics**, Jordi Andilla, Imagine Optic SA (France); Ignacio Izeddin, Lab. Kastler Brossel (France); Philippe Clemenceau, Imagine Optic Inc. (USA); Xavier Leveccq, Imagine Optic SA (France); Xavier Darzacq, Ecole Normale Supérieure (France); Maxime Dahan, Lab. Kastler Brossel (France) [8228-33]4:55 pm: **From single-molecule chemistry to superresolution microscopy**, Dirk-Peter Herten, Arina Rybina, Anne Seefeld, Jessica Balbo, Michael Schwering, Tanja Erhard, Konstantinos Lympopoulos, Ruprecht-Karls-Univ. Heidelberg (Germany) [8228-34]5:15 pm: **Complementation activated light microscopy for nanometer accuracy single-molecule targeting and tracking in cells and living animals**, Fabien Pinaud, Christian Stigloher, Ecole Normale Supérieure (France); Ingo Gregor, Jörg Enderlein, Georg-August Univ. (Germany); Maxime Dahan, Jean-Louis Bessereau, Ecole Normale Supérieure (France) [8228-35]PicoQuant Young Investigator Award
Room: 307 (Esplanade) Sun. 5:35 to 5:45 pm*Session Chair: Zygmunt Karol Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA)*

We are pleased to announce that a prize in the amount of \$750.00 will be awarded to the best oral presentation by a presenter under the age of 35 within conference 8228: Single Molecule Spectroscopy and Imaging V. Participants must be both the primary author and presenter of an accepted abstract to be eligible.

Prize donated by: **PicoQuant GmbH Berlin (Germany)**

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

A SPAD array detector for spectrally and lifetime resolved microscopy, Felix Koberling, Benedikt Kraemer, Rainer Erdmann, PicoQuant GmbH (Germany); Massimo Ghioni, Ivan Rech, Angelo Gulinatti, Politecnico di Milano (Italy); G.S. Buller, Aongus McCarthy, Andrew J. Waddie, Mohammad R. Taghizadeh, Heriot-Watt Univ. (United Kingdom); Ingo Gregor, Jörg Enderlein, Georg-August-Univ. Göttingen (Germany) [8228-36]

Camera simulation engine enables efficient system optimization for superresolution imaging, Teruo Takahashi, Tadashi Maruno, Jiro Yamashita, Hamamatsu Photonics K.K. (Japan); Stephanie M. Fullerton, Hamamatsu Corp. (USA) [8228-37]

Structured illumination confocal scanning microscope with enhanced optical resolution and acquisition speed, Young Duk Kim, MyoungKi Ahn, Dae-Gab Gweon, KAIST (Korea, Republic of) [8228-38]

Accurate single-molecule localization of superresolution microscopy images using multiscale products, Viet Anh Ngo, Biopolis Shared Facilities, A*STAR Singapore (Singapore); Yan Nei Law, Bioinformatics Institute (Singapore); Hariharan Srivats, A*STAR Institute of Medical Biology (Singapore); Hwee Kuan Lee, Bioinformatics Institute (Singapore); Sohail Ahmed, A*STAR Institute of Medical Biology (Singapore) [8228-39]

Conference 8228 · Room: 307 (Esplanade)

Two-fold enhancement of optical resolution in laser scanning microscopy, Harold Dehez, Yves De Koninck, Michel Piché, Univ. Laval (Canada) . . [8228-40]

Optical extinction spectroscopy of a single gold nanorod by using a fast camera, Seung Bum Cho, Hoseong Song, Yoon-Sung Bae, Gwangju Institute of Science and Technology (Korea, Republic of); Chang-Soo Park, Gwanju Institute of Science and Technology (Korea, Republic of); Dug Young Kim, Yonsei Univ. (Korea, Republic of) [8228-41]

Nano-aperture design and characterization for subdiffraction-limited fluorescence imaging, Wonju Lee, Kyujung Kim, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8228-42]

Diamond particles as nanoantennas for nitrogen-vacancy color centers: consequences in STED imaging of fluorescent nanodiamonds, Jean-Jacques Greffet, Jean-Paul Hugonin, Mondher Besbes, Lab. Charles Fabry (France); Marie-Pierre Adam, Piernicola Spinicelli, Xuan Loc Le, Ngoc Diep Lai, François Treussart, Jean-François Roch, Ecole Normale Supérieure de Cachan (France) [8228-43]

Visualization of neuron cells using surface plasmon enhanced randomly activated fluorescence microscopy, Youngjin Oh, Kyujung Kim, Wonju Lee, Nalae Han, Rimi Lee, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8228-44]

Stoichiometry quantification of DNA-dependent protein Kinase-catalytic subunit and Ku70/80 heterodimer using fluorescence correlation spectroscopy (FCS), Salim Abdisalaam, The Univ. of Texas at Arlington (USA) [8228-45]

Dielectric and SM measurements in polymer PMA and PVAc above glass transition temperature, Subhasis Adhikari, Markus Selmke, Frank Cichos, Univ. Leipzig (Germany) [8228-46]

Monitoring protein-protein interactions in vivo: FLIM and FIDSAM as powerful time-resolved fluorescence techniques for quantitative FRET analysis, Frank Schleifenbaum, Eberhard Karls Univ. Tübingen (Germany) [8228-47]

Probe size dependent rotational dynamics in polymer by single molecule spectroscopy, Subhasis Adhikari, Univ. of Leipzig (Germany); Frank Cichos, Univ. Leipzig (Germany) [8228-48]

Courses of Related Interest

- SC1013 Choosing the Correct Optical Filter for Your Application (Reichel)
Tuesday, 1:30 to 5:30 pm
- SC1054 Bio-Interferometry (Nolte) Sunday, 8:30 am to 12:30 pm
- SC868 Optical Design for Biomedical Imaging (Liang) Tuesday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Optical Diagnostics and Sensing XII: Toward Point-of-Care Diagnostics

Conference Chair: **Gerard L. Coté**, Texas A&M Univ. (USA)

Program Committee: **Rafat R. Ansari**, NASA Glenn Research Ctr. (USA); **Werner Gellermann**, The Univ. of Utah (USA); **Yuri I. Gurfinkel**, Central Clinical Hospital (Russian Federation); **Jürgen M. Lademann**, Charité Universitätsmedizin Berlin (Germany); **Michael J. McShane**, Texas A&M Univ. (USA); **Kenith E. Meissner**, Texas A&M Univ. (USA); **Risto Myllylä**, Univ. of Oulu (Finland); **Gert E. Nilsson**, Univ. Hospital Linköping (Sweden); **Jeffery S. Reynolds**, Bayer Healthcare LLC (USA); **Kexin Xu**, Tianjin Univ. (China); **Shaoqun Zeng**, Britton Chance Ctr. for Biomedical Photonics (China); **Dmitry A. Zimnyakov**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

Wednesday 25 January

POSTERS - WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 pm

Conference attendees are invited to attend the BIOS 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 at <http://spie.org/x27476.xml>.

Determination of melamine of milk based on two-dimensional correlation infrared spectroscopy, Ren-jie Yang, Rong Liu, Kexin Xu, Tianjin Univ. (China) [8229A-26]

Sensing cocaine in saliva with attenuated total reflection infrared (ATR-IR) spectroscopy combined with a one-step extraction method, Kerstin M. C. Hans, Susanne Müller, Michele E. Gianella, ETH Zürich (Switzerland); Markus W. Sigrist, ETH Zurich (Switzerland) [8229A-27]

The wide-field Fourier spectroscopic-imaging of the radiation heat from the object itself in the middle infrared region for the health monitoring, Wei Qi, Takashi Takuma, Asuka Inui, Ryosuke Tsutsumi, Takehiko Yuzuriha, Hiroyasu Kagiya, Daisuke Kojima, Akira Nishiyama, Ichirou Ishimaru, Kagawa Univ. (Japan) [8229A-28]

Study of specificity for non-invasive glucose measurements based on two-dimensional correlation mid-infrared spectroscopy, Wen Zhang, Yuzhen Cao, Rong Liu, Kexin Xu, Tianjin Univ. (China) [8229A-29]

A fluorescence polarization based assay for glucose sensing, Brian M. Cummins, Gerard L. Coté, Texas A&M Univ. (USA) [8229A-30]

Raman spectroscopy of blood in vitro, Adrian E. Villanueva-Luna, Jorge Castro-Ramos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Aaron Flores-Gil, Univ. Autónoma del Carmen (Mexico); Sergio Vazquez-Montiel, Carlos M. Ortiz-Lima, José A. Delgado-Atencio, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [8229A-31]

Snapshot hyperspectral imaging to measure oxygen saturation in the retina using fiber bundle and multislit spectrometer, Bahram Khoobehi, LSU Health Sciences Ctr. (USA); Aurash Khoobehi, LSU School of Medicine (USA) [8229A-32]

Quantitative determination of the human breast milk macro-nutrients by near-infrared Raman spectroscopy, Edlene C. M. Motta, Landulfo Silveira, Jr., Renato A. Zângaro, Univ. Camilo Castelo Branco (Brazil) [8229A-33]

An noncontact pulse oximeter with two-laser diode, Jong-Woon Choi, Honam Univ. (Korea, Republic of) [8229A-34]

Effect on glucose monitoring of pressure exerted by fiber optic probe: skin model and simulation, Chenxi Li, Huijuan Zhao, Zhenzhi Shi, Kexin Xu, Tianjin Univ. (China) [8229A-35]

Novel commercial nanostructured thin films for ultra-sensitive POC diagnostics, Daniele Gerion, LamdaGen Corp. (USA) [8229A-36]

SESSION 1

Room: 300 (Esplanade) Wed. 8:20 to 10:00 am

In Vivo Optical Perfusion and Oxygenation Monitoring

Session Chair: **Justin S. Baba**, Oak Ridge National Lab. (USA)

8:20 am: **Fetal oxygenation measurement using wireless near-infrared spectroscopy**, Babak Shadgan M.D., The Univ. of British Columbia (Canada) and Ctr. for International Collaboration on Repair Discoveries (Canada); Andrew J. Macnab, Patricia Janssen, Dan Rurak, Behnam Molavi, The Univ. of British Columbia (Canada) [8229A-01]

8:40 am: **Non-invasive gas monitoring in newborn infants using diode laser absorption spectroscopy: a case study**, Patrik Lundin, Emilie Krite Svanberg M.D., Lorenzo Cocola, Stefan Andersson-Engels, John Jahr, Vineta Fellman, Katarina Svanberg M.D., Sune Svanberg, Lund Univ. (Sweden) [8229A-02]

9:00 am: **In vitro performance of a perfusion and oxygenation optical sensor using a unique liver phantom**, Tony J. Akl, Travis J. King, Ruiqi Long, Texas A&M Univ. (USA); Milton N. Ericson, Oak Ridge National Lab. (USA); Mark A. Wilson, Univ. of Pittsburgh (USA) and U.S. Dept. of Veterans Affairs (USA); Michael J. McShane, Gerard L. Coté, Texas A&M Univ. (USA) [8229A-03]

9:20 am: **Measuring hemoglobin amount and oxygen saturation of skin with advancing age**, Shumpei Watanabe, Chiba Univ. (Japan); Satoshi Yamamoto M.D., Keio Univ. (Japan); Midori Yamauchi, Norimichi Tsumura, Chiba Univ. (Japan); Tetsuo Akiba M.D., AKIBA Clinic of Traditional Medicine (Japan); Keiko Ogawa-Ochiai M.D., Kanazawa Univ. Hospital (Japan) [8229A-04]

9:40 am: **Determination of oxygen saturation of the optic nerve head and overlying artery and vein using a snapshot multispectral imaging system**, Bahram Khoobehi, LSU Health Sciences Ctr. (USA) and LSU Health Sciences Ctr. (USA); Hussein Wafapoor, Alexander Eaton, LSU Health Sciences Ctr. (USA); Kim A. Firm, Tulane Univ. (USA) and LSU Health Sciences Ctr. (USA); Matt Peters, LSU Health Sciences Ctr. (USA); Ellie Rodebeck, Tulane Univ. (USA) and LSU Health Sciences Ctr. (USA); Brian Templet, Tulane Univ. (USA) [8229A-05]

Coffee Break 10:00 am

SESSION 2

Room: 300 (Esplanade) Wed. 10:30 to 11:50 am

Optical Imaging Systems for Cell and Lymph Analysis

Session Chair: **J. Brandon Dixon**, Georgia Institute of Technology (USA)

10:30 am: **MEMS-enabled hyperspectral imaging system for fast CTC screening**, Youmin Wang, The Univ of Texas at Austin (USA); Sheldon F. Bish, Yu-Yen Huang, Gauri Bhave, James W. Tunnell, Xiaojing Zhang, The Univ. of Texas at Austin (USA) [8229A-06]

10:50 am: **Biophotonic tool for sensing the dynamics of H₂O₂ extracellular release in stressed cells**, Guillaume Suarez, Christian Santschi, Shourya Dutta Gupta, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Lucienne Juillerat-Jeanerret, Ctr. Hospitalier Univ. Vaudois (Switzerland); Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8229A-07]

11:10 am: **An in vivo optical imaging system for measuring lipid uptake, vessel contraction, and lymph flow in small animal lymphatic vessels**, Timothy Kassis, Michael J. Weiler, J. Brandon Dixon, Georgia Institute of Technology (USA) and Parker H. Petit Institute for Bioengineering and Bioscience (USA) [8229A-08]

11:30 am: **Sensitivity analysis of near-infrared functional lymphatic imaging**, Michael J. Weiler, Timothy Kassis, J. Brandon Dixon, Georgia Institute of Technology (USA) [8229A-09]

Lunch/Exhibition Break 11:50 am

SESSION 3

Room: 300 (Esplanade) Wed. 1:20 to 3:00 pm

Point-of-Use Optical Field Systems for Analyte Detection

Session Chair: Gerard L. Coté, Texas A&M Univ. (USA)

1:20 pm: **A miniaturized particle detection system**, James J. Dou, Lu Chen, Univ. of Toronto (Canada); Rakesh Nayyar, Cytoquest Corp. (Canada); J. Stewart Aitchison, Univ. of Toronto (Canada) [8229A-10]

1:40 pm: **A study of a self diagnostic platform for the detection of A2 biomarker for Leishmania donovani**, Philip J. R. Roche, Maurice C. K. Cheung, Vamsy P. Chodavarapu, Brian Ward, Momar Ndao, Andrew G. Kirk, McGill Univ. (Canada) [8229A-11]

2:00 pm: **Complete urinary tract infection (UTI) diagnosis and antibiogram using surface enhanced Raman spectroscopy (SERS)**, Katerina Hadjigeorgiou, Evdokia Kastanos, Alexandros Kyriakides, Costas Pitris, Univ. of Cyprus (Cyprus) [8229A-12]

2:20 pm: **Silica suspended waveguide splitter-based biosensor**, Mark C. Harrison, Rasheeda M. Hawk, Andrea M. Armani, The Univ. of Southern California (USA) [8229A-13]

2:40 pm: **Low-level detection of cryptosporidium parvum in water using optical microfluidic biosensors**, Scott Angus, Hyuck-Jin Kwon, Jeong-Yeol Yoon, Univ. of Arizona (USA) [8229A-14]

Coffee Break 3:00 pm

SESSION 4

Room: 300 (Esplanade) Wed. 3:30 to 5:10 pm

Optically-Based Diagnostic Devices for Low Resource Areas

Session Chair: Kristen C. Maitland, Texas A&M Univ. (USA)

3:30 pm: **A cellphone-based laser speckle imager**, Itay Remer, Alberto Bilenca, Ben-Gurion Univ. of the Negev (Israel) [8229A-15]

3:50 pm: **Spectral reflectance of the ocular fundus as a diagnostic marker for cerebral malaria**, Xun Liu, David A. Rice, Tulane Univ. (USA); Bahram Khoobehi, LSU Health Sciences Ctr. (USA) [8229A-16]

4:10 pm: **Lensfree pixel superresolution microscopy using thin wetting films on a chip**, Onur Mudanyali, Waheb Bishara, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8229A-17]

4:30 pm: **Low-cost add-on microscope for cellphones for use in point-of-care diagnostics**, Harsha Umesh Babu, Siegwart Bogatscher, Nico Heussner, Leilei Shinohara, Wilhelm Stork, Karlsruher Institut für Technologie (Germany) [8229A-18]

4:50 pm: **Simple and affordable CD4 counting enabled by on-chip sample preparation and large-area image cytometry**, Markus Beck, Niels van der Velde, Silvia Brockhuis, Leon W. M. M. Terstappen, Univ. Twente (Netherlands) [8229A-19]

Thursday 26 January

SESSION 5

Room: 300 (Esplanade) Thurs. 8:00 to 10:00 am

Optical Glucose Monitoring Approaches

Session Chairs: Brent D. Cameron, The Univ. of Toledo (USA); Michael J. McShane, Texas A&M Univ. (USA)

8:00 am: **A critical query into the basis of spectroscopic measurements in non-invasive blood glucose monitoring**, Narahara Chari Dingari, Ishan Barman, Gajendra Pratap Singh, Jeon Woong Kang, Ramachandra R. Dasari, Michael S. Feld, Massachusetts Institute of Technology (USA) [8229A-20]

8:20 am: **Spectroscopic tomography of biological tissues with the near-infrared radiation for the non-invasive measurement of the biogenic-substances**, Daisuke Kojima, Takashi Takuma, Asuka Inui, Wei Qi, Ryosuke Tsutsumi, Takehiko Yuzuriha, Hiroyasu Kagiya, Akira Nishiyama, Ichirou Ishimaru, Kagawa Univ. (Japan) [8229A-21]

8:40 am: **A fiber loop ringdown glucose sensor**, Chuji Wang, Malik Kaya, Mississippi State Univ. (USA); Charlotte Wang, Mississippi School for Mathematics and Science (USA) [8229A-22]

9:00 am: **Polarimetric glucose sensing in an artificial eye anterior chamber**, Bilal H. Malik, Casey W. Pirstill, Gerard L. Coté, Texas A&M Univ. (USA) [8229A-23]

9:20 am: **Fluorescence lifetime-based glucose sensor using NADH**, Alexa von Ketteler, Kirchhoff Institute for Physics (Germany) and Roche Diagnostics GmbH (Germany); Dirk-Peter Herten, Heidelberg Univ. (Germany); Carina Horn, Roche Diagnostics GmbH (Germany); Wolfgang Petrich, Roche Diagnostics GmbH (Germany) and Kirchhoff Institute for Physics (Germany) [8229A-24]

9:40 am: **Loading of red blood cells with an analyte-sensitive dye for development of a long-term monitoring technique**, Sarah Ritter, Kenith E. Meissner, Texas A&M Univ. (USA) [8229A-25]

Courses of Related Interest

- SC981 Biomedical Fiber Optic Sensors and Applications (Mendez, McLaughlin) Monday, 8:30 am to 12:30 pm
- SC532 Micro- and Nanofluidics - Technology and Applications (Gärtner) Wednesday, 8:30 am to 12:30 pm
- SC1013 Choosing the Correct Optical Filter for Your Application (Reichel) Tuesday, 1:30 to 5:30 pm
- SC1054 Bio-Interferometry (Nolte) Sunday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue IV

Conference Chair: **Robert J. Nordstrom**, National Institutes of Health (USA)

Program Committee: **Anant Agrawal**, U.S. Food and Drug Administration (USA); **Jean-Pierre Bouchard**, INO (Canada); **Gerald T. Fraser**, National Institute of Standards and Technology (USA); **Rongguang Liang**, Carestream Health, Inc. (USA); **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Heidrun Wabnitz**, Physikalisch-Technische Bundesanstalt (Germany)

Saturday 21 January

SESSION 1

Room: 276 (Mezzanine) Sat. 1:30 to 4:30 pm

Phantom Fabrication, Testing and Validation

Session Chair: **Jean-Pierre Bouchard**, INO (Canada)

1:30 pm: **Confocal reflectance microscopy to specify the scattering co-efficient and anisotropy of tissue phantoms** (*Invited Paper*), Steven L. Jacques, Oregon Health & Science Univ. (USA) [8229B-37]

2:00 pm: **Low abundances of synthetic lipids in phantoms**, Adrian E. Villanueva-Luna, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Agustín Santiago-Alvarado, Brenda Iris Guadalupe Licona-Moran, Univ. Tecnológica de la Mixteca (Mexico); Jorge Castro-Ramos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Aaron Flores-Gil, Univ. Autónoma del Carmen (Mexico); Sergio Vazquez-Montiel, Jose Gabriel Aguilar-Soto, Jose A. Delgado-Atencio, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [8229B-38]

2:20 pm: **Possible diffusive reference standards for tissue phantoms based on fat emulsions**, Paola Di Ninni, Univ. degli Studi di Firenze (Italy); Yves Bérubé-Lauzière, Univ. de Sherbrooke (Canada); Fabrizio Martelli, Univ. degli Studi di Firenze (Italy) [8229B-39]

2:40 pm: **Characterization of an optical solid phantom for human skin fabricated by spin coating**, Yunjin Bae, Jiho Lee, Youngwoo Bae, Eungjun Youn, Byungjo Jung, Yonsei Univ. (Korea, Republic of) [8229B-40]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Fabrication and Characterization of a Multilayered Optical Phantom Using Buried Scattering Microspheres in Polymers** (*Invited Paper*), Robert C. Chang, Peter Johnson, Christopher Stafford, Jeeseong Hwang, National Institute of Standards and Technology (USA) [8229B-41]

3:50 pm: **Phantoms for performance assessment of optical coherence tomography systems**, Mohammad R. N. Nasiri Avanaki, Adrian G. Podoleanu, Univ. of Kent (United Kingdom); Marc C. Price, BBC Research and Development (United Kingdom); Serena A. Corr, Trinity College Dublin (Ireland); Ali Hojjatoleslami, Univ. of Kent (United Kingdom) [8229B-42]

4:10 pm: **Absolute calibration of a steady-state trans-illumination breast spectroscopy device**, Eleanor J. Walter, Univ. of Toronto (Canada) and Univ. Health Network (Canada); Lothar D. Lilge, Univ. Health Network (Canada) and Univ. of Toronto (Canada) [8229B-43]

Sunday 22 January

SESSION 2

Room: 276 (Mezzanine) Sun. 8:20 to 10:10 am

Phantoms for Microscopy, Hyperspectral Imaging, and Other Optical Methods

Session Chair: **Robert J. Nordstrom**, National Institutes of Health (USA)

8:20 am: **Design of calibration slide for quantitative microscopy imaging in absorbance** (*Invited Paper*), Calum MacAulay, The BC Cancer Agency Research Ctr. (Canada); Martial Guillaud, British Columbia Cancer Agency (Canada) [8229B-44]

8:50 am: **Validating the LASSO algorithm for unmixing spectral signatures with application to multicolor phantoms**, Daniel Samarov, Matthew Clarke, Ji Youn Lee, David Allen, Maritoni Litorja, Jeeseong Hwang, National Institute of Standards and Technology (USA) [8229B-46]

9:10 am: **Hyperspectral imaging of ischemic wounds**, Ronald X. Xu, James Melvin, Jiwei X. Huang, Haytham Elgharably M.D., Surya Gnyawali, Kun Huang, Valerie Bergdall, The Ohio State Univ. (USA); David Allen, Jeeseong Hwang, Maritoni Litorja, Eric Shirley, National Institute of Standards and Technology (USA); Chandan Sen, The Ohio State Univ. (USA) [8229B-47]

9:30 am: **Performance validation of EMCCD and ICCD based near-infrared fluorescence imaging systems on a fluorescence solid phantom**, Banghe Zhu, Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA) [8229B-48]

9:50 am: **Effects of physiological parameters in diffuse optical brain imaging**, Ali Hasnain, Nanguang Chen, National Univ. of Singapore (Singapore) [8229B-50]

Coffee Break 10:10 to 11:00 am

SESSION 3

Room: 276 (Mezzanine) Sun. 11:00 am to 12:00 pm

Phantom for Optical Coherence Tomography

Session Chair: **Robert J. Nordstrom**, National Institutes of Health (USA)

11:00 am: **New developments in eye models with retina tissue phantoms for ophthalmic optical coherence tomography**, T. Scott Rowe, Rowe Technical Design (USA); Robert J. Zawadzki, UC Davis Medical Ctr. (USA) [8229B-51]

11:20 am: **Three-dimensional calibration targets for optical coherence tomography**, Michelle Gabriele Sandrian, Boris Pova?ay, Aneesh Alex, Medizinische Univ. Wien (Austria); Pete Tomlins, Queen Mary, Univ. of London (United Kingdom); Peter D. Woolliams, National Physical Lab. (United Kingdom); Kate Sugden, Aston Univ. (United Kingdom); Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8229B-52]

11:40 am: **Maximizing OCT image quality at depth using a 3D-structured phantom to optimize imaging parameters**, Andrea Curatolo, Brendan F. Kennedy, David D. Sampson, The Univ. of Western Australia (Australia) [8229B-45]

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

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Conference 8229B · Room: 276 (Mezzanine)

SESSION 4

Room: 206 (Mezzanine) Sun. 1:30 to 3:30 pm

Joint Session with Conference 8215

Session Chairs: **Robert J. Nordstrom**,
National Institutes of Health (USA); **Ramesh Raghavachari**,
U.S. Food and Drug Administration (USA)

1:30 pm: **Calibration and validation of chemical imaging spectrometry for clinical use** (*Invited Paper*), Maritoni Litorja, National Institute of Standards and Technology (USA) [8215-11]

2:00 pm: **Standard test methods for established medical imaging modalities and their implications for optical coherence tomography** (*Invited Paper*), Joshua Pfefer, Anant Agrawal, Alex Beylin, U.S. Food and Drug Administration (USA) [8215-12]

2:30 pm: **Challenges in manufacturing optical tissue phantoms: an industrial perspective** (*Invited Paper*), Jean-Pierre Bouchard, Isabelle Noiseux, Ozzy Mermut, INO (Canada) [8229B-53]

3:00 pm: **Report on a recent workshop: Standards for Phantoms for the Performance Evaluation and Validation of Optical Medical Imaging Devices** (*Invited Paper*), Jeeseong Hwang, National Institute of Standards and Technology (USA); Robert J. Nordstrom, National Cancer Institute (USA) [8229B-54]

Coffee Break 3:30 to 4:00 pm

PANEL DISCUSSION

Room: 206 (Mezzanine) Sun. 4:00 to 5:00 pm

Session Chair: **Robert J. Nordstrom**,
National Institutes of Health (USA)

Panelists: **Maritoni Litorja**, **Joshua Pfefer**, **Jean-Pierre Bouchard**,
INO (Canada), **Jeeseong Hwang**, NIST

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

Optical properties in simulated human skin at a wavelength of 633 nm, Beatriz Morales, Jose A. Delgado-Atencio, Sergio Vázquez y Montiel, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). [8229B-55]

Influence of bubbles on the recovery of optical properties, Beatriz Morales, Jose A. Delgado-Atencio, Sergio Vázquez y Montiel, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). [8229B-56]

Courses of Related Interest

SC029 Tissue Optics (Jacques) Sunday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Biomedical Applications of Light Scattering VI

Conference Chairs: **Adam P. Wax**, Duke Univ. (USA); **Vadim Backman**, Northwestern Univ. (USA)

Program Committee: **Irving J. Bigio**, Boston Univ. (USA); **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign (USA); **Bernard Choi**, Beckman Laser Institute and Medical Clinic (USA); **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **Lev T. Perelman**, Harvard Univ. (USA); **Brian W. Pogue**, Dartmouth College (USA); **Bruce J. Tromberg**, Beckman Laser Institute and Medical Clinic (USA)

Saturday 21 January

SESSION 1

Room: 310 (Esplanade) Sat. 8:00 to 10:10 am

Dynamic Light Scattering and Speckle

Session Chair: **Bernard Choi**, Beckman Laser Institute and Medical Clinic (USA)

8:00 am: **Measuring intracellular motion using dynamic light scattering with optical coherence tomography in a mouse tumor model**, Golnaz Farhat, Univ. of Toronto (Canada); Adrian Mariampillai, Victor X. D. Yang M.D., Ryerson Univ. (Canada); Gregory J. Czarnota, Sunnybrook Health Sciences Ctr. (Canada); Michael C. Kolios, Ryerson Univ. (Canada) [8230-01]

8:20 am: **Biomechanical assessment of tissue using laser speckle rheology**, Zeinab Hajjarian Kashany, Seemantini K. Nadkarni, Harvard Medical School (USA) [8230-02]

8:40 am: **Eliminating the effect of bulk scattering when measuring skin surface roughness using speckle contrast imaging: a skin phantom study**, Lioudmila Tchivaleva, David I. McLean M.D., Harvey Lui M.D., The Univ. of British Columbia (Canada); Tim K. Lee, The BC Cancer Agency Research Ctr. (Canada) [8230-03]

9:00 am: **Optical histology of microvasculature in thick tissue sections**, Austin J. Moy, Bernard Choi, Beckman Laser Institute and Medical Clinic (USA) [8230-04]

9:20 am: **Tissue dynamics spectroscopy to detect cellular mitosis inside tissue**, Ran An, Kwan Jeong, John J. Turek, David D. Nolte, Purdue Univ. (USA) [8230-05]

9:40 am: **Development of coherent Spatial Frequency Domain Imaging (c-SFDI) for simultaneous determination of optical and dynamical properties of tissue (Invited Paper)**, Tyler B. Rice, Soren D. Konecky, Amaan Mazhar, Alexander J. Lin, Anthony J. Durkin, Bernard Choi, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8230-06]

Coffee Break 10:10 to 10:40 am

SESSION 2

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

Novel Techniques I

Session Chair: **Adam P. Wax**, Duke Univ. (USA)

10:40 am: **Lasing modes in disordered media for single-nanoparticle quantitation: a new approach for biosensing**, Seung Ho Choi, Young L. Kim, Purdue Univ. (USA) [8230-07]

11:00 am: **Time and wavelength resolved measurements of diffusive reflectance on electrically activated tissue phantom confirm depth selectivity of the method**, Michal Kacprzak, Daniel Milej, Anna Gerega, Norbert Zolek, Institute of Biocybernetics and Biomedical Engineering (Poland); Jeremy C. Hebden, Salavat Magazov, Oliver White, Univ. College London (United Kingdom); Adam Liebert, Institute of Biocybernetics and Biomedical Engineering (Poland) [8230-08]

11:20 am: **Use of a radial angular filter array to estimate the position of an absorption target within in a turbid medium**, Yan Zhang, Simon Fraser Univ. (Canada); Fartash Vasefi, Lawson Health Research Institute (Canada); Mohamadreza Najiminaini, Bozena Kaminska, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, The Univ. of Western Ontario (Canada) and Lawson Health Research Institute (Canada) [8230-09]

11:40 am: **High-precision wide-bandwidth spectroscopy of turbid media**, Dmitry Khoptyar, Lund Univ. (Sweden); Muhammad Saleem, National Institute of Lasers and Optronics (Pakistan); Arman Ahamed Subash, Stefan Andersson-Engels, Lund Univ. (Sweden) [8230-10]

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

SESSION 3

Room: 310 (Esplanade) Sat. 1:20 to 3:00 pm

Novel Techniques II

Session Chair: **Adam P. Wax**, Duke Univ. (USA)

1:20 pm: **Experimental measurement of the optical properties of biological tissue using polarized enhanced backscattering (EBS) spectroscopy**, Andrew J. Radosevich, Nikhil N. Mutyal, Jeremy D. Rogers, Vladimir M. Turzhitsky, Vadim Backman, Northwestern Univ. (USA) [8230-11]

1:40 pm: **Optical phase measurements in red blood cells using low-coherence spectroscopy**, Itay Shock, Uri Nevo, Natan T. Shaked, Tel Aviv Univ. (Israel) [8230-12]

2:00 pm: **Characterization of the diffusion properties of light through scattering media with a femtosecond laser pulse**, Nathan Curry, Ecole Supérieure de Physique et de Chimie Industrielles (France); Pierre Bondareff, Ecole Supérieure de Physique et de Chimie Industrielles (France) and Univ. Pierre et Marie Curie (France); Mathieu Leclerc, Ecole Supérieure de Physique et de Chimie Industrielles (France); Riccardo Sapienza, Niek F. van Hulst, ICFO - Institut de Ciències Fotòniques (Spain) and ICREA - Institució Catalana de Recerca i Estudis Avançats (Spain); Sylvain Gigan, Ecole Supérieure de Physique et de Chimie Industrielles (France); Samuel Gresillon, Univ. Pierre et Marie Curie (France) [8230-13]

2:20 pm: **The study of influence of radiation therapy on experimental tumor's oxygenation using diffuse optical spectroscopy**, Anna G. Orlova, Institute of Applied Physics (Russian Federation); Anna Maslennikova M.D., Nizhny Novgorod State Medical Academy (Russian Federation) and Institute of Applied Physics (Russian Federation) and N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); German Golubjatnikov, Institute of Applied Physics (Russian Federation); Tatiana Pryanikova, Institute of Applied Physics (Russian Federation) and N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Vladislav A. Kamensky, Institute of Applied Physics (Russian Federation); Tatiana Smirnova, N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Natalia M. Shakhova M.D., Ilya V. Turchin, Institute of Applied Physics (Russian Federation) [8230-14]

2:40 pm: **Hyperspectral stray light imaging of chromosomes: a novel concept for label-free karyotyping**, Rudolf W. Kessler, Reutlingen Univ. (Germany); Karsten Rebner D.V.M., Reutlingen Univ. (Germany) and BASF SE (Germany); Dieter Oelkrug, Eberhard Karls Univ. Tübingen (Germany) [8230-15]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 310 (Esplanade) Sat. 3:30 to 5:20 pm

Modeling and Theory

Session Chair: **Lev T. Perelman**, Harvard Univ. (USA)

3:30 pm: **Improved empirical models for extraction of tissue optical properties from reflectance spectra (Invited Paper)**, Katherine Calabro, Evgeni Aizenberg, Irving J. Bigio, Boston Univ. (USA) [8230-16]

4:00 pm: **Determination of the scattering coefficient, the reduced scattering coefficient, and the anisotropy factor of tissue with differential interference contrast microscopy**, Bianca DeAngelo, Patrick Shanley, Grant Arzumanov, Fairfield Univ. (USA); Zhang Xu, Wenzhou Medical College (China); Min Xu, Fairfield Univ. (USA) [8230-17]

4:20 pm: **Superresolution imaging for spatial light interference microscopy**, Kaiqin Chu, NSF Ctr. for Biophotonics Science and Technology (USA) [8230-18]

4:40 pm: **Monte Carlo simulations of polarimetric response of healthy and cancerous human tissues**, Maria Rosaria Antonelli, Angelo Pierangelo, Tatiana Novikova, Ecole Polytechnique (France); Pierre Validire, Abdelali Benali, Brice Gayet, Institut Mutualiste Montsouris (France); Antonello De Martino, Ecole Polytechnique (France) [8230-19]

Conference 8230 · Room: 310 (Esplanade)

5:00 pm: **Numerical modelling and in vivo analysis of fluorescent and laser light backscattered from glial brain tumours**, Tatiana A. Savelieva, Nina Kalyagina, Maria Kholodtsova, A. M. Prokhorov General Physics Institute (Russian Federation); Aleksandr Potapov, Sergey Goryainov, N.N. Burdenko Neurosurgical Institute (Russian Federation); Victor B. Loschenov, A. M. Prokhorov General Physics Institute (Russian Federation) [8230-20]

BiOS Hot Topics
Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm
Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 5

Room: 310 (Esplanade) Sun. 8:20 to 10:20 am

In Vitro

Session Chair: Vadim Backman, Northwestern Univ. (USA)

8:20 am: **Cellular morphology measurement using high-speed two-dimensional angle-resolved low-coherence interferometry** (*Invited Paper*), Michael G. Giacomelli, Adam P. Wax, Duke Univ. (USA) [8230-21]

8:50 am: **Determining the orientation of subsurface light scattering structures with spatial frequency domain imaging**, Soren D. Konecky, Tyler B. Rice, Anthony J. Durkin, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8230-22]

9:10 am: **Direct and highly sensitive measurement of the spatial arrangement of microstructures within biological samples**, Nada N. Boustany, Heidy Sierra, Robert M. Pasternack, Bryan Rabin, Rutgers, The State Univ. of New Jersey (USA) [8230-23]

9:30 am: **Correlating the light scattering pattern of a biological cell to its mitochondrial properties using a Gabor filter technique**, Marina Moran, Xinhua Hu, Jun Q. Lu, East Carolina Univ. (USA) [8230-24]

9:50 am: **Light scattering based monitoring of leukemic cells in flowing in vitro blood samples** (*Invited Paper*), Irene Georgakoudi, Cherry A. Greiner, Martin Hunter, Tufts Univ. (USA) [8230-25]

Coffee Break 10:20 to 10:40 am

SESSION 6

Room: 310 (Esplanade) Sun. 10:40 am to 12:20 pm

Low Coherence Light Scattering

Session Chair: Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA)

10:40 am: **Digital Fourier holography for wide-field characterization of microstructures** (*Invited Paper*), David D. Sampson, The Univ. of Western Australia (Australia) [8230-26]

11:10 am: **Speckle reduction using wavefront modulation for multifunctional optical coherence tomography**, Christian M. Oh, Univ. of California, Riverside (USA); Chenyu Feng, Stanford Univ. (USA); Yan Wang, B. Hyle Park, Univ. of California, Riverside (USA); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) [8230-27]

11:30 am: **Detecting nanoparticles and cells with optical coherence microscopy**, Noelia L. Bocchio, Christophe Pache, Martin L. Villiger, Arno Bouwens, Corinne Berclaz, Christian Santschi, Anne Grapin-Botton, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8230-28]

11:50 am: **Probing biological tissue morphology and function with coherent light scattering imaging techniques** (*Invited Paper*), Yingtian Pan, Hugang Ren, Zhijia Yuan, Zhongchi Luo, Ki Park, Congwu Du, Stony Brook Univ. (USA) [8230-29]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 7

Room: 310 (Esplanade) Sun. 1:30 to 4:30 pm

Clinical and Pre-Clinical

Session Chair: Irving J. Bigio, Boston Univ. (USA)

1:30 pm: **Recent progress in angle-resolved low-coherence interferometry and its application for detecting intestinal dysplasia**, Yizheng Zhu, Neil G. Terry, Julie Thacker, John Migaly, Cynthia Guy, Christopher R. Mantyh, Adam P. Wax, Duke Univ. (USA) [8230-30]

1:50 pm: **Subdiffractive differences in macromolecular density distribution detected in the field of esophageal cancer**, Lusik Cherkezyan, Northwestern Univ. (USA); Vani Konda, The Univ. of Chicago Medical Ctr. (USA); Hariharan Subramanian, Northwestern Univ. (USA); Kristen Wroblewski, The Univ. of Chicago Medical Ctr. (USA); Dhwanil Damania, Northwestern Univ. (USA); Leah Karl, The Univ. of Chicago Medical Ctr. (USA); Michael J. Goldberg, NorthShore Univ. HealthSystem (USA); Irving Waxman, The Univ. of Chicago Medical Ctr. (USA); Hemant K. Roy, NorthShore Univ. HealthSystem (USA); Vadim Backman, Northwestern Univ. (USA) [8230-31]

2:10 pm: **Nanomorphology-based cancer diagnosis via spatial-domain low-coherence quantitative phase microscopy** (*Invited Paper*), Yang Liu, Rajan K. Bista, Pin Wang, Uttam Shikhar, Rohit Bhargava, Douglas J. Hartman, Staton Kevin, Randall E. Brand M.D., Univ. of Pittsburgh Medical Ctr. (USA) [8230-32]

2:30 pm: **In vivo risk stratification of colon carcinogenesis by measurement of optical properties with novel lens-free fiber optic probe using low-coherence enhanced backscattering spectroscopy (LEBS)** (*Invited Paper*), Nikhil N. Mutyal, Andrew J. Radosevich, Jeremy D. Rogers, Northwestern Univ. (USA); Michael J. Goldberg, Laura Bianchi, Nela Krosjnar, Boris Jancan, Hemant K. Roy, NorthShore Univ. HealthSystem (USA); Vadim Backman, Northwestern Univ. (USA) [8230-33]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Measuring nanoscale refractive-index alterations in the field of ovarian cancer using partial wave spectroscopic microscopy**, Dhwanil Damania, Hariharan Subramanian, Lusik Cherkezyan, Yuanjia Zhu, Craig White, Prabhakar Pradhan, Hemant K. Roy, Vadim Backman, Northwestern Univ. (USA) [8230-34]

3:50 pm: **Enhanced tumor contrast during breast lumpectomy provided by independent component analysis of localized reflectance measures**, Alma Eguizabal, Univ. de Cantabria (Spain); Ashley M. Laughney, Thayer School of Engineering at Dartmouth (USA); Pilar Beatriz Garcia-Allende, Helmholtz Zentrum München GmbH (Germany); Venkataramanan Krishnaswamy, Thayer School of Engineering at Dartmouth (USA); Wendy A. Wells, Dartmouth Hitchcock Medical Ctr. (USA); Keith D. Paulsen, Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA); Jose M. Lopez-Higuera, Olga M. Conde, Univ. de Cantabria (Spain) [8230-35]

4:10 pm: **Non-invasive detection of periodontal disease using diffuse reflectance spectroscopy: a clinical study**, Chandra Sekhar Prasanth, Ctr. for Earth Science Studies (India); Joseph Betsy, Government Dental College, Thiruvananthapuram (India); Subhash Narayanan, Ctr. for Earth Science Studies (India); Janam Prasanthila, Government Dental College, Thiruvananthapuram (India) [8230-36]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

Polarized Monte Carlo simulation of blood vessel structure in colon tissue. Wendy Yip, Andrew Gomes, Alan V. Sahakian, Vadim Backman, Northwestern Univ. (USA) [8230-37]

Optimal attenuation of the unscattered light for spatial light interference microscopy. Kaiqin Chu, Univ. of Rochester (USA) [8230-38]

Blind breast tissue diagnosis using independent component analysis of localized backscattering response. Alma Eguizabal, Univ. de Cantabria (Spain); Ashley M. Laughney, Thayer School of Engineering at Dartmouth (USA); Pilar Beatriz García-Allende, Helmholtz Zentrum München GmbH (Germany); Venkataramanan Krishnaswamy, Thayer School of Engineering at Dartmouth (USA); Wendy A. Wells, Dartmouth Hitchcock Medical Ctr. (USA); Keith D. Paulsen, Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA); Jose M. Lopez-Higuera, Olga M. Conde, Univ. de Cantabria (Spain) . . . [8230-39]

Development of a next-generation fully integrated hybrid FMT/XCT system. Maximilian Koch, Angelique B. F. Ale, Pouyan Mohajerani, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8230-40]

Optical reflectance spectroscopy with a double-clad fiber for measurements of blood oxygenation. Rocio del Pilar Soto Astorga, Edward Z. Zhang, Jan G. Laufer, Jeremy C. Hebden, Adrien E. Desjardins, Univ. College London (United Kingdom) [8230-41]

Generalized pulse spectrum technique for diffuse optical tomography based on the third-order spherical harmonics approximation to radiative transfer equation. Wenjuan Ma, Feng Gao, Linhui Wu, Xi Yi, Huijuan Zhao, Tianjin Univ. (China) [8230-42]

Polarized reflectance spectroscopy based on polarization maintaining single-mode optical fiber. Vladislav A. Kamensky, Andrey N. Morozov, Mikhail Y. Kirillin, Institute of Applied Physics (Russian Federation); Maria Shakhova, Nizhny Novgorod Regional Hospital (Russian Federation); Ilya V. Turchin, Institute of Applied Physics (Russian Federation) [8230-43]

Development and Eigenvalue calibration of an automated spectral Mueller matrix system for biomedical polarimetry. Harsh Purwar, Indian Institute of Science Education and Research Kolkata (India); Shubham Chandel, Ctr. of Excellence in Lasers and Opto-electronic Sciences (India); Harshit Lakhota, Chitram Banerjee, Jalpa Soni, Nirmalya Ghosh, Indian Institute of Science Education and Research Kolkata (India) [8230-44]

A new imaging technique for the study of polarimetric properties using light polarization. Isabella C. Buscemi, Steve Guyot, Univ. Paris 12 - Val de Marne (France) [8230-45]

Investigation of diffusely backscattered Mueller matrix pattern of poly-disperse suspensions. Ping Sun, Xianping Cao, Beijing Normal Univ. (China) [8230-46]

The reconstruction algorithm for endoscopic diffuse optical tomography based on effective detection area. Zhuanping Qin, Huijuan Zhao, Xiaoqing Zhou, Yanshuang Yang, Feng Gao, Tianjin Univ. (China) [8230-47]

Diffuse photon-pairs density wave for the detection of changes of glucose in highly scattering medium. Li-Ping Yu, Chien Chou, Chang Gung Univ. (Taiwan); Li-Chen Su, Jheng-Syong Wu, National Central Univ. (Taiwan); Yu-Te Wu, National Yang Ming Univ. (Taiwan); Chao-Sung Lai, Chang Gung Univ. (Taiwan) [8230-48]

Nondestructive determination of absolute concentration of admixtures in turbid media by means of diffuse reflectance spectrophotometry without phantom calibration and preliminary measurements. Alexander V. Lappa, Anton N. Kulikovskiy, Artem Kulikovskiy, Chelyabinsk State Univ. (Russian Federation); Valeriy A. Privalov, Chelyabinsk State Medical Academy (Russian Federation) [8230-49]

Experimental estimation of the sensitivity profile of time-resolved diffuse reflectance: experiments on cadavers. Piotr Sawosz, Michal Kacprzak, Institute of Biocybernetics and Biomedical Engineering (Poland); Wojciech Weigl, Aleksandra Borowska-Solonyanko, Pawel Krajewski, Medical Univ. of Warsaw (Poland); Norbert Zolek, Roman Maniewski, Adam Liebert, Institute of Biocybernetics and Biomedical Engineering (Poland) [8230-50]

Single-mode and subcellular fiber probes for cell scattering and density variation measurements. Dimitrios Kokkinos, Regina Sullivan, Nidhi Gadura, Sunil Dehipawala, George Tremberger, Jr., Todd Holden, Pat Schneider, David Lieberman, Tak D. Cheung, Queensborough Community College (USA) [8230-51]

Courses of Related Interest

SC1013 Choosing the Correct Optical Filter for Your Application (Reichel)
Tuesday, 1:30 to 5:30 pm

SC1054 Bio-Interferometry (Nolte) Sunday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VIII

Conference Chairs: **Alexander N. Cartwright**, Univ. at Buffalo (USA); **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

Program Committee: **Igal Brener**, Sandia National Labs. (USA); **Vamsy P. Chodavarapu**, McGill Univ. (Canada); **Philippe M. Fauchet**, Univ. of Rochester (USA); **Piotr Grodzinski**, National Cancer Institute (USA); **Brian D. MacCraith**, Dublin City Univ. (Ireland); **Ammasi Periasamy**, Univ. of Virginia (USA); **Paras N. Prasad**, Univ. at Buffalo (USA); **Weihong Tan**, Univ. of Florida (USA)

Wednesday 25 January

Keynote Session

Room: 276 (Mezzanine) Wed. 8:50 to 9:50 am

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

8:50 am: **Engineering nanodevices based on molecular motors**, Henry Hess, Columbia Univ. (USA) [8231-33]

9:20 am: **Molecular motors in artificial and natural world**, Dan V. Nicolau, Univ. of Liverpool (United Kingdom) [8231-35]

KEYNOTE DISCUSSION

Room: 276 (Mezzanine) Wed. 9:50 to 10:00 am

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

Coffee Break 10:00 to 10:30 am

SESSION 1

Room: 276 (Mezzanine) Wed. 10:30 am to 12:30 pm

Imaging I

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

10:30 am: **Imaging caveolae-mediated transport of nanoparticles using superresolution microscopy**, Zhenjia Wang, Chinnaswamy Tirupathi, Richard Minshall, Asrar B. Malik, Univ. of Illinois at Chicago (USA) [8231-01]

10:50 am: **Tunable near-infrared dispersive quantitative phase microscopy**, Nelson Cardenas, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8231-02]

11:10 am: **Multiprobe AFM bio-imaging: the next evolution in SPM**, Aaron Lewis, Hebrew Univ. of Jerusalem (Israel); Rimma Dekhter, Galina Fish, Sofia Kokotov, Michael Kokotov, Hesham Taha, David Lewis, Nanonics Imaging Ltd. (Israel) [8231-03]

11:30 am: **Development of photonic force microscopy with chemical mapping function**, Seungjin Heo, Kipom Kim, Yong-Hoon Cho, KAIST (Korea, Republic of) [8231-04]

11:50 am: **Investigation of nanostructure scattering and absorption for combined optical diagnostic and therapeutic applications**, Myria Angelidou, Costas Pitris, Univ. of Cyprus (Cyprus) [8231-07]

12:10 pm: **Multifunctional cell therapeutics with plasmonic nanobubbles**, Dmitri Lapotko, Rice Univ. (USA) [8231-25]

Lunch/Exhibition Break 12:30 to 1:50 pm

SESSION 2

Room: 276 (Mezzanine) Wed. 1:50 to 3:10 pm

Imaging II

Session Chair: **Dan V. Nicolau**, Univ. of Liverpool (United Kingdom)

1:50 pm: **Multimodal spatially resolved near-field scattering and absorption spectroscopy**, Edwin Ostertag, Tobias Merz, Rudolf W. Kessler, Reutlingen Univ. (Germany) [8231-05]

2:10 pm: **Near-field coherent anti-Stokes Raman scattering microscopy using radially polarized light**, Kenneth Er, Jian Lin, Zhiwei Huang, National Univ. of Singapore (Singapore) [8231-06]

2:30 pm: **Tracking of optically trapped particle in three dimensions by off-axis digital holographic microscopy**, Yoon-Sung Bae, Seung Bum Cho, Jong-In Song, Gwangju Institute of Science and Technology (Korea, Republic of); Dug Young Kim, Yonsei Univ. (Korea, Republic of) [8231-08]

2:50 pm: **In vivo visualization of abnormal microvascular features in oral precancerous lesions by two-photon luminescence of gold nanorods**, Gracie Vargas, Saam Motamedi, Kristopher Trahan, Tuya Shilagard, Kert Edward, Suimin Qiu M.D., The Univ. of Texas Medical Branch (USA) [8231-09]

Coffee Break 3:10 to 3:30 pm

SESSION 3

Room: 276 (Mezzanine) Wed. 3:30 to 5:10 pm

Nanoparticles for Imaging and Sensing

Session Chair: **Alexander N. Cartwright**, Univ. at Buffalo (USA)

3:30 pm: **Double resonance light scattering from gold nanoparticles on interferometric surfaces**, Karen Hayrapetyan, David D. Nolte, Cagri A. Savran, Khalid M. Arif, Purdue Univ. (USA) [8231-10]

3:50 pm: **Diffraction-based nanoparticle biosensors**, Hao Sun, Karen Hayrapetyan, David D. Nolte, Cagri A. Savran, Purdue Univ. (USA) [8231-11]

4:10 pm: **Utilizing nonlinear optical properties of nanoparticles for imaging and sensing**, Brian G. Yust, Neema Razavi, Francisco Pedraza, Dhiraj K. Sardar, The Univ. of Texas at San Antonio (USA) [8231-12]

4:30 pm: **Toward the use of two-color emission control in upconverting NaYF₄:Er³⁺, Yb³⁺ nanoparticles for biomedical imaging**, Christian F. Gainer, Gihan S. Joshua, Marek Romanowski, The Univ. of Arizona (USA) [8231-13]

4:50 pm: **Study on translating the nanoparticle-protein corona into microbubble contrast agents**, Wen-Kai Chuang, Walter H. Chang, Tzu-Yun Huang, Ching-ta Chen, Chung Yuan Christian Univ. (Taiwan); Wen-Fu T. Lai, Taipei Medical Univ. (Taiwan); Cheng-An J. Lin, Chung Yuan Christian Univ. (Taiwan) [8231-14]

POSTERS - WEDNESDAY**Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 pm**

Conference attendees are invited to attend the BIOS 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 at <http://spie.org/x27476.xml>.

Concentration and detection of bacteria in virtual environmental samples based on non-immunomagnetic separation and quantum dots by using a laboratory-made system, Zhi Cheng, Taihu Wu, Feng Chen, Yaohua Du, Biao Gu, Zijian Yang, Institute of Medical Equipment (China) [8231-15]

Thursday 26 January**SESSION 4****Room: 276 (Mezzanine) Thurs. 8:00 to 10:10 am****Nanostructures for Biomedical Applications I***Session Chair: Natalia M. Litchinitser, Univ. at Buffalo (USA)*

8:00 am: **Optical mapping by low-cost instrumentation and disposable chemically induced nanochannels** (*Invited Paper*), Philip J. R. Roche, Maurice C. K. Cheung, McGill Univ. (Canada); Lenore Beitel, Mark A. Trifiro M.D., Lady Davis Institute, Jewish General Hospital (Canada); Andrew G. Kirk, Vamsy P. Chodavarapu, McGill Univ. (Canada) [8231-16]

8:30 am: **Surface-enhanced biodetection on a CMOS biosensor chip**, Federico Belloni, Falko Pippig, Sylvain Contie, Florence Vicaire, PixinBio SA (France); Róisín M. Owens, Ecole Nationale Supérieure des Mines de Saint-Étienne (France); Hervé Rigneault, Institut Fresnel (France) [8231-17]

8:50 am: **Porous polymer-based optically selective nanostructures**, Alexander N. Cartwright, Univ. at Buffalo (USA) [8231-18]

9:10 am: **Bragg-grating air-slot optical waveguide for label-free sensing**, Aju S. Jugessur, James J. Dou, Mariya Yagnyukova, J. Stewart Aitchison, Univ. of Toronto (Canada) [8231-19]

9:30 am: **A nanorod polymer micro-array formed by microcontact printing**, Philip J. R. Roche, Songzhe Wang, Maurice C. K. Cheung, Vamsy P. Chodavarapu, Andrew G. Kirk, McGill Univ. (Canada) [8231-20]

9:50 am: **Silicon cell culture templates with nanotopography: periodic nanostructures and random nanoporous topologies generated by high repetition-rate sub-15-femtosecond pulsed near-infrared laser light**, Martin H. Straub, Aisada Uchugonova, Karsten König, Univ. des Saarlandes (Germany) [8231-21]

Coffee Break 10:10 to 10:50 am

SESSION 5**Room: 276 (Mezzanine) Thurs. 10:50 am to 12:00 pm****Nanostructures for Biomedical Applications II***Session Chair: Alexander N. Cartwright, Univ. at Buffalo (USA)*

10:50 am: **Novel micro, nano, and meta structures for sensing** (*Invited Paper*), Natalia M. Litchinitser, Apra Pandey, Univ. at Buffalo (USA); Roshni Biswas, The Univ. of Southern California (USA); Tania Moein, Jinwei Zeng, Edward Furlani, Alexander N. Cartwright, Univ. at Buffalo (USA) . [8231-22]

11:20 am: **Studying split mesa photonic crystal gratings for self-referencing in microfluidic optical biosensing**, Ryan Schilling, Univ. of Toronto (Canada) [8231-23]

11:40 am: **Transmission characteristics of SWCNT-deposited microtapered long-period fiber gratings with the variation in O₂ gas**, Young-Geun Han, Naram Jun, Whikun Yi, Hanyang Univ. (Korea, Republic of) [8231-24]

Lunch/Exhibition Break 12:00 to 1:50 pm

SESSION 6**Room: 276 (Mezzanine) Thurs. 1:50 to 3:30 pm****Nanostructures for Biomedical Applications III***Session Chair: Vamsy P. Chodavarapu, McGill Univ. (Canada)*

1:50 pm: **Periodic two-dimensional nanobottle structures for SERS applications**, Haiping M. Chen, Lin Pang, Univ. of California, San Diego (USA); Grace M. Hwang, The MITRE Corp. (USA); Yeshaiah Fainman, Univ. of California, San Diego (USA); Lee Cambrea, Naval Air Warfare Ctr. Weapons Div. (USA) [8231-26]

2:10 pm: **Raman spectroscopy hyperspectral imager based on volume Bragg gratings**, Sébastien Blais-Ouellette, Marc Verhaegen, Stephane Marcet, Photon etc. Inc. (Canada); Richard Martel, Univ. de Montréal (Canada) [8231-27]

2:30 pm: **Computer simulation of lipid bilayer detection using ion-sensitive field-effect transistors**, Shigeyasu Uno, Ritsumeikan Univ. (Japan) . . [8231-28]

2:50 pm: **Selective surface functionalization of zero-mode waveguides to study membrane dynamics in living cells**, Chia-Fen Hsieh, Chih-Ting Chen, Shui-Chin Lai, Academia Sinica (Taiwan); Yii-Lih Lin, National Taiwan Univ. (Taiwan); Kuo-Tang Liao, Shengqin Wang, Po-Chieh Chiang, Chia-Fu Chou, Academia Sinica (Taiwan) [8231-29]

3:10 pm: **FDTD simulation on refractive index sensitivity of bow-tie metallic nanostructure**, Tingjun Luo, Weiping Zhang, Guangxi Univ. (China) . . [8231-30]

Courses of Related Interest

- SC463 Biophotonics (Prasad) Sunday, 8:30 am to 5:30 pm
 SC1013 Choosing the Correct Optical Filter for Your Application (Reichel) Tuesday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Colloidal Nanocrystals for Biomedical Applications VII

Conference Chairs: **Wolfgang J. Parak**, Philipps-Univ. Marburg (Germany); **Kenji Yamamoto**, National Ctr. for Global Health and Medicine (Japan); **Marek Osinski**, The Univ. of New Mexico (USA)

Program Committee: **Antigoni Alexandrou**, Ecole Polytechnique (France); **Maxime Dahan**, Lab. Kastler Brossel (France); **Jesus Martinez de la Fuente**, Univ. de Zaragoza (Spain); **Niko Hildebrandt**, Institut d'Électronique Fondamentale (France); **Jennifer A. Hollingsworth**, Los Alamos National Lab. (USA); **Thomas M. Jovin**, Max-Planck-Institut für biophysikalische Chemie (Germany); **Hedi Mattoussi**, The Florida State Univ. (USA); **Igor L. Medintz**, U.S. Naval Research Lab. (USA); **Paul Mulvaney**, The Univ. of Melbourne (Australia); **Jay L. Nadeau**, McGill Univ. (Canada); **Geoffrey F. Strouse**, The Florida State Univ. (USA); **Subramanian Tamil Selvan**, A*STAR Institute of Materials Research and Engineering (Singapore); **Claudia Tortiglione**, Istituto di Cibernetica Eduardo Caianiello (Italy); **Tania Q. Vu**, Oregon Health & Science Univ. (USA); **Horst Weller**, Univ. Hamburg (Germany)

Saturday 21 January

Welcome Remarks

Room: 250 (Mezzanine).....Sat. 8:00 am

Session Chair: **Wolfgang J. Parak**, Philipps-Univ. Marburg (Germany)

SESSION 1

Room: 250 (Mezzanine)..... Sat. 8:05 to 10:35 am

Targeting of Cellular Structures and Sensing

Session Chair: **Marek Osinski**, The Univ. of New Mexico (USA)

8:05 am: **Interactions of gold nanoparticles and biological systems** (*Invited Paper*), Antonios G. Kanaras, Dorota Bartczak, Otto L. Muskens, Tilman Sanchez-Elsner, Timothy M. Millar, Univ. of Southampton (United Kingdom)..... [8232-01]

8:35 am: **Fluorescent diamond nanoparticle: a stable marker for the functional study of dendritic spines of mouse cortical neurons in culture** (*Invited Paper*), Loc Le Xuan, Ecole Normale Supérieure de Cachan (France); Aude-Marie Lepagnol-Bestel, Ctr. de Psychiatrie et Neurosciences (France) and Ctr. National de Génotypage (France); Marie-Pierre Adam, Ecole Normale Supérieure de Cachan (France); Géraldine Dantelle, Ecole Polytechnique (France); Huan-Cheng Chang, Institute of Atomic and Molecular Sciences (Taiwan); Michel Simonneau, Univ. Paris Descartes (France); François Treussart, Ecole Normale Supérieure de Cachan (France)..... [8232-02]

9:05 am: **Quantum-dots (QD) nanobiosensors for simultaneous dynamic measurements of multiple intracellular ions' concentrations**, Lid B. Wong, Hua Mao, Yuchi Wang, Cytopitics Corp. (USA)..... [8232-03]

9:15 am: **Differences in reactive oxygen species generation by quantum dots: core material and ligand comparisons**, Amber Nagy, Andrea Steinbrück, Yagnaseni Ghosh, Allison M. Dennis, Rashi S. Iyer, Jennifer A. Hollingsworth, Los Alamos National Lab. (USA)..... [8232-04]

9:25 am: **Aquatic organisms as new high-throughput systems for bio-nan bio interactions** (*Invited Paper*), Alfredo Ambrosone, Valentina Marchesano, Lucia Mattered, Angela Tino, Claudia Tortiglione, Istituto di Cibernetica Eduardo Caianiello (Italy)..... [8232-05]

9:55 am: **Optical sensing of small ions with colloidal nanoparticles** (*Presentation Only*), Wolfgang J. Parak, Philipps-Univ. Marburg (Germany)..... [8232-06]

10:05 am: **Biodegradable polymer nanocarriers for therapeutic sense and antisense microRNA delivery in living animals** (*Invited Paper*), Ramasamy Paulmurugan, Narayana M. Sekar, Thillai V. Sekar, Stanford Univ. School of Medicine (USA)..... [8232-07]

Coffee Break 10:35 to 10:55 am

SESSION 2

Room: 250 (Mezzanine)..... Sat. 10:55 am to 1:05 pm

Loading of Cells with Nanoparticles and Toxic Effects

Session Chair: **Claudia Tortiglione**, Istituto di Cibernetica Eduardo Caianiello (Italy)

10:55 am: **Photothermal microscopy of metallic and magnetic nanoparticles in cells** (*Invited Paper*), Lara K. Bogart, Yann Cesbron, Umbreen Shaheen, Arthur W. Taylor, Raphael Levy, Univ. of Liverpool (United Kingdom) .. [8232-08]

11:25 am: **Synaptosomes as a platform for loading nanoparticles into synaptic vesicles**, Daniel T. Chiu, Univ. of Washington (USA)..... [8232-09]

11:45 am: **Peptide-mediated cellular delivery of quantum dots**, Kelly Boeneman, James Delehanty, Michael Stewart, Kimihiro Susumu, U.S. Naval Research Lab. (USA); Juan B. Blanco-Canosa, Philip Dawson, The Scripps Research Institute (USA); Alan Huston, Igor L. Medintz, U.S. Naval Research Lab. (USA)..... [8232-10]

12:05 pm: **Effective silencing of a proto-oncogene through nanoparticle mediated RNA interference in hydra-vulgaris**, Claudia Tortiglione, Alfredo Ambrosone, Valentina Marchesano, Istituto di Cibernetica Eduardo Caianiello (Italy); Jesus M. de la Fuente, Instituto de Nanociencia de Aragon (Spain)..... [8232-12]

12:25 pm: **CdTe/CdS-AMP quantum dots as fluorescent probes to label yeast cells: synthesis, characterization, and conjugation with Concanavalin A**, Caetano P. Sabino, Camila Campos Santos, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Denise Azevedo, Univ. Federal de Pernambuco (Brazil); Ilka T. Kato, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Paulo E. Cabral Filho, Univ. Federal de Pernambuco (Brazil); Renato A. Prates, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Adriana Fontes, Beate S. Santos, Univ. Federal de Pernambuco (Brazil); Martha Simões Ribeiro, Instituto de Pesquisas Energéticas e Nucleares (Brazil)..... [8232-13]

12:35 pm: **Impact of nanomaterials on in vitro and in vivo systems: role of nanoscale features in nanotoxicology** (*Invited Paper*), Pier P. Pompa, Istituto Italiano di Tecnologia (Italy)..... [8232-14]

Lunch/Exhibition Break 1:05 to 2:15 pm

SESSION 3

Room: 250 (Mezzanine)..... Sat. 2:15 to 3:05 pm

Selective Destruction and Delivery to Cells I

Session Chair: **Dorleta Jimenez de Aberasturi**, Univ. del País Vasco (Spain)

2:15 pm: **Engineered nanoparticles for improved vasoactive intestinal peptide (VIP) applications in immune modulation** (*Invited Paper*), David Pozo Perez, Rebecca Klippstein, Ctr. Andaluz de Biología Molecular y Medicina Regenerativa (Spain)..... [8232-15]

2:45 pm: **Quantum dots: aluminium phthalocyanine conjugates perform the photodynamic therapy to kill cancer cells by FRET**, Ji Yao Chen, Fudan Univ. (China)..... [8232-16]

Coffee Break 3:05 to 3:25 pm

SESSION 4

Room: 250 (Mezzanine) Sat. 3:25 to 5:15 pm

Selective Destruction and Delivery to Cells II

Session Chair: David Pozo Perez,

Ctr. Andaluz de Biología Molecular y Medicina Regenerativa (Spain)

3:25 pm: **Small NIR-to-VIS upconverting nanoparticles for photodynamic therapy** (*Invited Paper*), Yong Zhang, Niagara Muhammad Idris, National Univ. of Singapore (Singapore) [8232-17]3:55 pm: **Photosensitization of InP/ZnS quantum dots for anti-cancer and anti-microbial applications**, Jay L. Nadeau, Hicham Chibli, Lina Carlini, McGill Univ. (Canada) [8232-18]4:15 pm: **Cells as factories for humanized encapsulation**, Dayang Wang, Univ. of South Australia (Australia) [8232-19]4:45 pm: **Antimicrobial properties of sub-nanometer silver clusters: a key to understand the biocide properties of silver?** (*Invited Paper*), M. Arturo Lopez-Quintela, Univ. de Santiago de Compostela (Spain); Javier Calvo, Nanogap (Spain); Fernando Dominguez, Jose Neissa, Univ. de Santiago de Compostela (Spain); Jose Maria Leal, Begonia Garcia, Natalia Busto, Univ. de Burgos (Spain); Giampaolo Barone, Univ. degli Studi di Palermo (Italy) [8232-20]

SESSION 5

Room: 250 (Mezzanine) Sat. 5:15 to 6:25 pm

Nanoparticles for Imaging

Session Chair: M. Arturo Lopez-Quintela,
Univ. de Santiago de Compostela (Spain)5:15 pm: **Synthesis and characterization of fluorescent dyes: magnetic nanoparticles for bioimaging applications**, Swee Kuan Yen, D. Janczewski, Surani Bin Dolmanan, Sudhiranjan Tripathy, Subramanian T. Selvan, A*STAR Institute of Materials Research and Engineering (Singapore) [8232-21]5:35 pm: **Multifunctional superparamagnetic nanocrystals for imaging and targeted drug delivery to the lung**, Leisha M. Armijo, Yekaterina Brandt, The Univ. of New Mexico (USA); Dale L. Huber, Sandia National Labs. (USA); Nathan J. Withers, John B. Plumley, Nathaniel C. Cook, Antonio C. Rivera, Gennady A. Smolyakov, Surabhi Yadav, The Univ. of New Mexico (USA); Hugh D. C. Smyth, The Univ. of Texas at Austin (USA); Marek Osinski, The Univ. of New Mexico (USA) [8232-22]5:55 pm: **Nanoparticles: present and future towards molecular imaging** (*Invited Paper*), Parasuraman Padmanabhan, Abma Asad, PWG Genetics Pte Ltd. (Singapore) [8232-23]

BiOS Hot Topics

Room: 134 (Exhibit Level) Sat. 7:00 to 9:00 pm

Hear the latest technical breakthroughs and directions from leading worldwide experts. See page 16 for details.

Sunday 22 January

SESSION 6

Room: 250 (Mezzanine) Sun. 8:00 to 10:10 am

Surface Modification and Bioconjugation of Nanoparticles I

Session Chair: Jesus M. de la Fuente, Univ. de Zaragoza (Spain)

8:00 am: **Interaction of functionalized metallic nanoparticles with synthetic lipid membranes** (*Invited Paper*), Kislion Voitchovsky, Maria Ricci, Randy P. Carney, Francesco Stellacci, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8232-24]8:30 am: **Stable gold nanocolloids with controllable surface modification and functionalization**, Wei Qian, Makoto Murakami, Yuki Ichikawa, Yong Che, IMRA America, Inc. (USA) [8232-25]8:50 am: **Polymer coating of colloidal nanoparticles as a universal tool for tailoring properties toward biologically motivated experiments** (*Invited Paper*), Feng Zhang, Inner Mongolia Agricultural Univ. (China) [8232-26]9:20 am: **Effects of LaF3:Ce nanoparticles capped with polyethylene glycol on human astrocytoma cells in vitro**, Nathan J. Withers, Yekaterina Brandt, Antonio C. Rivera, Nathaniel C. Cook, Leisha M. Armijo, Marek Osinski, The Univ. of New Mexico (USA) [8232-27]9:40 am: **Framing the nano-biointeractions by proteomics** (*Invited Paper*), Stefania Sabella, Istituto Italiano di Tecnologia (Italy) [8232-28]

Coffee Break 10:10 to 10:30 am

SESSION 7

Room: 250 (Mezzanine) Sun. 10:30 am to 12:00 pm

Surface Modification and Bioconjugation of Nanoparticles II

Session Chair: Jay L. Nadeau, McGill Univ. (Canada)

10:30 am: **Oriented conjugates of monoclonal and single-domain antibodies with quantum dots for flow cytometry and immunohistochemistry diagnostic applications** (*Invited Paper*), Alyona Sukhanova M.D., Univ. de Reims Champagne-Ardenne (France); Klervi Even-Desrumeaux, INSERM (France); Jean-Marc Millot, Univ. de Reims Champagne-Ardenne (France); Patrick Chames, Daniel Baty, INSERM (France); Mikhail Artemyev, Belarusian State Univ. (Belarus); Vladimir A. Oleinikov, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation); Jacques H. M. Cohen M.D., Igor Nabiev, Univ. de Reims Champagne-Ardenne (France) [8232-29]11:00 am: **Functionalized nanoparticles for binding ions from biological fluids** (*Presentation Only*), Dorleta Jimenez de Aberasturi, Idoia Ruiz de Larramendi, Teófilo Rojo, Univ. del País Vasco (Spain); Jose Maria Montenegro Martos, Wolfgang J. Parak, Philipps-Univ. Marburg (Germany) [8232-30]11:20 am: **Intracellular delivery of water dispersed CdTe/CdS quantum dots by fusogenic liposomes**, Rafael Lira, Maria Seabra, Jessica Vasconcelos, Darlene Bezerra, Univ. Federal de Pernambuco (Brazil); Renato Grillo, Univ. Estadual de Campinas (Brazil); Nereide Magalhães, Oleg Krasilnikov, Univ. Federal de Pernambuco (Brazil); Eneida de Paula, Univ. Estadual de Campinas (Brazil); Beate S. Santos, Adriana Fontes, Univ. Federal de Pernambuco (Brazil) [8232-31]11:30 am: **Multifunctional gold nanoparticles for gene silencing** (*Invited Paper*), Vanesa Sanz Beltran, Univ. de Zaragoza (Spain); Joao Conde, Univ. de Zaragoza (Spain) and Univ. Nova Lisboa (Portugal); Yulan Hernandez, M. Ricardo Ibarra, Pedro V. Baptista, Jesus Martinez de la Fuente, Univ. de Zaragoza (Spain) [8232-32]

Lunch/Exhibition Break 12:00 to 1:10 pm

SESSION 8

Room: 250 (Mezzanine) Sun. 1:10 to 3:20 pm

Magnetic Nanoparticles

Session Chair: Subramanian Tamil Selvan,

A*STAR Institute of Materials Research and Engineering (Singapore)

1:10 pm: **Fighting cancer with magnetic nanoparticles and immunotherapy** (*Invited Paper*), Lucía Gutiérrez, Instituto de Ciencia de Materiales de Madrid (Spain); Raquel Mejias, Domingo F. Barber, Consejo Superior de Investigaciones Científicas (Spain); Sabino Veintemillas-Verdaguer, Carlos J. Serna, Instituto de Ciencia de Materiales de Madrid (Spain); Francisco J. Lázaro, Univ. de Zaragoza (Spain); Maria del Puerto Morales, Instituto de Ciencia de Materiales de Madrid (Spain) [8232-33]1:40 pm: **Photosensitizer-loaded magnetic vesicles as a new MRI-trackable biogenic nanoplatform for multimodal targeted cancer theranostics** (*Invited Paper*), Amanda Andriola Brun, Univ. Paris 7-Denis Diderot (France); Stephanie Bonneau, Univ. Pierre et Marie Curie (France); Nathalie Luciani, Florence Gazeau, Claire Wilhelm, Univ. Paris 7-Denis Diderot (France) [8232-35]2:10 pm: **Stability of iron oxide nanoparticles in aqueous dispersions after laser irradiation in starch environment**, Alexander I. Omelchenko, Emil N. Sobol, Institute on Laser and Information Technologies (Russian Federation) [8232-36]2:20 pm: **Tailoring biocompatible Fe₃O₄ nanoparticles for applications to magnetic hyperthermia** (*Invited Paper*), Maitte Insausti, Javier Hernandez, Idoia Castellanos, Luis Lezama, Izaskun Gil de Muro, Teófilo Rojo, Eneko Garaio, Fernando Plazaola, Univ. del País Vasco (Spain) [8232-37]2:50 pm: **Multifunctional fluorescent and magnetic nanoparticles for biomedical applications** (*Invited Paper*), Subramanian T. Selvan, A*STAR Institute of Materials Research and Engineering (Singapore) [8232-38]

Coffee Break 3:20 to 3:40 pm

Conference 8232 · Room: 250 (Mezzanine)

SESSION 9

Room: 250 (Mezzanine) Sun. 3:40 to 6:10 pm

Metal Nanoparticles

Session Chair: Maite Insausti, Univ. del País Vasco (Spain)

3:40 pm: **Chirality sensing by metal nanoparticles** (*Invited Paper, Presentation Only*), Andres Guerrero-Martinez, Luis M. Liz-Marzán, Univ. de Vigo (Spain) [8232-39]

4:10 pm: **Optical properties and SERS enhancement of gold-silver alloy nanoparticles** (*Invited Paper*), David Rioux, Simon Vallières, Ecole Polytechnique de Montréal (Canada); Philip A. Munoz, Paul Peng, Eric Mazur, Harvard Univ. (USA); Michel Meunier, Ecole Polytechnique de Montréal (Canada) [8232-40]

4:30 pm: **Increased nucleic acid density on gold nanoparticles**, Timothy A. Larson, Denny Nguyen, Konstantin Sokolov, The Univ. of Texas at Austin (USA) [8232-41]

4:40 pm: **Optically dense colloidal nanoparticles as discrete platforms for bio-SERS**, Ramon A. Alvarez-Puebla, Univ. de Vigo (Spain) [8232-42]

5:00 pm: **Highly organized complex plasmonic structures for biodiagnosis** (*Invited Paper*), Nicolas Pazos Perez, Andreas Fery, Univ. Bayreuth (Germany) [8232-43]

5:30 pm: **Inorganic capsules for drug delivery: biocompatible open nanoboxes**, Victor F. Puntes, Institut Català de Nanotecnologia (Spain) [8232-44]

5:50 pm: **Simplifying attachment chemistry for nanocrystal applications in life sciences**, Travis L. Jennings, Sara G. Becker-Catania, Robert C. Triulzi, Guoliang Tao, eBioscience Inc. (USA); Kim Sapsford, Samantha Spindel, Eunkeu Oh, Vaibhav Jain, James Delehanty, Duane E. Prasuhn, Kelly Boeneman, W. Russ Algar, Igor Medintz, U.S. Naval Research Lab. (USA) [8232-56]

POSTERS - SUNDAY

Room: 103 (Exhibit Level) Sun. 5:30 to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday 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 at <http://spie.org/x27476.xml>.

Accurate measurement of systolic blood

Characterization and bioactivity study of nanohydroxyapatite on superhydrophilic vertically aligned carbon nanotubes using optical techniques, Anderson O. Lobo, Fernanda R. Marciano, Univ. do Vale do Paraíba (Brazil); Ana Maria E. Santo, Univ. Federal de São Paulo (Brazil); Joao L. Rangel, Univ. do Vale do Paraíba (Brazil); Ursula A. Mengui, Instituto Nacional de Pesquisas Espaciais (Brazil); Airton A. Martin, Univ. do Vale do Paraíba (Brazil); Evaldo J. Corat, Instituto Nacional de Pesquisas Espaciais (Brazil) [8232-11]

Magnetic properties of functionalized PdFe-based nanoparticles: specific absorption rate (SAR) measurements, Izaskun Gil de Muro, Idoia Castellanos, Luis Lezama, Maite Insausti, Fernando Plazaola, Teófilo Rojo, Univ. del País Vasco (Spain) [8232-34]

Monday 23 January

SESSION 10

Room: 250 (Mezzanine) Mon. 8:00 to 10:15 am

Optical Probes I

Session Chair: Alf Mews, Univ. Hamburg (Germany)

8:00 am: **Are upconverting Ln³⁺ based nanoparticles any good for deep tissue imaging with retention of optical sectioning?** (*Invited Paper*), Frank C. J. M. van Veggel, Univ. of Victoria (Canada) [8232-45]

8:25 am: **Glycine-coated photoluminescent silver nanoclusters**, Vira V. Kravets, Kyle Culhane, Anatoliy O. Pinchuk, Univ. of Colorado at Colorado Springs (USA) [8232-46]

8:45 am: **Rare earth-doped NaYF₄ upconverting nanophosphors for tracking biological processes** (*Invited Paper*), Delia J. Milliron, Emory Chan, Alexis D. Ostrowski, Bruce E. Cohen, Daniel J. Gargas, P. James Schuck, Lawrence Berkeley National Lab. (USA) [8232-47]

9:10 am: **New synthetic route of CdTe/CdS quantum dot performed by electroreduction of TeO**, Rogerio T. Ribeiro, Jessica Dias, Denilson Freitas, Mariana Monteiro, Adriana Fontes, Beate S. Santos, Marcelo Navarro, Giovanna A. Pereira, Univ. Federal de Pernambuco (Brazil) [8232-48]

9:20 am: **Colloidal upconverting Ln³⁺ doped nanoparticles: bio-imaging, cell tracking, and diagnostic medicine** (*Invited Paper*), John A. Capobianco, Concordia Univ. (Canada) [8232-49]

9:50 am: **Bandgap engineering of InP nanocrystal quantum dots through shell thickness and composition** (*Invited Paper*), Allison M. Dennis, Young-Shin Park, Benjamin D. Mangum, Han Htoon, Jennifer A. Hollingsworth, Los Alamos National Lab. (USA) [8232-50]

Coffee Break 10:15 to 10:30 am

SESSION 11

Room: 250 (Mezzanine) Mon. 10:30 am to 12:50 pm

Optical Probes II

Session Chair: Kenji Yamamoto,

National Ctr. for Global Health and Medicine (Japan)

10:30 am: **Quantum dot barcode labels for high-throughput screening assays using droplet microfluidics** (*Invited Paper*), Ralph A. Sperling, Adam R. Abate, Pascaline Mary, Tony Hung, David A. Weitz, Harvard Univ. (USA) [8232-51]

11:00 am: **Understanding “giant” II-VI nanocrystal quantum dots by synthetic manipulations, and spectroscopic and electrochemical methods**, Yagnaseni Ghosh, Benjamin D. Mangum, Han Htoon, Jennifer A. Hollingsworth, Los Alamos National Lab. (USA) [8232-52]

11:20 am: **Design and study of activatable (“OFF/ON”) quantum dots (Qdots) for potential biomedical applications: Ligand selection for Qdot surface modification for controlling Qdot fluorescence quenching and restoration** (*Invited Paper*), Swadeshmukul Santra, Srijita Basumallick, Rajendra N. Mitra, Subhash Banerjee, Rikhav Shah, UCF NanoScience Technology Ctr. (USA) [8232-53]

11:50 am: **Optical spectroscopy of single semiconductor nanocrystals close to gold nanoparticles** (*Invited Paper*), Alf Mews, Xuedan Ma, Tobias Kipp, Univ. Hamburg (Germany); Luis M. Liz-Marzán, Univ. de Vigo (Spain) [8232-54]

12:20 pm: **Facile synthesis of highly fluorescent metal nanoclusters and application in cellular imaging** (*Invited Paper*), Li Shang, René M. Dörlich, Stefan Brandholt, Naghmeh Azadfar, Karlsruher Institut für Technologie (Germany); Gerd Ulrich Nienhaus, Karlsruher Institut für Technologie (Germany) and University of Illinois at Urbana-Champaign (USA) [8232-55]

Courses of Related Interest

- SC463 Biophotonics (Prasad) Sunday, 8:30 am to 5:30 pm
- SC1013 Choosing the Correct Optical Filter for Your Application (Reichel) Tuesday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Conference Chairs: **Samuel Achilefu**, Washington Univ. in St. Louis (USA); **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA)

Program Committee: **Ashok Kumar Mishra**, Indian Institute of Technology Madras (India); **Bohumil Bednar**, Merck & Co., Inc. (USA); **Mikhail Y. Berezin**, Washington Univ. in St. Louis (USA); **Richard B. Dorshow**, Covidien (USA); **Paul M. W. French**, Imperial College London (United Kingdom); **Yueqing Gu**, China Pharmaceutical Univ. (China); **Hisataka Kobayashi**, National Institutes of Health (USA); **D. Michael Olive**, LI-COR Biosciences (USA); **Gabor Patonay**, Georgia State Univ. (USA); **Attila Tarnok**, Univ. Leipzig (Germany); **Yasuteru Urano**, The Univ. of Tokyo (Japan)

Monday 23 January

SESSION 1

Room: 306 (Esplanade) Mon. 8:05 to 10:00 am

Molecular Probes for Targeted Imaging and Therapy

Session Chair: **Samuel Achilefu**, Washington Univ. School of Medicine in St. Louis (USA)

8:05 am: **Targeting drug resistance mechanism for a rapid optical identification of specific antibiotic utility: photosensitizers as multifunctional molecular probes**, Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA) [8233-01]

8:35 am: **Electrospraying of multifunctional microparticles for image-guided delivery of anti-VEGF therapies**, Leilei Zhang, Joshua Mena, Alan Letson M.D., Cynthia Roberts, Ronald X. Xu, The Ohio State Univ. (USA) [8233-02]

8:55 am: **Development of peptide multimers for improved endoscopic targeting of murine colonic dysplasia**, Bishnu Joshi, Sharon J. Miller, Zhongyao Liu, Sakib Elahi, Thomas D. Wang M.D., Univ. of Michigan (USA) [8233-03]

9:15 am: **Cancer therapy utilizing molecular layer deposition (MLD) and self-organized lightwave network (SOLNET): proposal and theoretical prediction**, Tetsuzo Yoshimura, Tokyo Univ. of Technology (Japan) . . . [8233-04]

9:35 am: **Theranostic imaging guided target-specific photo-activatable immunotherapy (PIT)** (*Invited Paper*), Hisataka Kobayashi, National Institutes of Health (USA) [8233-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 306 (Esplanade) Mon. 10:30 to 11:15 am

NIR Probes for Molecular Imaging

Session Chair: **Ashok Kumar Mishra**, Indian Institute of Technology Madras (India)

10:30 am: **Novel water soluble NIR dyes: does charge matter?** (*Invited Paper*), Gabor Patonay, Maged Henary, Garfield Beckford, Alison Daube, Georgia State Univ. (USA) [8233-06]

10:55 am: **Pyrrrolopyrrole Cyanine (PPCy) dyes: A new class of near-infrared fluorophores**, Simon Wiktorowski, Georg M. Fischer, Ewald Daltrozzo, Andreas Zumbusch, Univ. Konstanz (Germany) [8233-09]

Lunch/Exhibition Break 11:15 am to 1:30 pm

SESSION 3

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

Nonbleaching and Ultrasmall Fluorescent Tags I

Joint Session with Conference 8272

Session Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Philip R. Hemmer**, Texas A&M Univ. (USA)

1:30 pm: **Bringing color to electron microscopy with cathodoluminescent nanoparticles** (*Invited Paper*), David Glenn, Huiliang Zhang, Harvard-Smithsonian Ctr. for Astrophysics (USA); Narayanan Kasthuri, Alexei Trifonov, Richard Schalek, Jeff W. Lichtman, Harvard Univ. (USA); Ronald L. Walsworth, Harvard-Smithsonian Ctr. for Astrophysics (USA) [8272-01]

2:00 pm: **Rare-earth doped YAG nanoparticles for high- and super-resolution upconversion imaging** (*Invited Paper*), Roman L. Kolesov, Rolf Reuter, Kangwei Xia, Rainer Stoeber, Andrea Zappe, Jörg Wrachtrup, Univ. Stuttgart (Germany) [8272-02]

2:30 pm: **Nanodiamonds pave the way for fluorescent quantum probes in biology** (*Invited Paper*), David A. Simpson, Liam P. McGuinness, Yan Yan, Alastair Stacey, Liam T. Hall, Dougal Maclaurin, Steven Praver, Paul Mulvaney, The Univ. of Melbourne (Australia); Jörg Wrachtrup, Univ. Stuttgart (Germany); Frank Caruso, Robert E. Scholten, Lloyd Hollenberg, The Univ. of Melbourne (Australia) [8272-03]

Coffee Break 3:00 to 3:30 pm

SESSION 4

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

Nonbleaching and Ultrasmall Fluorescent Tags II

Joint Session with Conference 8272

Session Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Philip R. Hemmer**, Texas A&M Univ. (USA)

3:30 pm: **In vitro and in vivo applications of fluorescent nanodiamonds** (*Invited Paper*), Huan-Cheng Chang, Institute of Atomic and Molecular Sciences (Taiwan) [8272-04]

4:00 pm: **Use of upconverting fluorescent nanoparticles for bioimaging** (*Invited Paper*), Yong Zhang, Niagara Muhammad Idris, Li-Ching Ong, Lei-Yin Ang, Sylvie Alonso, National Univ. of Singapore (Singapore) [8272-05]

4:30 pm: **Tailoring rare earth doped nano-particles for applications from biology to quantum computing**, Zameer U. Hasan, Aras Konjhdzic, Temple Univ. (USA) [8272-06]

Conference 8233 · Room: 306 (Esplanade)

POSTERS - MONDAY

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

Conference attendees are invited to attend the 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, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Interaction of 7-hydroxyquinoline with human serum albumin: revealing the mode of molecular recognition, Najla Al-Lawatia, Thomas Steinbrecher, Osama K. Abou-Zied, Sultan Qaboos Univ. (Oman) [8233-53]

Strain-hardening effect of graphene on a chain of the chitosan for the tissue engineering, Olga E. Glukhova, Irina V. Kirillova, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Vladimir V. Nechaev, Saratov State Technology Univ. (Russian Federation); Anna S. Kolesnikova, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) [8233-54]

The observation research of the differences in cell death and reactive oxygen species in the process of infecting Arabidopsis with avirulent strains, Wen Li Chen, Hua Bing Liu, South China Normal Univ. (China) [8233-55]

The observation of mitochondrial movement and ATG5 position in Arabidopsis during the process of infection with virulent and avirulent P. syringae strains, Wen Li Chen, Liu Yang, South China Normal Univ. (China) [8233-56]

Fluorescent nanodiamonds as highly stable biomarker for endotoxin verification, Thorsten Bergmann, Jan Michael Burg, Maria Lilholt, Ulf Maeder, Sebastian Beer, Denise Salzig, Mehrdad Ebrahimi, Peter Czermak, Martin Fiebich, Technische Hochschule Mittelhessen (Germany) [8233-57]

Real-time point-of-care measurement of impaired renal function in a rat acute injury model employing exogenous fluorescent tracer agents, Richard B. Dorshow, Richard M. Fitch, Jollette K. Wojdyla, Amruta R. Poreddy, John N. Freskos, Raghavan Rajagopalan, Covidien (USA) [8233-58]

Tuesday 24 January

SESSION 5

Room: 306 (Esplanade) Tues. 8:40 to 10:00 am

Fluorescence Foundations for Probing and Imaging

Session Chair: Ramesh Raghavachari,
U.S. Food and Drug Administration (USA)

8:40 am: **Excited-state prototropism-based fluorescent molecular probes for lipid bilayer membranes**, Ashok Kumar Mishra, Monalisa Mohapatra, Indian Institute of Technology Madras (India) [8233-10]

9:10 am: **Iridium complex probes for monitoring of cellular oxygen levels and imaging of hypoxic tissues** (*Invited Paper*), Seiji Tobita, Toshitada Yoshihara, Atsushi Kobayashi, Kazuki Ichikawa, Gunma Univ. (Japan); Masahiro Hosaka, Akita Prefectural Univ. (Japan); Toshiyuki Takeuchi, Gunma Univ. (Japan) [8233-11]

9:35 am: **Amyloid diagnostics: probing protein aggregation and conformation with ultrasensitive fluorescence detection** (*Invited Paper*), Rajiv Abhyankar, Niraj K. Singh, Bidyut Sarkar, Suman Nag, Tata Institute of Fundamental Research (India); Chandrakasan Muralidharan, Seth G. S. Medical College (India); Debanjan Bhowmik, Banakanidhi Sahoo, Tata Institute of Fundamental Research (India); Sucheta Dandekar, Seth G. S. Medical College (India); Sudipta Maiti, Tata Institute of Fundamental Research (India) . . [8233-12]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 306 (Esplanade) Tues. 10:30 am to 12:20 pm

Fluorescence: Lifetime Imaging and Spectroscopy

Session Chair: Mikhail Y. Berezin,
Washington Univ. School of Medicine in St. Louis (USA)

10:30 am: **Targeted probes for fluorescence intensity and lifetime imaging exploiting a series of new nir dyes and ph-sensitive fluorophores** (*Invited Paper*), Jutta Pauli, Bundesanstalt für Materialforschung und -prüfung (Germany); Julia Mathejczyk, Max-Planck-Institut für experimentelle Medizin (Germany); Markus Grabolle, Bundesanstalt für Materialforschung und -prüfung (Germany); Janis Berkemeyer, Freie Univ. Berlin (Germany); Frauke Alves,

Max-Planck-Institut für experimentelle Medizin (Germany); Kai Licha, mivenion GmbH (Germany); Ute Resch-Genger, Bundesanstalt für Materialforschung und -prüfung (USA) [8233-14]

10:55 am: **Measuring calpain activity in vivo using lifetime imaging of a far red biosensor**, Daniel W. Stuckey, James McGinty, Romain Laine, Imperial College London (United Kingdom); Vadim Y. Soloviev, Univ. College London (United Kingdom); Dominic J. Wells, The Royal Veterinary College (United Kingdom); Simon R. Arridge, Univ. College London (United Kingdom); Joseph V. Hajnal, Paul M. W. French, Imperial College London (United Kingdom); Alessandro Sardini, MRC Clinical Sciences Ctr. (United Kingdom) [8233-15]

11:15 am: **Monitoring tunable, pH responsive nanoprobe using Raster-Scan Image Correlation Spectroscopy**, Salim Abdisalaam, The Univ. of Texas at Arlington (USA) [8233-16]

11:35 am: **Fast-responding and sensitive fluorescence in vivo imaging of cancer by using a novel protease probe for gamma-glutamyltranspeptidase**, Masayo Sakabe, The Univ. of Tokyo (Japan); Nobuyuki Kosaka, Makoto Mitsunaga, National Institutes of Health (USA); Mikako Ogawa, Hamamatsu Univ. School of Medicine (Japan); Peter Choyke, National Institutes of Health (USA); Daisuke Asanuma, Mako Kamiya, Tetsuo Nagano, The Univ. of Tokyo (Japan); Hisataka Kobayashi, National Institutes of Health (USA); Yasuteru Urano, The Univ. of Tokyo (Japan) [8233-17]

11:55 am: **Time-domain Imaging with Quench-based Fluorescent Contrast Agents** (*Invited Paper*), Walter J. Akers, Metasebya Solomon, Gail P. Sudlow, Samuel Achilefu, Mikhail Y. Berezin, Washington Univ. School of Medicine in St. Louis (USA) [8233-18]

Lunch/Exhibition Break 12:20 to 1:30 pm

Nano/Biophotonics Program Track Plenary Session Room: 306 (Esplanade) Tues. 1:30 to 2:30 pm

Single-molecule active control microscopy for nanoscale 3D cell images W.E. Moerner, Stanford Univ.

Single-molecule fluorescence imaging enables biophysical measurements in cells without ensemble averaging, but also yields enhanced spatial resolution surpassing the diffraction limit (super-resolution) when combined with active control of the single emitters to maintain sparse concentrations. Using photoinduced blinking and/or photoswitching/photoactivation of fluorescent proteins, a variety of cellular superstructures have been imaged with sub-40 nm resolution. Several approaches lead to 3D imaging; the double-helix point spread function enables quantitative tracking of single mRNA particles in living yeast cells as well as 3D images in bacterial and eukaryotic cells with relatively uniform localization precision over a large depth-of-field (microns).

SESSION 7

Room: 306 (Esplanade) Tues. 2:30 to 4:50 pm

Imaging Molecular Processes with Fluorescent Reporters

Session Chair: Gabor Patonay, Georgia State Univ. (USA)

2:30 pm: **Pharmacokinetics of bioconjugated ICG-micellar nanocapsules for optical molecular imaging: preclinical and toxic studies**, Yong-Ping Chen, Toufic Jabour, Xingde D. Li, The Johns Hopkins Univ. (USA) . . . [8233-19]

2:50 pm: **Effect of capsid protein and ICG mass ratio on fluorescent quantum yield of plant virus-resembling optical nanomaterials**, Sharad Gupta, Gerardo Ico, Paul Matsumura, Yadir Guerrero, Ayala L. N. Rao, Valentine I. Vullev, Bahman Anvari, Univ. of California, Riverside (USA) [8233-20]

3:10 pm: **Selective detection of peritoneal ovarian cancer micrometastases by microendoscopic imaging of a photoimmunconjugate**, Bryan Q. Spring, Xiang Zheng, Adnan O. Abu-Yousif, Tayyaba Hasan, Massachusetts General Hospital (USA) [8233-21]

Coffee Break 3:30 to 3:50 pm

3:50 pm: **Imaging B. anthracis heme catabolism in living mouse using the IFP1.4 gene reporter**, Banghe Zhu, Holly Robinson, Nathaniel Wilganowski, The Univ. of Texas Health Science Ctr. at Houston (USA); Christopher L. Nobles, Baylor College of Medicine (USA); Eva M. Seveck-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA); Anthony Maresso, Baylor College of Medicine (USA) [8233-22]

4:10 pm: **Development of anti-HER2 conjugated ICG-loaded polymeric nanoparticles for targeted optical imaging of ovarian cancer**, Baharak Bahmani, Jack Tang, Jason Crovisier, Valentine I. Vullev, Bahman Anvari, Univ. of California, Riverside (USA) [8233-23]

4:30 pm: **Variants of monomeric red fluorescent protein at residue 66: spectral and individual photophysical properties**, Alexandr A. Banishev, Institute on Laser and Information Technologies (Russian Federation); Evgeny P. Vrzheschch, Nazim Usmanov, Alexander M. Saletsky, Lomonosov Moscow State Univ. (Russian Federation). [8233-24]

SESSION 8

Room: 306 (Esplanade) Tues. 4:50 to 6:15 pm

Multiphoton Imaging Probes

Session Chair: **Hisataka Kobayashi**, National Institutes of Health (USA)

4:50 pm: **One-photon and two-photon fluorescence folate receptor bioimaging with an aggregation-enhanced emission silica nanoprobe** (*Invited Paper*), Kevin D. Belfield, Xuhua Wang, Alma R. Morales, Univ. of Central Florida (USA); Takeo Urakami, Masanobu Komatsu, Sanford-Burnham Medical Research Institute (USA); Lifu Zhang, Univ. of Central Florida (USA) [8233-25]

5:15 pm: **In vivo track the development of melanoma with the intrinsic third harmonic generation and two-photon fluorescence contrasts of melanin**, Pei-chun Wu, Tzu-Ming Liu, Yu-Shing Chen, Yuan Tsung Hsieh, Han-wen Liu, Wen-li Lin, National Taiwan Univ. (Taiwan) [8233-26]

5:35 pm: **Multiphoton fluorescence spectra and lifetimes of biliverdins and their protein-associated complex**, Chin-Jie Huang, Cheng-Ham Wu, Tzu-Ming Liu, National Taiwan Univ. (Taiwan) [8233-27]

5:55 pm: **Detection of neurotransmitters by surface enhanced Raman scattering (SERS) within hollow-core photonic crystal fiber**, Vidhu S. Tiwari, Altaf Khetani, Ali Momenpour, Hanan Anis, Vance Trudeau, Univ. of Ottawa (Canada) [8233-28]

Wednesday 25 January

SESSION 9

Room: 306 (Esplanade) Wed. 8:35 to 9:40 am

Organic Nano Particles for Biomedical Imaging

Session Chair: **Yasuteru Urano**, The Univ. of Tokyo (Japan)

8:15 am: **Design of peptide-conjugated glycol chitosan nanoparticles for near-infrared fluorescent (NIRF) in vivo imaging of bladder tumors** (*Invited Paper*), Jaehong Key, Deepika Dhawan, Deborah K. Knapp, Purdue Univ. (USA); Kwangmeyung Kim, Ick Chan Kwon, Kuiwon Choi, Korean Institute of Science and Technology (Korea, Republic of); James F. Leary, Purdue Univ. (USA) [8233-29]

8:40 am: **Plant virus-resembling optical nanoparticles conjugated with anti-EGFR for targeted cancer imaging**, Sharad Gupta, Hailey Wilder, Ayala L. N. Rao, Bahman Anvari, Univ. of California, Riverside (USA) [8233-30]

9:00 am: **Active Brain Targeting of Hydrophilic Substances Using Polymeric Magnetic Nanoparticles**, El Mostafa Sadoqi, Bharat Kirthivasan, Murali Mohan Bommana, St. John's Univ. (USA); Sangram Raut, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Dhirender Singh, Univ. of Nebraska Medical Ctr. (USA); Emilio Squillante III, St. John's Univ. (USA) [8233-31]

9:20 am: **Multi-modal in cellulose evaluation of NPR-C targeted C-ANF-peptide and C-ANF-comb nanoparticles**, Monica Shokeen, Washington Univ. School of Medicine in St. Louis (USA); Eric Pressly, Univ. of California, Santa Barbara (USA); Michael J. Welch, Washington Univ. School of Medicine in St. Louis (USA); Craig J. Hawker, Univ. of California, Santa Barbara (USA); Pamela K. Woodard, Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA) [8233-33]

Coffee Break 9:40 to 10:30 am

SESSION 10

Room: 306 (Esplanade) Wed. 10:30 to 11:50 am

Gold Nanoparticles for Molecular Imaging

Session Chair: **Richard B. Dorshow**, Covidien (USA)

10:30 am: **Plasmonic nanosensors for molecular photoacoustic imaging of regional micrometastasis**, Aristarchos Papagiannaros, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Geoffrey P. Luke, Justina O. Tam, The Univ. of Texas at Austin (USA); Stanislav Y. Emelianov, Konstantin Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) [8233-34]

10:50 am: **Calibrating the imaging and therapy performance of magneto-fluorescent gold nanoshells for breast cancer**, Adam E. Dowell, Nrusingh C. Biswal, Baylor College of Medicine (USA); Ciceron Ayala-Orozco, Rice Univ. (USA); Mario Giuliano, Wenxue Chen, Rachel Schiff, Baylor College of Medicine (USA); Naomi J. Halas, Rice Univ. (USA); Amit Joshi, Baylor College of Medicine (USA) [8233-35]

11:10 am: **Gold nanoparticles heated by x-rays for applications to cancer therapies**, Renat R. Letfullin, Rose-Hulman Institute of Technology (USA); Brent Murphy, Radiological Technologies Univ.-VT (USA); Colin W. Rice, Rose-Hulman Institute of Technology (USA) [8233-37]

11:30 am: **Silica-coated gold nanorods optimized for 1064-nm photoacoustic molecular imaging**, Yun-Sheng Chen, David Xu, Wolfgang Frey, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8233-38]

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

SESSION 11

Room: 306 (Esplanade) Wed. 1:30 to 3:10 pm

Inorganic Nanoparticles for Biological Applications

Session Chair: **Yueqing Gu**, China Pharmaceutical Univ. (China)

1:30 pm: **Self-illuminating nanoprobe for in vivo imaging of cancers over-expressing the folate receptor**, Steve C. Miller, Zymera, Inc. (USA); Lucia Beviglia, Pete Yeung, OncoMed Pharmaceuticals (USA); Sukanta Bhattacharyya, Daniel Sobek, Zymera, Inc. (USA) [8233-39]

1:50 pm: **Dual modality photothermal OCT and magnetic resonance imaging with carbon nanotubes**, Jason M. Tucker-Schwartz, Tu Hong, Daniel C. Colvin, Yaqiong Xu, Melissa C. Skala, Vanderbilt Univ. (USA) [8233-41]

2:10 pm: **Super-strong nanoindentors for biomedical applications based on the bamboo-like nanotubes**, Olga E. Glukhova, Anna S. Kolesnikova, Roman Zhnichkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) [8233-42]

2:30 pm: **Highly efficient phosphors in cancer sensing and PDT**, Brian G. Yust, Lawrence C. Mimum, Dhiraj K. Sardar, Gangadharan Ajith Kumar, The Univ. of Texas at San Antonio (USA); Peter J. Hornsby, Jason Rocha, The Univ. of Texas Health Science Ctr. at San Antonio (USA) [8233-43]

2:50 pm: **Magnetomotive optical coherence elastography for monitoring tissue stiffness changes induced by magnetic hyperthermia**, Jong S. Kim, Adeel Ahmad, Vasilica Crecea, Boris M. Odintsov, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8233-44]

Coffee Break 3:10 to 3:30 pm

SESSION 12

Room: 306 (Esplanade) Wed. 3:30 to 6:35 pm

Fluorescent Biosensors and Methods

Session Chair: **D. Michael Olive**, LI-COR Biosciences (USA)

3:30 pm: **Metal-enhanced fluorescence improves the detection of reactive oxygen species in vivo** (*Invited Paper*), Niren Murthy, Georgia Tech Research Institute (USA) [8233-45]

3:55 pm: **Autophagy plays a role in chloroplast degradation (chlorophagy) in Arabidopsis during the process of avirulent Pst DC3000(avrRps4) strain infection**, Wen Li Chen, JunJian Dong, South China Normal Univ. (China) [8233-46]

4:15 pm: **Beta-galactosidase fluorescence probe with improved cellular accumulation based on spirocyclized rhodol scaffold**, Mako Kamiya, Daisuke Asanuma, The Univ. of Tokyo (Japan); Erina Kuranaga, RIKEN (Japan); Masayo Sakabe, The Univ. of Tokyo (Japan); Masayuki Miura, The Univ. of Tokyo (Japan); Tetsuo Nagano, Yasuteru Urano, The Univ. of Tokyo (Japan) [8233-47]

Conference 8233 · Room: 306 (Esplanade)

4:35 pm: **Tracking single cells in live animals using a photoconvertible near-infrared cell membrane label**, Alicia L. Carlson, Joji Fujisaki, Massachusetts General Hospital (USA); Cristina Lo Celso, Imperial College London (United Kingdom); Juwell Wu, Joel A. Spencer, David T. Scadden, Massachusetts General Hospital (USA); Terry B. Strom, Beth Israel Deaconess Medical Ctr. (USA); Charles P. Lin, Massachusetts General Hospital (USA) [8233-48]

4:55 pm: **Cellular preferential uptake of NIR fluorophore in tumor for lesion malignancy screening**, Kuo-Chih Liao, National Chung Hsing Univ. (Taiwan) [8233-49]

5:15 pm: **Raman microscopy of ex vivo tissue culture reveals circadian rhythms in bone mineralization**, John-David P. McElderry, Guisheng Zhao, Renny T. Franceschi, Michael D. Morris, Univ. of Michigan (USA) [8233-50]

5:35 pm: **Deep sample multiplexing using ratiometric rare earth optical encoding**, Robert C. Haushalter, R. W. Haushalter, K. J. Haushalter, S. Vetcha, J. Wang, A. Hill, Parallel Synthesis Technologies, Inc. (USA) [8233-51]

5:55 pm: **The curvature influence of the graphene nanoribbon on its sensory properties**, Olga E. Glukhova, Irina V. Kirillova, Michel M. Slepchenkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) [8233-52]

6:15 pm: **New cross-linking quinoline and quinolone based lanthanide ion probes for sensitive fluorescent labeling (Presentation Only)**, Shyamala Pillai, New Jersey Institute of Technology (USA) [8233-59]

Courses of Related Interest

- SC463 Biophotonics (Prasad) Sunday, 8:30 am to 5:30 pm
- SC1013 Choosing the Correct Optical Filter for Your Application (Reichel) Tuesday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.



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Plasmonics in Biology and Medicine IX

Conference Chairs: **Tuan Vo-Dinh**, Duke Univ. (USA); **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine (USA)

Program Committee: **A. Claude Boccara**, Ecole Supérieure de Physique et de Chimie Industrielles (France); **Michael T. Canva**, Lab. Charles Fabry (France); **Volker Deckert**, Institut für Photonische Technologien e.V. (Germany); **Bruce S. Dunn**, Univ. of California, Los Angeles (USA); **Christopher D. Geddes**, Univ. of Maryland, Baltimore (USA); **Zygmunt Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); **Naomi J. Halas**, Rice Univ. (USA); **Jiri Homola**, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic); **Aaron Ho-Pui**, The Chinese Univ. of Hong Kong (); **Laura Maria Lechuga**, Ctr. d'Investigacions en Nanociència i Nanotecnologia (Spain); **Boris Mizaikoff**, Univ. Ulm (Germany); **Shuming Nie**, Emory Univ. (USA); **Weihong Tan**, Univ. of Florida (USA); **Andrew Taton**, Univ. of Minnesota, Twin Cities (USA); **Richard P. Van Duyne**, Northwestern Univ. (USA); **Jeffrey I. Zink**, Univ. of California, Los Angeles (USA)

Sunday 22 January

SESSION 1

Room: 222 (Mezzanine) Sun. 8:30 to 10:10 am

Plasmonics and SERS I

Session Chair: **Tuan Vo-Dinh**, Duke Univ. (USA)

8:30 am: **Gold nanoparticle tags for SERS-based imaging of human glioblastoma cells**, Laura Fabris, Bryan J. Paladini, Prabhas V. Moghe, Dominik J. Naczynski, Rutgers, The State Univ. of New Jersey (USA) [8234-02]

8:50 am: **SERS nanoprobe based on gold-silver alloy nanoparticles produced by femtosecond laser processing**, David Rioux, Sam Osseiran, Sébastien Besner, Ecole Polytechnique de Montréal (Canada); Natalie Tam, Alexandre Albanese, Anna Lee, Christina M. MacLaughlin, Gilbert C. Walker, Eugenia Kumacheva, Gang Zheng, Warren C. W. Chan, Univ. of Toronto (Canada); Michel Meunier, Ecole Polytechnique de Montréal (Canada) . [8234-03]

9:10 am: **SERS enhancement of Ag nanoparticle patterns embedded in glass by two-step ion exchange**, Ya Chen, Lasse Karvonen, Aalto Univ. (Finland); Antti Säynätjoki, Aalto Univ. School of Science and Technology (Finland); Ari Tervonen, Seppo K. Honkanen, Aalto Univ. School of Electrical Engineering (Finland) [8234-04]

9:30 am: **Plasmonic nanostructures on the basis of Ag covered PMMA gratings**, Matthias Zeisberger, Institut für Photonische Technologien e.V. (Germany); Karina Weber, Institut für Photonische Technologien e.V. (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Uwe Hübner, Henrik Schneidewind, Roland Mattheis, Institut für Photonische Technologien e.V. (Germany); Dana Cialla, Jürgen Popp, Institut für Photonische Technologien e.V. (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [8234-05]

9:50 am: **Optimization of SERS enhancement from nanostructured metallic substrate based on arrays of inverted pyramids, and investigation of effect of lattice non-symmetry**, Swe Z. Oo, Martin D. B. Charlton, Univ. of Southampton (United Kingdom); David Eustice, Renishaw plc (United Kingdom) [8234-06]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 222 (Mezzanine) Sun. 10:40 am to 12:20 pm

Plasmonics and SERS II

Session Chair: **Tuan Vo-Dinh**, Duke Univ. (USA)

10:40 am: **Surface-enhanced Raman scattering for label-free protein detection and identification**, Mustafa Culha, Sercan Keskin, Yeditepe Univ. (Turkey) [8234-07]

11:00 am: **Deep-UV surface-enhanced resonance Raman scattering for ultrasensitive detection of biomolecules**, Shankar Kumar Jha, ETH Zurich (Switzerland); Yasin Ekinci, ETH Zurich (Switzerland) and Paul Scherrer Institut (Switzerland); Mario Agio, Jörg Löffler, ETH Zurich (Switzerland) [8234-08]

11:20 am: **Controllable cavity rim opening of up-right nanocrescents leading to repeatable SERS measurements**, Haiping M. Chen, Lin Pang, Univ. of California, San Diego (USA); Grace M. Hwang, The MITRE Corp. (USA); Andrew King, Renishaw Inc. (USA); Yeshaiahu Fainman, Univ. of California, San Diego (USA) [8234-09]

11:40 am: **Surface-enhanced Raman scattering and microwave absorption in silver nanoparticle inks**, Manuel A. Figueroa, Drexel Univ. (USA); Stephen A. Schraer, Villanova Univ. (USA); Kambiz Pourrezai, Somdev D. Tyagi, Drexel Univ. (USA) [8234-10]

12:00 pm: **Fluorescence enhancement using silver-gold nanocomposite substrates**, Sharmistha D. Choudhury, Ramachandram Badugu, Krishanu Ray, Joseph R. Lakowicz, Univ. of Maryland School of Medicine (USA) [8234-63]

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

SESSION 3

Room: 222 (Mezzanine) Sun. 1:40 to 3:00 pm

Plasmonics Detection and Imaging

Session Chairs: **Michael T. Canva**, Lab. Charles Fabry (France); **Brian C. Wilson**, Princess Margaret Hospital (Canada)

1:40 pm: **Nanobiophotonics for molecular imaging of cancer**, Leanne Lucas, Kevin Hewitt, Dalhousie Univ. (Canada) [8234-11]

2:00 pm: **Intravital confocal Raman microscopy with multiplexed SERS contrast agents**, Patrick McVeigh, Univ. of Toronto (Canada); Brian Wilson, Univ. of Toronto (Canada) and Univ. Health Network (Canada) [8234-12]

2:20 pm: **Molecular imaging with surface-enhanced CARS on nanostructures**, Sumeet Mahajan, Jeremy J. Baumberg, Christian Steuwe, Univ. of Cambridge (United Kingdom) [8234-13]

2:40 pm: **Intracellular multiplex detection and imaging of stable chemisorbed labels by SERS**, Narayana M.S. Sirimuthu, Christopher D. Syme, Jonathan M. Cooper, Univ. of Glasgow (United Kingdom) [8234-14]

Coffee Break 3:00 to 3:40 pm

SESSION 4

Room: 222 (Mezzanine) Sun. 3:40 to 5:40 pm

Plasmonic Biosensing

Session Chair: **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine (USA)

3:40 pm: **Plasmonic gold nanorods as nanorheology probes in diffusion-sensitive optical coherence tomography**, Raghav K. Chhetri, The Univ. of North Carolina at Chapel Hill (USA); Krystian A. Kozek, Aaron C. Johnston-Peck, Joseph B. Tracy, North Carolina State Univ. (USA); Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) [8234-16]

4:00 pm: **A magnetic-field enriched surface-enhanced resonance Raman spectroscopy strategy towards the early diagnosis of malaria**, Yuen Clement, Quan Liu, Nanyang Technological Univ. (Singapore) [8234-17]

4:20 pm: **Characterisation of individual microdroplets by multiplex SERRS spectroscopy**, Christopher D. Syme, Narayana M.S. Sirimuthu, Chiara Martino, Rama Yuvvana, Jonathan M. Cooper, Univ. of Glasgow (United Kingdom) [8234-18]

4:40 pm: **Experimental investigation of droplet biosensing by multiwavelength plasmonic**, Caroline Desfours, Serge Habraken, Juriy Hastanin, Cedric Lenaerts, Karl Fleury-Frenette, Univ. de Liège (Belgium) [8234-19]

5:00 pm: **Ultrasensitive system for the real-time detection of H₂O₂ based on strong coupling in a bioplasmonic system**, Shourya Dutta Gupta, Guillaume Suarez, Christian Santschi, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Lucienne Juillerat-Jeanneret, Ctr. Hospitalier Univ. Vaudois (Switzerland); Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8234-20]

5:20 pm: **Development of LSPR and SPR sensor for the detection of an anti-cancer drug for chemotherapy**, Sandy Shuo Zhao, Olivier R. Bolduc, Damien Y. Colin, Joelle Y. Pelletier, Jean-François Masson, Univ. de Montréal (Canada) [8234-55]

Monday 23 January

SESSION 5

Room: 222 (Mezzanine) Mon. 8:00 to 10:10 am

Plasmonic Nanostructures

Session Chair: Boris Mizaikoff, Univ. Ulm (Germany)

8:00 am: **Plasmon-controlled fluorescence and single DNA strand sequencing** (*Invited Paper*), Joseph R. Lakowicz, Univ. of Maryland School of Medicine (USA) [8234-21]

8:30 am: **Surface plasmon resonance detection enhancement using colocalization of near-fields and target molecules**, Yonghui Kim, Youngjin Oh, Wonju Lee, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8234-22]

8:50 am: **Localized surface plasmonic resonant based on bow-tie type metallic nanostructure**, Tingjun Luo, Lin Pang, Weiping Zhang, Guangxi Univ. (China) [8234-23]

9:10 am: **Hybrid nanoparticle and thin film SPR biosensor with a high figure of merit**, Arash Farhang, B. Abasahl, Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8234-24]

9:30 am: **Label-free biosensing based on multilayer plasmonic nanocomposites and a cationic polymeric transducer**, Danny Brouard, Félix-Antoine Lavoie, Olivier Ratelle, Denis Boudreau, Univ. Laval (Canada) . . . [8234-25]

9:50 am: **Radiative-SPR platform for the detection of small proteins**, Beniamino Sciacca, Alexandre Francois, Peter Hoffmann, Julie Brazzatti, Manuela Klingler-Hoffmann, Tanya Monro, The Univ. of Adelaide (Australia) [8234-26]

Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 222 (Mezzanine) Mon. 10:40 am to 12:00 pm

Plasmonics and Fluorescence I

Session Chair: Joseph R. Lakowicz, Univ. of Maryland School of Medicine (USA)

10:40 am: **Controlled fluorescence emission via surface modes on dielectric and metallo-dielectric multistack**, Emiliano Descrovi, Mirko Ballarini, Francesca Frascella, Politecnico di Torino (Italy); Francesco Michelotti, Univ. degli Studi di Roma La Sapienza (Italy); Natascia De Leo, Emanuele Enrico, National Institute of Metrological Research (Italy); Fabrizio Giorgis, Politecnico di Torino (Italy) [8234-27]

11:00 am: **Green CdTe/CdS quantum dots fluorescence enhancement by core-shell silver nanoparticles**, Luciana S.A. de Melo, Claudilene R. Chaves, Univ. Federal de Pernambuco (Brazil); Sybele Saska, Karina Nigoghossian, Sidney J. L. Ribeiro, Younes Messadeg, Univ. Estadual Paulista (Brazil); Anderson S. L. Gomes, Beate S. Santos, Renato E. de Araujo, Adriana Fontes, Univ. Federal de Pernambuco (Brazil) [8234-28]

11:20 am: **Non-centrosymmetric metallic nanoparticles as new efficient nonlinear nanoemitters**, Sophie Brasselet, Institut Fresnel (France); Hong Shen, Ngoc Nguyen, Univ. de Technologie Troyes (France); Vincent Maillard, David Gachet, Institut Fresnel (France); Timothée Toury, Univ. de Technologie Troyes (France) [8234-29]

11:40 am: **Surface plasmon enhanced-field fluorescence biosensor for point-of-care testing using fluorescent nanoparticles**, Kazuyoshi Horii, Toshihito Kimura, Hisashi Ohtsuka, Noriyuki Kasagi, Tomoya Oohara, Tadahiro Matsuno, Masashi Hakamata, Akihiro Komatsu, Tomonari Sendai, FUJIFILM Corp. (Japan) [8234-30]

Lunch Break 12:00 to 1:30 pm

SESSION 7

Room: 222 (Mezzanine) Mon. 1:30 to 3:10 pm

Plasmonics and Fluorescence II

Session Chair: Joseph R. Lakowicz, Univ. of Maryland School of Medicine (USA)

1:30 pm: **Fluorescence enhancements and spectral modifications near the cut-off frequency of plasmonic structure**, Kareem Elsayad, Research Institute of Molecular Pathology (Austria); Alexander Urich, Technische Univ. Wien (Austria); Maria Nemethova, John V. Small, Institute of Molecular Biotechnology GmbH (Austria); Karl Unterrainer, Technische Univ. Wien (Austria); Katrin Heinze, Research Institute of Molecular Pathology (Austria) and Univ. of Würzburg (Germany) [8234-31]

1:50 pm: **Superresolution axial sensitivity in plasmonic fluorescence cellular assays of protein internalisation**, Nicholas I. Cade, Gilbert O. Fruhwirth, Tony C. Ng, David R. Richards, King's College London (United Kingdom) . . . [8234-32]

2:10 pm: **Optical transmission study of fractal iterate nano-apertures made by direct-focused ion beam milling of metallic thin films**, Yin Yuen, Lambertus Hesselink, Stanford Univ. (USA) [8234-33]

2:30 pm: **Multifunctional gold nanorods for detection and photothermal therapy of cancer**, Clement Barriere, Pilar Beatriz Garcia-Allende, Ji Qi, Daniel S. Elson, Imperial College London (United Kingdom) [8234-34]

2:50 pm: **Plasmonic sensing in crude biofluids with microhole arrays**, Jean-François Masson, Ludovic S. Live, Julien Breault-Turcot, Damien Y. Colin, Joelle Y. Pelletier, Univ. de Montréal (Canada); Michael T. Canva, Institut d'Optique Graduate School (France); Anuj Dhawan, Tuan Vo-Dinh, Duke Univ. (USA) [8234-35]

Coffee Break 3:10 to 3:40 pm

SESSION 8

Room: 222 (Mezzanine) Mon. 3:40 to 4:20 pm

Plasmonic Applications I

Session Chair: Joseph R. Lakowicz, Univ. of Maryland School of Medicine (USA)

3:40 pm: **Fabrication method for controlling surface plasmon resonance wavelength and improving bio-conjugation yield of Au nanoring**, Hung-Yu Tseng, Yu-Lung Jung, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [8234-36]

4:00 pm: **Properties and commercial applications of mass-produced LSPR films**, Daniele Gerion, LamdaGen Corp. (USA) [8234-38]

POSTERS - MONDAY

Room: 103 (Exhibit Level) Mon. 5:30 to 7:30 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, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Surface-enhanced Raman spectroscopy of pterins, Ciarán Smyth, Inam Mirza, James G. Lunney, Eithne M. McCabe, Trinity College Dublin (Ireland) [8234-37]

Integrated waveguide sensor platform utilizing organic photodiodes, Bernhard Lamprecht, Elke Kraker, Paul Hartmann, Georg Jakopic, Martin Sagmeister, Stefan Köstler, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); Tobias Abel, Torsten Mayr, Technische Univ. Graz (Austria); Harald Diltbacher, Nicole Galler, Karl-Franzens-Univ. Graz (Austria) . . . [8234-50]

Nucleic acid sequencing with tip-enhanced Raman spectroscopy: toward single-base resolution, Noah J. Kolodziejcki, Rajan S. Gurjar, Radiation Monitoring Devices, Inc. (USA); Jeeseong Hwang, National Institute of Standards and Technology (USA) [8234-51]

Single-cell targeting using plasmon resonant gold-coated liposomes, Sarah J. Leung, Marek Romanowski, The Univ. of Arizona (USA) [8234-52]

Visual detection of cancer biomarkers with naked eye using plasmonic Fano resonances, Ahmet A. Yanik, Arif Engin Çetin, Min Huang, Alp Artar, Boston Univ. (USA); S. Hossein Mousavi, Alexander Khanikev, The Univ. of Texas at Austin (USA); John H. Connor, Boston Univ. (USA); Gennady B. Shvets, The Univ. of Texas at Austin (USA); Hatice Altug, Boston Univ. (USA) . . [8234-53]

Nano-optical conveyor belt, Yuxin Zheng, Jason Ryan, Paul Hansen, Yao-Te Cheng, Yin Yuen, Lambertus Hesselink, Stanford Univ. (USA) [8234-54]

Thermal contrast measurement of gold nanoparticle biodistribution, Zhenpeng Qin, Taner Akkin, Univ. of Minnesota, Twin Cities (USA); Warren C. W. Chan, Univ. of Toronto (Canada); John C. Bischof, Univ. of Minnesota, Twin Cities (USA) [8234-56]

Surface plasmon resonance sensing using index-matched metallic nano-hole array structures, Mohamadreza Najiminaini, Fartash Vasefi, Simon Fraser Univ. (Canada) and Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada); Bozena Kaminska, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada) [8234-57]

A feasibility study on plasmon coupled whispering gallery mode biosensors, Kyujung Kim, Youngjin Oh, Wonju Lee, Donghyun Kim, Yonsei Univ. (Korea, Republic of); Frank Vollmer, Max-Planck-Institut für die Physik des Lichts (Germany) [8234-58]

SPR prism sensor using laser line generator, Benny L. Chan, Suganda Jutamulia, Univ. of Northern California (USA) [8234-59]

Surface plasmon resonance imaging (SPRI) sensor chips based on gold and silver nano- and microstructures, Anuj Dhawan, Duke Univ. (USA); Julien Moreau, Aurélien Duval, Michael T. Canva, Institut d'Optique Graduate School (France); Tuan Vo-Dinh, Duke Univ. (USA) [8234-60]

Three-dimensional gold nanorods-doped multicolor microstructures, Chi-Hsiang Lien, Wen-Shuo Kuo, Chun-Yu Lin, Keng-Chi Cho, Shean-Jen Chen, National Cheng Kung Univ. (Taiwan) [8234-62]

Tuesday 24 January

SESSION 9

Room: 222 (Mezzanine) Tues. 8:00 am to 12:40 pm

Plasmonic Applications II

Session Chair: **Ho-Pui A. Ho**,

The Chinese Univ. of Hong Kong (Hong Kong, China)

8:00 am: **Multimodal gold nanoshells for simultaneous imaging and therapy of cancer** (*Invited Paper*), Amit Joshi, Baylor College of Medicine (USA); Naomi J. Halas, Rice Univ. (USA) [8234-39]

8:30 am: **Copper/gold and silver/gold composites as sensing surface for high-performance spectral phase surface plasmon resonance sensors**, Ho-Pui A. Ho, The Chinese Univ. of Hong Kong (Hong Kong, China); Cheng Wang, Tsinghua Univ. (China); Shu-Yuen Wu, The Chinese Univ. of Hong Kong (Hong Kong, China); Ping Shum, Nanyang Technological Univ. (Singapore); Siu-Kai Kong, The Chinese Univ. of Hong Kong (Hong Kong, China) [8234-40]

8:50 am: **LSPR sensing with Ag nanodisk arrays fabricated using nanospherical-lens lithography**, Hsin-Chan Chung, Jyun-Sen Huang, Yun-Chorng Chang, National Cheng Kung Univ. (Taiwan) [8234-41]

9:10 am: **Patterning and plasmonic modes in metallic structures for sensitivity enhancement**, Ping Bai, Lin Wu, Erping Li, A*STAR Institute of High Performance Computing (Singapore) [8234-42]

9:30 am: **Specific cell fusion using femtosecond pulses and gold nanoparticles**, Daniella Yeheskely-Hayon, Limor Minai, Lior Golan, Gili Bisker, Dvir Yelin, Technion-Israel Institute of Technology (Israel) [8234-43]

9:50 am: **Infrared surface plasmon spectroscopy and biosensing**, Dan Davidov, Victor Yashunsky, Vladislav Lirtsman, Alexander Zilbershtein, Tal Marciano, Michael Golosovsky, Benjamin Aroeti, The Hebrew Univ. of Jerusalem (Israel) [8234-44]

Coffee Break 10:10 to 10:40 am

10:40 am: **Dynamical sequence of Au nanopore formation for genome sequencing using high-electron beam exposure**, Seong Soo Choi, Sun Moon Univ. (Korea, Republic of); Myoung Jin Choi, Korea Military Academy (Korea, Republic of); T. Yamaguchi, Sun Moon Univ. (Korea, Republic of) [8234-45]

11:00 am: **Single-step injection of gold nanoparticles through phospholipid membranes**, Alexander S. Urban, Tom Pfeiffer, Andrey A. Lutich, Jochen Feldmann, Ludwig-Maximilians-Univ. München (Germany) [8234-46]

11:20 am: **Novel biosensor for detecting Hemoglobin and its oxygenation state based on nonreciprocity in a coupled waveguide system**, Shourya Dutta Gupta, Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Subhasish Dutta Gupta, Univ. of Hyderabad (India) [8234-47]

11:40 am: **Microwave hyperthermia of tumor in combination with gold nanorods**, Marina V. Shirmanova, N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Marina A. Sirotkina, Vadim Elagin, Nizhny Novgorod State Medical Academy (Russian Federation); Askol'd Strikovskiy, Dmitry Yanin, Institute of Applied Physics (Russian Federation); Anna Kordyukova, N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Victor Nadochenko, N.N. Semenov Institute of Chemical Physics (Russian Federation); Elena Zagaynova, Nizhny Novgorod State Medical Academy (Russian Federation) [8234-48]

12:00 pm: **Gold nanorods-doped membranes for laser-activated drug delivery**, Paolo Matteini, Fulvio Ratto, Francesca Rossi, Lapo Luconi, Giuliano Giambastiani, Istituto di Fisica Applicata Nello Carrara (Italy); Luigi Dei, Gabriella Caminati, Univ. degli Studi di Firenze (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) [8234-49]

12:20 pm: **Plasmonic nanobubbles for cell theranostics**, Dmitri Lapotko, Rice Univ. (USA) [8234-15]

Courses of Related Interest

SC727 Nanoplasmonics (Stockman) Wednesday, 8:30 am to 5:30 pm

SC1013 Choosing the Correct Optical Filter for Your Application (Reichel) Tuesday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

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Laser Source Engineering

Program Chair: **Gregory J. Quarles, B.E.**
Meyers & Co., Inc. (USA)

- 8235 **Solid State Lasers XXI: Technology and Devices** (Clarkson/Shori) 168
- 8236 **Laser Resonators, Microresonators, and Beam Control XIV** (Kudryashov/Paxton/Ilchenko) 172
- 8237 **Fiber Lasers IX: Technology, Systems, and Applications** (Honea) 176
- 8238A **High Energy/Average Power Lasers and Intense Beam Applications VII** (Davis/Heaven/Schriempf) 183
- 8238B **Atmospheric and Oceanic Propagation of Electromagnetic Waves VI** (Korotkova) 184
- 8239 **High Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications** (Beyer/Morris) 185

Nonlinear Optics

- 8240 **Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XI** (Vodopyanov) 188
- 8258 **Organic Photonic Materials and Devices XIV** (Tabor/Kajzar/Kaino/Koike) 244
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Semiconductor Lasers and LEDs

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

- 8241 **High-Power Diode Laser Technology and Applications X** (Zediker) 192
- 8242 **Vertical External Cavity Surface Emitting Lasers (VECSELs) II** (Tropper) 194
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- 8262 **Gallium Nitride Materials and Devices VII** (Chyi/Nanishi/Morkoç) 254
- 8276 **Vertical-Cavity Surface-Emitting Lasers XVI** (Lei/Choquette) 297
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- 8278 **Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVI** (Streubel/Jeon/Tu) 303

Laser Micro-/Nanoengineering

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

- 8243 **Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XVII** (Hennig/Xu/Gu/Nakata) 196
- 8244 **Laser-based Micro- and Nanopackaging and Assembly VI** (Bachmann/Pfleging/Washio) 200

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8250 **Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices XI** (García-Blanco/Ramesham) 216

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- Friedrich G. Bachmann**, LUMERA LASER GmbH (Germany)
- Eckhard Beyer**, Fraunhofer IWS Dresden (Germany)
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- Eric C. Honea**, Lockheed Martin Aculight (USA)
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- Michel Meunier**, Ecole Polytechnique de Montréal (Canada)
- Timothy Morris**, TRUMPF Inc. (USA)
- Yoshiki Nakata**, Osaka Univ. (Japan)
- Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)
- Alan H. Paxton**, Air Force Research Lab. (USA)
- Wilhelm Pfleging**, Karlsruhe Institut für Technologie (Germany)
- Gregory J. Quarles**, B.E. Meyers & Co., Inc. (USA)
- J. Thomas Schriempf**, Naval Sea Systems Command (USA)
- Ramesh K. Shori**, Naval Air Warfare Ctr. Weapons Div. (USA)
- Klaus P. Streubel**, OSRAM GmbH (Germany)
- Frank Träger, Univ. Kassel (Germany)
- Anne C. Tropper**, Univ. of Southampton (United Kingdom)
- Konstantin L. Vodopyanov**, Stanford Univ. (USA)
- Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)
- Xianfan Xu**, Purdue Univ. (USA)
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	8236 Laser Resonators, Microresonators, and Beam Control XIV (Kudryashov, Paxton, Ilchenko) p. 172				
		8237 Fiber Lasers IX: Technology, Systems, and Applications (Honea) p. 276			
	8238A High Energy/Average Power Lasers and Intense Beam Applications VII (Davis, Heaven, Schriempf) p. 183		8238B Atmospheric and Oceanic Propagation of electromagnetic Waves VI (Korotkova) p. 184		
			8239 High Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications (Beyer, Morris) p. 185		
Nonlinear Optics					
			8240 Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XI (Vodopyanov) p. 188		
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		8255 Physics and Simulation of Optoelectronic Devices XX (Witzigmann, Osirski, Henneberger, Arakawa) p. 233			
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			8278 Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVI (Streubel, Jeon, Tu) p. 303		
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Laser Micro-/Nanoengineering

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

8243 **Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XVII** (*Hennig, Xu, Gu, Nakata*) p. 196

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Solid State Lasers XXI: Technology and Devices

Conference Chairs: **W. Andrew Clarkson**, Univ. of Southampton (United Kingdom); **Ramesh K. Shori**, Naval Air Warfare Ctr. Weapons Div. (USA)

Program Committee: **Santanu Basu**, Sparkle Optics Corp. (USA); **Marc Eichhorn**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Adolf Giesen**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Norman Hodgson**, Coherent, Inc. (USA); **Hans-Dieter Hoffmann**, Fraunhofer-Institut für Lasertechnik (Germany); **Helena Jelinková**, Czech Technical Univ. in Prague (Czech Republic); **Ursula Keller**, ETH Zurich (Switzerland); **Jacob I. Mackenzie**, Univ. of Southampton (United Kingdom); **Narasimha S. Prasad**, NASA Langley Research Ctr. (USA); **Martin C. Richardson**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Wolf R. Seelert**, Coherent Lubeck GmbH (Germany); **Akira Shirakawa**, The Univ. of Electro-Communications (Japan); **David E. Spence**, Spectra-Physics®, a Newport Corp. Brand (USA); **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom)

Sunday 22 January

SESSION 1

Room: 120 (Exhibit Level) Sun. 10:30 am to 12:30 pm

Mid-IR Lasers

Session Chair: **Ramesh Shori**,
Naval Air Warfare Ctr. Weapons Div. (USA)

10:30 am: **High-efficiency diode pumped Er:YLF laser with multi-wavelength generation**, Mikhail V. Inochkin, Valery Y. Khramov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Gregory B. Altshuler, Andrey Erofeev, Stewart W. Wilson, Palomar Medical Technologies, Inc. (USA); Felix I. Feldchtein, Dental Photonics, Inc. (USA) [8235-04]

10:50 am: **Mid-IR Laser oscillation via energy transfer in the Co:Fe:ZnS/Se co-doped crystals**, Jeremy M. Peppers, The Univ. of Alabama at Birmingham (USA); NoSung Myoung, The Univ. of Alabama at Birmingham (USA) and Samsung SMD (Korea, Republic of); Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) [8235-06]

11:10 am: **3- μ m wavelength-tunable compact light source with 805/1064-nm differential frequency generation using intracavity photon-reuse and spectrum shaping techniques**, Naokatsu Yamamoto, Kouichi Akahane, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Hideyuki Sotobayashi, Aoyama Gakuin Univ. (Japan) [8235-07]

11:30 am: **Fabrication and optical properties of single-crystal YAG fiber optics**, B. T. Laustsen, James A. Harrington, Rutgers, The State Univ. of New Jersey (USA) [8235-05]

11:50 am: **3- μ m optical fiber laser based on guided mode resonance filter (Presentation Only)**, Yuan Li, Ryan H. Woodward, Menelaos K. Poutous, The Univ. of North Carolina at Charlotte (USA); Ramesh Shori, Naval Air Warfare Ctr. Weapons Div. (USA); Eric G. Johnson, Clemson Univ. (USA) [8235-123]

12:10 pm: **Efficient, high energy 2-micron solid state laser transmitter for NASA's space-based CO₂ measurements**, Upendra N. Singh, Jirong Yu, Mulugeta Petros, NASA Langley Research Ctr. (USA); Yingxin Bai, Science Systems and Applications, Inc. (USA) [8235-08]

Lunch Break 12:30 to 1:30 pm

Courses of Related Interest

- SC752 Solid State Laser Technology (Hodgson) Saturday, 8:30 am to 5:30 pm
- SC860 Resonator Design for Solid State Lasers (Paschotta) Wednesday, 8:30 am to 5:30 pm
- SC1053 Ultrafast Laser Pulse Shaping and Adaptive Pulse Compression (Dantus) Tuesday, 1:30 to 5:30 pm
- SC1012 Coherent Mid-Infrared Sources and Applications (Vodopyanov) Sunday, 1:30 to 5:30 pm
- SC746 Introduction to Ultrafast Technology (Trebino) Tuesday, 1:30 to 5:30 pm
- SC744 Ultrafast Fiber Lasers (Fermann) Sunday, 1:30 to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm
- SC1060 Fundamentals of Nonlinear Optics (Powers) Sunday, 8:30 am to 12:30 pm
- SC931 Applied Nonlinear Frequency Conversion (Paschotta) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

SESSION 2

Room: 120 (Exhibit Level) Sun. 1:30 to 3:20 pm

Ceramics Laser Materials I

Session Chair: **Ramesh Shori**,
Naval Air Warfare Ctr. Weapons Div. (USA)

1:30 pm: **Overview of ceramic laser technology (Invited Paper)**, Jas Sanghera, Woohong Kim, Guillermo R. Villalobos, L. Brandon Shaw, Colin Baker, U.S. Naval Research Lab. (USA); Michael Hunt, Univ. Research Foundation (USA); Bryan Sadowski, Robert E. Miklos, Sotera Defense Solutions (USA); Jesse Frantz, U.S. Naval Research Lab. (USA); Ishwar Aggarwal, Sotera Defense Solutions (USA) [8235-75]

2:00 pm: **Effect of Si-induced defects on 1 μ m-absorption losses in laser-grade YAG ceramics**, Romain Gaume, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Stanford Univ. (USA); Ye He, Ashot S. Markosyan, Robert L. Byer, Stanford Univ. (USA) [8235-72]

2:20 pm: **All ceramic Nd:YAG waveguide laser element with perfect bonding condition (Invited Paper)**, Akio Ikesue, Yan Lin Aung, World Lab Co., Ltd. (Japan); Tomosumi Kamimura, Osaka Institute of Technology (Japan) . [8235-73]

2:50 pm: **Processing control for high quality RE:YAG laser (Invited Paper)**, Jian Zhang, Hao Yang, Dewei Luo, Hui Lin, Changwen Xu, Ding Yuan Tang, Jan Ma, Nanyang Technological Univ. (Singapore) [8235-74]

Coffee Break 3:20 to 3:50 pm

SESSION 3

Room: 120 (Exhibit Level) Sun. 3:50 to 5:20 pm

Ceramics Laser Materials II

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

3:50 pm: **Processing and fabrication of lanthanide sesquioxide transparent ceramics**, John Ballato, Baris Kokouz, Joseph W. Kolis, Colin D. McMillen, Clemson Univ. (USA) [8235-76]

4:10 pm: **Er³⁺-doped laser ceramics for resonantly-pumped eye-safe lasers (Invited Paper)**, Mark Dubinskii, Nikolay E. Ter-Gabrielyan, Viktor Fromzel, Tigran V. Sanamyan, U.S. Army Research Lab. (USA) [8235-01]

4:40 pm: **Refractive indices and thermo-optic coefficients of Erbium doped Ytria**, David E. Zelmon, Nicholas Haynes, Air Force Research Lab. (USA); Ramesh Shori, Naval Air Warfare Ctr. Weapons Div. (USA) [8235-02]

5:00 pm: **Spectroscopic properties of Er-sesquioxides**, Saurabh Sharma, Ramesh Shori, Univ. of California, Los Angeles (USA) and Naval Air Warfare Ctr. (USA); J. Keith Miller, Naval Air Warfare Ctr. Weapons Div. (USA) [8235-03]

Monday 23 January

SESSION 4

Room: 120 (Exhibit Level) Mon. 8:20 to 10:00 am

Pulsed Lasers I

Session Chair: **Helena Jelinková**,

Czech Technical Univ. in Prague (Czech Republic)

8:20 am: **1-kHz rep rate, mode-controlled, and passively Q-switched Nd:YLF laser operating at 1053 nm**, Alessandro M. Deana, Univ. Nove de Julho (Brazil); Niklaus U. Wetter, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [8235-09]

8:40 am: **High gain and high power Nd:YVO₄ single pass amplifier**, Xavier Délen, François Balembois, Patrick Georges, Lab. Charles Fabry (France) [8235-11]

9:00 am: **1.34- μ m Nd:YVO₄ laser mode-locked by a single-walled carbon nanotube saturable absorber**, Hristo L. Iliev, Ivan Buchvarov, Sofia Univ. St. Kliment Ohridski (Bulgaria); Sun Young Choi, Kihong Kim, Fabian Rotermund, Ajou Univ. (Korea, Republic of); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [8235-12]

9:20 am: **Performance of 100-J cryogenically cooled multi-slab amplifier with respect to pump beam parameters and geometry**, Martin Divok?, Magdalena Sawicka, Jakub Novak, Bedrich Rus, Tomas Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8235-13]

9:40 am: **Comparative design study of 100-J cryogenically cooled Yb:YAG multi-slab amplifiers operating at 10 Hz**, Pawel Sikocinski, Martin Divoký, Magdalena Sawicka, Bedrich Rus, Tomas Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8235-14]

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 120 (Exhibit Level) Mon. 10:30 am to 12:10 pm

Pulsed Lasers II

Session Chair: **Helena Jelinková**,

Czech Technical Univ. in Prague (Czech Republic)

10:30 am: **3.5-ps pulses from a compressed passively Q-switched microchip laser employing nonlinear temporal cleaning**, Alexander Steinmetz, Andreas Martin, Dirk Nodop, Reinhold Lehneis, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8235-15]

10:50 am: **High-power VCSEL array pumped Q-switched Nd:YAG lasers**, Robert Van Leeuwen, Yihan Xiong, Laurence S. Watkins, Jean-Francois Seurin, Guoyang Xu, Alexander Miglo, Qing Wang, Chuni L. Ghosh, Princeton Optronics, Inc. (USA) [8235-16]

11:10 am: **24-picosecond pulses from a spectrally filtered passively Q-switched microchip laser**, Reinhold Lehneis, Alexander Steinmetz, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [8235-17]

11:30 am: **Compact VCSEL pumped Q-switched Nd:YAG lasers**, Brian J. Cole, Chris McIntosh, Alan D. Hays, John E. Nettleton, Lew Goldberg, U.S. Army RDECOM CERDEC NVESD (USA) [8235-18]

11:50 am: **Laser amplifiers for high-energy pulse train applications**, George J. Doster, Northrop Grumman Cutting Edge Optronics (USA) [8235-19]

Lunch Break 12:10 to 1:30 pm

SESSION 6

Room: 120 (Exhibit Level) Mon. 1:30 to 3:10 pm

Disk Lasers

Session Chair: **Santanu Basu**, Sparkle Optics Corp. (USA)

1:30 pm: **Yb:CaGdAlO₄ thin disk**, Sandrine Ricaud, Lab. Charles Fabry de l'Institut d'Optique (France); Anael Jaffres, Pascal Loiseau, Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France); Birgit Weichelt, Marwan Abdou-Ahmed, Andreas Voss, Thomas Graf, Univ. Stuttgart (Germany); Daniel Ritz, FEE GmbH (Germany); Martin Delaigue, Eric P. Mottay, Amplitude Systemes (France); Patrick Georges, Frédéric Druon, Lab. Charles Fabry de l'Institut d'Optique (France) [8235-20]

1:50 pm: **Numerical modeling of a joule level thin-disk laser system**, Martin Smrž, Tomas Mocek, Patricie Severova, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8235-21]

2:10 pm: **Yb:YAG thin-disk laser performance at room and cryogenic temperatures**, Natasa Vretenar, Tyler Carson, Tim C. Newell, T. Lucas, William P. Latham, Phillip R. Peterson, Air Force Research Lab. (USA) [8235-77]

2:30 pm: **Initial testing of edge-pumped Yb:YAG disk laser with multi-passed extraction**, John Vetrovec, Drew A. Copeland, Amardeep S. Litt, Aqwest, LLC (USA); Detao Du, General Atomics Aeronautical Systems, Inc. (USA) [8235-23]

2:50 pm: **Gain tailoring model and improved optical extraction in CW edge-pumped disk amplifiers**, Drew A. Copeland, John Vetrovec, Aqwest, LLC (USA) [8235-24]

Coffee Break 3:10 to 3:40 pm

SESSION 7

Room: 131 (Exhibit Level) Mon. 3:40 to 6:10 pm

High-Power Fiber and Disk Lasers

Joint Session with Conference 8237

Session Chairs: **Norman Hodgson**, Coherent, Inc. (USA); **Dahv A. Kliner**, JDSU (USA)

3:40 pm: **High-power disk and fiber lasers: a performance comparison (Invited Paper)**, Stefan Ruppik, Frank Becker, Frank-Peter Grundmann, Wolfram Rath, Ulrich Heffter, ROFIN-SINAR Laser GmbH (Germany) [8235-25]

4:10 pm: **Multi-kW single fiber laser based on an extra large mode area fiber design**, Andreas Langner, Mario Such, Gerhard Schötz, Heraeus Quarzglas GmbH & Co. KG (Germany); Florian Just, Martin Leich, Christian Mühlig, Jens Kobelke, Anka Schwuchow, Stephan Grimm, Institut für Photonische Technologien e.V. (Germany); Olaf Strauch, Björn Wedel, HIGHYAG Lasertechnologie GmbH (Germany); Georg Rehmann, Charley Bachert, Volker Krause, Laserline GmbH (Germany) [8237-44]

4:30 pm: **High-power disk lasers: advances and applications**, David L. Havrilla, Tracey S. Ryba, TRUMPF Inc. (USA); Marco Holzer, TRUMPF Laser- und Systemtechnik GmbH (Germany) [8235-26]

4:50 pm: **1.2-kW single-mode fiber laser based on 100-W high-brightness pump diodes**, Dahv A. Kliner, Hongbo Yu, Johnny Luu, Kai-Hsiu Liao, Jeff Segall, Martin H. Muendel, Jane Shen, Matthew K. Kutsuris, Donald K. Holdener, Justin Franke, Kelvin Nguyen, Dave L. Woods, David Meng, David L. Vecht, Richard Duesterberg, Lei Xu, Jay A. Skidmore, James Guo, Jane Cheng, Jihua Du, Brad Johnson, Nicolas Guerin, Benli Huang, Peter Cheng, Reddy Raju, Kong Weng Lee, Jason Cai, Victor V. Rossin, Erik P. Zucker, JDSU (USA) [8237-45]

5:10 pm: **Ultrafast disk lasers and amplifiers**, Dirk H. Sutter, Jochen D. Kleinbauer, Dominik Bauer, Martin Wolf, Chuong Tan, Raphael Gebs, Aleksander Budnicki, Philipp Wagenblast, TRUMPF Laser GmbH & Co. KG (Germany); Sascha Weiler, TRUMPF Inc. (USA) [8235-27]

5:30 pm: **65 W of average power and 6-MW peak power generation from a mode-locked fiber oscillator**, Martin Baumgartl, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Caroline Lecaplain, Ammar Hideur, Univ. de Rouen (France); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8237-46]

5:50 pm: **800-W CW near diffraction limited beam delivery through a 100-m long multi-mode fiber**, Armin Austerschulte, Moritz M. Vogel, Thomas Rataj, Jan-Philipp Negel, Andreas Voss, Marwan Abdou Ahmed, Thomas Graf, Univ. Stuttgart (Germany) [8237-47]

Tuesday 24 January

SESSION 8

Room: 120 (Exhibit Level) Tues. 8:00 to 10:00 am

Ultrafast Lasers

Session Chair: Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

8:00 am: **A multi-wavelength variable-pulsewidth diode-pumped laser system for laser temporal diagnostics testing**, Andrey V. Okishev, Christophe Dorrer, Univ. of Rochester (USA); Yoram Fisher, Michael J. Pavia, Sydor Instruments LLC (USA) [8235-28]

8:20 am: **Power scaling of an Yb:LuScO₃ thin disk laser to 23 W and 235 fs**, Clara J. Saraceno, Oliver H. Heckl, Cyrill R. E. Baer, Matthias C. Golling, Thomas Südmeyer, ETH Zurich (Switzerland); Kolja Beil, Christian Kränkel, Klaus Petermann, Günter Huber, Univ. Hamburg (Germany); Ursula Keller, ETH Zurich (Switzerland) [8235-29]

8:40 am: **Pulse-on demand regenerative amplifier**, Christian Holtz, Joachim Meier, Juerg Aus-der-Au, High Q Laser Innovation GmbH (Austria); Max J. Lederer, European XFEL GmbH (Germany) [8235-30]

9:00 am: **Sub-100-fs pulses with 12.5 W from Yb:CALGO based oscillators**, Annalisa Guandalini, High Q Laser Innovation GmbH (Austria); Alessandro Greborio, Univ. degli Studi di Pavia (Italy); Juerg Aus-der-Au, High Q Laser Innovation GmbH (Austria) [8235-31]

9:20 am: **Cryo-Yb:YAG lasers for next-generation photoinjector applications**, Kevin F. Wall, Q-Peak, Inc. (USA); Daniel Miller, T. Y. Fan, MIT Lincoln Lab. (USA) [8235-32]

9:40 am: **High-energy 1-Hz titanium sapphire amplifier for PetaWatt class lasers**, François Lureau, Sébastien Laux, Olivier Casagrande, Christophe Radier, Olivier J. Chalus, Frédéric Caradec, Christophe Simon-Boissin, Thales Optronique S.A. (France) [8235-33]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 120 (Exhibit Level) Tues. 10:30 am to 12:30 pm

Eye Safe Lasers

Session Chair: Jacob I. Mackenzie, Univ. of Southampton (United Kingdom)

10:30 am: **Er-doped Tellurite glasses for planar waveguide power amplifier with extended gain bandwidth**, Jacob I. Mackenzie, S. Murugan Ganapathy, Univ. of Southampton (United Kingdom); Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan); Anthony W. Yu, James B. Abshire, NASA Goddard Space Flight Ctr. (USA) [8235-34]

10:50 am: **Optimized heat extraction geometry for resonantly diode pumped Er³⁺:YAG lasers**, Lukasz Galecki, Institut Franco-Allemand de Recherches de Saint-Louis (France); Waldemar Zenzian, Military Univ. of Technology (Poland); Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France) [8235-35]

11:10 am: **Resonant diode-pumping of Er:YAG single crystal fiber operating at 1617 nm**, Adrien Aubourg, Igor Martial, Lab. Charles Fabry de l'Institut d'Optique (France) and Fibercryst SAS (France); Julien Didierjean, Fibercryst SAS (France); François Balembois, Patrick Georges, Lab. Charles Fabry de l'Institut d'Optique (France) [8235-36]

11:30 am: **Ho:KRE(WO₄)₂, RE=(Y, Gd, Lu), CW laser performance near 2.1 micron under resonant pumping by a Tm:KLu(WO₄)₂ laser**, Venkatesan Jambunathan, Xavier Mateos, Maria Cinta Pujol, Joan Josep Carvajal, Francesc Diaz, Univ. Rovira i Virgili (Spain); Magdalena Aguiló, Univ. Rovira i Virgili (Slovenia); Uwe Griebner, Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [8235-37]

11:50 am: **Crystalline fiber Ho³⁺:YAG laser resonantly pumped by high-spectral-brightness laser diodes**, Antoine Berrou, Thierry Ibach, Martin Schellhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France); Wentao Hu, Robert M. Lammert, Laurent Vaissie, Jeffrey E. Ungar, Laser Operations LLC / QPC Lasers (USA); Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France) [8235-38]

12:10 pm: **A coherent laser Doppler wind profiler for active control of wind turbine**, Leilei Shinohara, Siegwart Bogatscher, Nico Heussner, Harsha Umesh Babu, Wilhelm Stork, Karlsruher Institut für Technologie (Germany) . . . [8235-39]

Lunch/Exhibition Break 12:30 to 1:50 pm

SESSION 10

Room: 120 (Exhibit Level) Tues. 1:50 to 3:30 pm

Visible and UV Lasers I

Session Chair: W. Andrew Clarkson, Univ. of Southampton (United Kingdom)

1:50 pm: **Potential of the Eu:LYB crystal as a laser material for DPSS lasers emitting at 613 nm**, Romain Cattoor, Inka B. Manek-Hönninger, Jean-Christophe Delagnes, Bruno Bousquet, Univ. Bordeaux 1 (France); Yannick Petit, Véronique Jubera, Alexandre Fargues, Philippe Veber, Matias Velazquez, Alain Garcia, Institut de Chimie de la Matière Condensée de Bordeaux (France); Patrick Mounaix, Lionel S. Canioni, Univ. Bordeaux 1 (France) [8235-40]

2:10 pm: **Progress in the development of a pulsed UV laser system for an LDMS instrument on Mars**, Christian Kolleck, Alexander Buettner, Mathias Ernst, Michael Hunnekuhl, Thomas Huelsenbusch, Marc Priehs, Dietmar Kracht, Jörg Neumann, Laser Zentrum Hannover e.V. (Germany) [8235-41]

2:30 pm: **High average power sub-picosecond pulse generation at 515 nm by extracavity frequency doubling of a mode-locked Innoslab MOPA**, Bastian Gronloh, Peter Russbuedt, Fraunhofer-Institut für Lasertechnik (Germany); Waldemar Schneider, Max-Planck-Institut für Quantenoptik (Germany); Bernd Jungbluth, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [8235-42]

2:50 pm: **Development and optimization of single-mode green solid state microchip laser**, Jaroslaw Sotor, Arkadiusz J. Antonczak, Grzegorz Dudzik, Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland) [8235-43]

3:10 pm: **Stability enhanced high average power green lasers for precision semiconductor processing**, Nick Hay, Ian Baker, Stuart Bashford, Young Kwon, Powerlase Photonics Ltd. (United Kingdom) [8235-44]

Coffee Break 3:30 to 4:00 pm

SESSION 11

Room: 120 (Exhibit Level) Tues. 4:00 to 6:00 pm

Visible and UV Lasers II

Joint Session with Conference 8240

Session Chairs: W. Andrew Clarkson, Univ. of Southampton (United Kingdom); **Andrei V. Shchegrov**, KLA-Tencor Corp. (USA)

4:00 pm: **Coherent quasi-CW 153-nm light source at high repetition rate (Invited Paper)**, Yutaka Nomura, Institute for Molecular Science (Japan) and Japan Science and Technology Agency (Japan); Yoshiaki Ito, The Univ. of Tokyo (Japan); Akira Ozawa, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan); Xiaoyang Wang, Chuangtian Chen, Technical Institute of Physics and Chemistry (China); Shik Shin, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan); Shuntaro Watanabe, Tokyo Univ. of Science (Japan) and Japan Science and Technology Agency (Japan); Yohei Kobayashi, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan) [8240-16]

4:30 pm: **Frequency-doubled diode laser for direct pumping of ultrashort Ti:sapphire lasers**, André Müller, Ole B. Jensen, Technical Univ. of Denmark (Denmark); Angelika Unterhuber, Tuan Le, Andreas Stingl, FEMTOLASERS Produktions GmbH (Austria); Karl-Heinz Hasler, Bernd Sumpf, Götz Erbert, Ferdinand-Braun-Institut (Germany); Peter E. Andersen, Paul M. Petersen, Technical Univ. of Denmark (Denmark) [8235-45]

4:50 pm: **Mode hop free tunable blue laser**, Kang Li, Univ. of Glamorgan (United Kingdom); Hongying Wang, Xi'an Univ. of Arts and Science (China); Jungang Huang, Ray Chaney, Nigel J. Copner, Univ. of Glamorgan (United Kingdom) [8235-46]

5:10 pm: **High-power compact green laser source based on wavelength-stabilized pump laser diodes**, Kendra Gallup, Xiaodong Yang, Wentao Hu, Charles Wang, Jeffrey E. Ungar, Laurent Vaissie, Laser Operations LLC / QPC Lasers (USA) [8235-47]

5:30 pm: **Designable nonlinear optical device: QPM quartz for VUV spectrum (Invited Paper)**, Sunao Kurimura, National Institute for Materials Science (Japan); Masaki Harada, National Institute for Materials Science (Japan) and Nikon Corp. (Japan); Ken-ichi Muramatsu, Motoi Ueda, Nikon Corp. (Japan); Muneyuki Adachi, National Institute for Materials Science (Japan) and NIDEK Co., Ltd. (Japan); Tsuyoshi Yamada, Tokio Ueno, NIDEK Co., Ltd. (Japan) [8240-17]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

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) [8235-54]

Comparison between two active media Nd:YAG and Nd:YVO₄ rods inside a cavity for producing a high power 808-nm diode end-pumping laser system, Ashraf F. El-Sherif, Arab Academy for Science, Technology & Maritime Transport (Egypt) and Military Technical College (Egypt) [8235-55]

Amplified spontaneous emission in disk lasers, Xiaojun Wang, Hua Su, Institute of Applied Physics and Computational Mathematics (China) . . . [8235-56]

Influence of Ce³⁺ ions in Pr,Ce:YAlO₃ crystal on spectroscopic and laser characteristics, Martin Fibrich, Helena Jelinková, Jan Sulc, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Skoda, Crytur Ltd. (Czech Republic) [8235-57]

Theoretical and experimental results for using phosphate glass solar laser in the focus of powerful solar concentrator, Abdulkhakim Fazilov, Riskiev Tohtapulat, Abdurahmanov Abdujabbar, Radjapov Lutfulla, Payziev Shermahamat, Institute of Materials Science UAS (Uzbekistan); Joris Lousteau, Daniel Milanese, Davide Negro, Emanuele Mura, Nadia Boetti, Politecnico di Torino (Italy) [8235-58]

10-km dynamic laser oscillation with a coupled cavity assisted by four wave mixing, Frank F. Wu, Anatoliy I. Khizhnyak, Stephen A. Kupiec, Vladimir B. Markov, Amit Lal, MetroLaser, Inc. (USA) [8235-59]

Passive Q-switching of a diode-pumped (Tm,Yb):KLu(WO₄)₂ laser near 2 μm with a Cr²⁺:ZnS saturable absorber, Martha Segura, Xavier Mateos, Univ. Rovira i Virgili (Spain); Aleksey Tyazhev, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Maria Cinta Pujol, Joan Josep Carvajal, Magdalena Aguiló, Francesc Diaz, Univ. Rovira i Virgili (Spain); Uwe Griebner, Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [8235-60]

Continuous wave Yb:KGW laser with polarization-independent pump absorption, Haitao Zhao, Arkady Major, Univ. of Manitoba (Canada) . . [8235-61]

High-energy picosecond regenerative thin disk amplifier at 1 kHz, Michal Chyla, Martin Smr?, Tomas Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8235-62]

Tuning possibility of dysprosium-doped lead thiogallate laser, Maxim E. Doroshenko, A. M. Prokhorov General Physics Institute (Russian Federation); Helena Jelinková, Michal Jelínek, Jan Sulc, Michal Nemeč, Czech Technical Univ. in Prague (Czech Republic); Tasolnt T. Basiev, A. M. Prokhorov General Physics Institute (Russian Federation); Valerii V. Badikov, Dmitrii V. Badikov, Kuban State Univ. (Russian Federation) [8235-63]

Compact pulsed high-energy Er:glass laser, Peng Wan, Jian Liu, PolarOnyx, Inc. (USA) [8235-64]

Influence of undoped YAG cup on diode pumped composite YAG:Er:Yb:glass laser, Jan Šulc, Helena Jelinková, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Skoda, Crytur Ltd. (Czech Republic) [8235-65]

Spectroscopic characterization of Ti³⁺:AgGaS₂ and Fe²⁺:MgAl₂O₄ crystals for mid-IR laser applications, Rose K. Sackovich, The Univ. of Alabama at Birmingham (USA) and The Univ. of Kansas (USA); Jeremy M. Peppers, The Univ. of Alabama at Birmingham (USA); NoSung Myoung, The Univ. of Alabama at Birmingham (USA) and Samsung SMD (Korea, Republic of); Valerii V. Badikov, Kuban State Univ. (Russian Federation); Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) [8235-66]

Mid-IR volumetric Bragg grating based on LiF color center crystals, Anitha Arumugam, Anton V. Fedorov, Dmitri V. Martyshkin, Vladimir V. Fedorov, David J. Hilton, Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) . [8235-67]

Yb:YAG/Cr:YAG composite crystal with external and microchip resonator, Jan Šulc, Tomáš Koutný, Helena Jelinková, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Skoda, Crytur Ltd. (Czech Republic) [8235-68]

A highly efficient DPSS mode-locked Nd:YLF single-mode laser, Frank F. Wu, MetroLaser, Inc. (USA) [8235-69]

DPSS laser beam quality optimization through pump current tuning, Sydney Sukuta, Thuy-Lan Le, Robert A. Omohundro, Mehran J. Ejlali, San Jose City College (USA) [8235-70]

Observation of laser formation inside a laser cavity containing a phase conjugate mirror, Frank F. Wu, Anatoliy I. Khizhnyak, Vladimir B. Markov, MetroLaser, Inc. (USA) [8235-71]

Wednesday 25 January

SESSION 12

Room: 120 (Exhibit Level) Wed. 8:00 to 10:00 am

Novel Concepts for SSL

Session Chair: David H. Titterton,
Defence Science and Technology Lab. (United Kingdom)

8:00 am: **Passive alignment and soldering technique for optical components**, Heinrich Faidel, Michael Leers, Bastian Gronloh, Valentin Morasch, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [8235-48]

8:20 am: **High-power continuous wave Nd:YAG single crystal fiber laser emitting at 946 nm**, Xavier Délen, Lab. Charles Fabry de l'Institut d'Optique (France); Igor Martial, Lab. Charles Fabry de l'Institut d'Optique (France) and FiberCryst SAS (France); Julien Didierjean, Nicolas Aubry, FiberCryst SAS (France); François Balembos, Patrick Georges, Lab. Charles Fabry de l'Institut d'Optique (France) [8235-49]

8:40 am: **Yb³⁺:LuAG single crystal grown by micro-PD: spectroscopy and laser experiments**, Mauro Tonelli, Y. Z. Zhang, Stefano Veronesi, Univ. di Pisa (Italy); Antonio Agnesi, Federico Pirzio, Alessandro Greborio, Giancarlo C. Reali, Univ. degli Studi di Pavia (Italy) [8235-50]

9:00 am: **Rare-earth doped photo-thermo-refractive glass for monolithic solid state lasers**, Apurva Jain, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Larissa Glebova, OptiGrate Corp. (USA); Julien Lumeau, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim Smirnov, OptiGrate Corp. (USA); Alexandra Rapaport, Michael A. Bass, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Christine P. Spiegelberg, OptiGrate Corp. (USA); Michael A. Krainak, NASA Goddard Space Flight Ctr. (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8235-51]

9:20 am: **Generating multiple wavelengths, simultaneously, in a Ti:sapphire ring laser with a ramp-hold-fire seeding technique**, Thomas Moore, F. Scott Anderson, Southwest Research Institute (USA) [8235-52]

9:40 am: **Voltage tunable polymer laser device**, Sebastian Döring, Fraunhofer-Institut für Angewandte Polymerforschung (Germany); Matthias Kollösche, Univ. Potsdam (Germany); Torsten Rabe, Technische Univ. Braunschweig (Germany); Guggi Kofod, Univ. Potsdam (Germany); Joachim Stumpe, Fraunhofer-Institut für Angewandte Polymerforschung (Germany) [8235-53]

Coffee Break 10:00 to 10:20 am

LASE PLENARY SESSION

Room: 134 (Exhibit Level) . . .Wed. 10:20 am to 12:30 pm

Session Chairs: Friedhelm Dorsch,
TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany);
Alberto Piqué, U.S. Naval Research Lab. (USA)

10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)

10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

10:35 am: **Impact of Green Technology in Germany**,
Matthias Machnig, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)

10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)

11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)

11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH + Co. KG (Germany)

See page 20 for details.

Laser Resonators, Microresonators, and Beam Control XIV

Conference Chairs: **Alexis V. Kudryashov**, Moscow State Open Univ. (Russian Federation); **Alan H. Paxton**, Air Force Research Lab. (USA); **Vladimir S. Ilchenko**, OEwaves, Inc. (USA)

Conference Co-Chairs: **Lutz Aschke**, LIMO Lissotschenko Mikrooptik GmbH (Germany); **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)

Program Committee: **Yanne K. Chembo**, FEMTO-ST (France); **Jean-Claude M. Diels**, The Univ. of New Mexico (USA); **Hans Joachim Eichler**, Technische Univ. Berlin (Germany); **Andrew Forbes**, Council for Scientific and Industrial Research (South Africa); **Pierre Galerneau**, INO (Canada); **Thomas Graf**, Univ. Stuttgart (Germany); **Tobias J. Kippenberg**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **James R. Leger**, Univ. of Minnesota, Twin Cities (USA); **Andrey B. Matsko**, OEwaves, Inc. (USA); **Shayan Mookherjea**, Univ. of California, San Diego (USA); **Steve A. Pappert**, Booz Allen Hamilton Inc. (USA); **Andrew W. Poon**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Michelle L. Povinelli**, The Univ. of Southern California (USA); **Michael Scaggs**, Neoteric Concepts, LLC (USA); **Lan Yang**, Washington Univ. in St. Louis (USA)

Sunday 22 January

SESSION 1

Room: 110 (Exhibit Level) Sun. 8:30 to 10:35 am

Resonators

Session Chair: **Alexis V. Kudryashov**,
Moscow State Open Univ. (Russian Federation)

8:30 am: **Fine control of ultrashort pulse trains with a Fabry-Perot intracavity resonator** (*Invited Paper*), Ladan Arissian, Koji Masuda, Jean-Claude M. Diels, The Univ. of New Mexico (USA) [8236-01]

8:55 am: **Experimental verification of path length sensitivity to coherent beam combining by spatial filtering**, Chenhao Wan, James R. Leger, Univ. of Minnesota, Twin Cities (USA) [8236-02]

9:15 am: **Beam control of nonplanar ring resonators based on the analysis of optical-axis perturbation**, Jie Yuan, Xingwu Long, Meixiong Chen, Xudong Yu, Fei Wang, Yu Wang, Pengfei Zhang, National Univ. of Defense Technology (China) [8236-03]

9:35 am: **1121-nm resonator properties and impact on the design of a 1178-nm sodium guidestar laser**, Leanne J. Henry, Jacob Grosek, Gerald T. Moore, Thomas Shay, Air Force Research Lab. (USA) [8236-04]

9:55 am: **Comprehensive analysis of thermal lensing effects on the a coaxial resonator on a high power RF excited CO₂ laser**, Viktor Granson, Jochen Deile, Jesus F. Monjardin, Shadi S. Sumrain, Francisco J. Villarreal-Saucedo, TRUMPF Inc. (USA) [8236-05]

10:15 am: **Unstable resonator with high magnification and low output coupling**, Carsten Pargmann, Thomas Hall, Frank Duschek, Karin M. Grünewald, Jürgen Handke, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8236-06]

Coffee Break 10:35 to 11:00 am

SESSION 2

Room: 110 (Exhibit Level) Sun. 11:00 to 11:40 am

Beam Shaping I

Session Chair: **Lutz Aschke**,
LIMO Lissotschenko Mikrooptik GmbH (Germany)

11:00 am: **Effect of ring width on ring generated Bessel beam**, Islam Abdo, Naguib Ashry, Mohamed Sadek, Ain Shams Univ. (Egypt); Mohamed Abd El Hakim, Daa Khalil, Si-Ware Systems (Egypt) and Ain Shams Univ. (Egypt) [8236-08]

11:20 am: **Efficient beam splitting with diffractive kinoforms and microlens arrays**, Aliaksei Krasnaberski, Yuri V. Miklyaev, Denis Pikhulya, Lisa Kleinschmidt, Waleri Imgrunt, Mikhail Ivanenko, Vitalij N. Lissotschenko, LIMO Lissotschenko Mikrooptik GmbH (Germany) [8236-09]

Lunch Break 11:40 am to 1:05 pm

SESSION 3

Room: 110 (Exhibit Level) Sun. 1:05 to 2:45 pm

Beam Shaping II

Session Chair: **Lutz Aschke**,
LIMO Lissotschenko Mikrooptik GmbH (Germany)

1:05 pm: **Gaussian-to-top-hat beam shaping: an overview of parameters, methods, and applications**, Oliver Homburg, Thomas Mitra, LIMO Lissotschenko Mikrooptik GmbH (Germany) [8236-10]

1:25 pm: **Parametric optimization of refractive beam shaping systems considering diffraction and interference effects**, Hagen Schweitzer, Michael Kuhn, Christian Hellmann, LightTrans GmbH (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) [8236-11]

1:45 pm: **Wave front reconstruction using computer-generated holograms**, Christian Schulze, Daniel Flamm, Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany); Oliver A. Schmidt, Max Planck Institute for the Science of Light (Germany) [8236-12]

2:05 pm: **Variable beam shaping with using the same field mapping refractive beam shaper**, Alexander V. Laskin, Vadim Laskin, AdlOptica Optical Systems GmbH (Germany) [8236-13]

2:25 pm: **Propagating aberrated light**, Andrew Forbes, Cosmas Mafusire, CSIR National Laser Ctr. (South Africa) [8236-14]

SESSION 4

Room: 110 (Exhibit Level) Sun. 2:45 to 4:45 pm

Beam or Mode Diagnostics

Session Chair: **Kunihiko Washio**,
Paradigm Laser Research Ltd. (Japan)

2:45 pm: **Continuous single pulse resolved measurement of beam diameters at 200 kHz using optical transmission filters** (*Invited Paper*), Johannes Fruechtenicht, Andreas Letsch, Marwan Abdou Ahmed, Andreas Voss, Thomas Graf, Univ. Stuttgart (Germany) [8236-15]

3:10 pm: **Discerning comb and Fourier mean frequency from an fs laser based on the principle of non-interaction of waves**, Chandrasekhar Roychoudhuri, Univ. of Connecticut (USA); Narasimha S. Prasad, NASA Langley Research Ctr. (USA) [8236-16]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Real-time monitoring of thermal lensing of a multikilowatt fiber laser optical system** (*Invited Paper*), Michael Scaggs, Gilbert J. Haas, Haas Laser Technologies, Inc. (USA) [8236-17]

4:25 pm: **Comparison of two modal decomposition techniques**, Robert Brüning, Daniel Flamm, Christian Schulze, Friedrich-Schiller-Univ. Jena (Germany); Oliver A. Schmidt, Max Planck Institute for the Science of Light (Germany); Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany) [8236-18]

SESSION 5

Room: 110 (Exhibit Level) Sun. 4:45 to 5:45 pm

Adaptive Optics

Session Chair: Alan H. Paxton, Air Force Research Lab. (USA)

4:45 pm: **Active mirrors for intra-cavity compensation of the aspherical thermal lens in thin-disk lasers**, Stefan Piehler, Birgit Weichelt, Andreas Voss, Marwan Abdou Ahmed, Thomas Graf, Univ. Stuttgart (Germany) [8236-19]

5:05 pm: **New deformable mirror technology and associated control strategies for ultrahigh intensity laser beam corrections and optimizations**, Nicolas Lefaudeux, Imagine Optic SA (France); Jérôme Ballesta, Imagine Optic Inc. (USA) [8236-20]

5:25 pm: **New Hartmann wavefront sensor for high power CO₂ lasers**, Alexis V. Kudryashov, Pavel Romanov, Alexey L. Rukosuev, Alexander Alexandrov, Moscow State Open Univ. (Russian Federation) [8236-81]

Monday 23 January

SESSION 6

Room: 110 (Exhibit Level) Mon. 8:00 to 10:05 am

Microcavity Lasers and Applications I

Session Chair: Vladimir S. Ilchenko, OEwaves, Inc. (USA)

8:00 am: **Unidirectional-emission, single-mode, whispering-gallery-mode microlasers** (*Invited Paper*), Yong-Zhen Huang, Jian-Dong Lin, Yue-De Yang, Qi-Feng Yao, Xiao-Meng Lv, Jin-Long Xiao, Yun Du, Institute of Semiconductors (China) [8236-21]

8:25 am: **Miniaturized optical microwave source based on simultaneous single-mode laser oscillations in Er:ZBLALiP whispering-gallery-mode resonator** (*Invited Paper*), Patrice Féron, Elodie Le Cren, Alphonse Rasoloniaina, Yann G. Boucher, Yannick Dumeige, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Michel S. Mortier, Ecole Nationale Supérieure de Chimie de Paris (France) [8236-22]

8:50 am: **Progress in miniature sub-kilohertz microresonator based self-injection locked semiconductor laser systems** (*Invited Paper*), Elijah B. Dale, Danny Eliyahu, Vladimir S. Ilchenko, Wei Liang, Jerry Byrd, David J. Seidel, Lute Maleki, OEwaves, Inc. (USA) [8236-23]

9:15 am: **Whispering-gallery-mode resonators for compact optical clocks** (*Invited Paper*), Nan Yu, Lukas M. Baumgartel, Yanne Chembo, Ivan S. Grudin, Dmitry V. Strekalov, Robert J. Thompson, Jet Propulsion Lab. (USA) [8236-24]

9:40 am: **Exploring the frequency stability limits of whispering gallery mode resonators for metrological applications** (*Invited Paper*), Yanne K. Chembo, FEMTO-ST (France); Lukas M. Baumgartel, Ivan S. Grudin, Dmitry V. Strekalov, Robert J. Thompson, Nan Yu, Jet Propulsion Lab. (USA) [8236-25]

Coffee Break 10:05 to 10:30 am

SESSION 7

Room: 110 (Exhibit Level) Mon. 10:30 to 11:45 am

Parametric Processes in Microresonators

Session Chair: Andrey B. Matsko, OEwaves, Inc. (USA)

10:30 am: **Whispering-gallery-modes for nonlinear light generation from a low number of molecules** (*Invited Paper*), Jordi Martorell, ICFO - Institut de Ciències Fotòniques (Spain) and Univ. Politècnica de Catalunya (Spain); Gregory Kozyreff, Univ. Libre de Bruxelles (Belgium); Jorge Luis Dominguez-Juarez, ICFO - Institut de Ciències Fotòniques (Spain) [8236-26]

10:55 am: **Monolithic optical parametric oscillators** (*Invited Paper*), Ingo Breunig, Albert-Ludwigs-Univ. Freiburg (Germany) [8236-27]

11:20 am: **Photonic microwave receivers based on high-Q optical resonance** (*Invited Paper*), Mani Hossein-Zadeh, Ctr. for High Technology Materials (USA) [8236-28]

Lunch Break 11:45 am to 1:20 pm

SESSION 8

Room: 110 (Exhibit Level) Mon. 1:20 to 3:00 pm

Integration of Microresonators and Photonic Circuits

Session Chair: Andrew W. Poon, Hong Kong Univ. of Science and Technology (Hong Kong, China)

1:20 pm: **High-Q resonators and ultralow-loss delay lines** (*Invited Paper*), Kerry J. Vahala, Hansuek Lee, Tong Chen, Jiang Li, California Institute of Technology (USA) [8236-30]

1:45 pm: **Coupling approaches and new geometries in whispering-gallery-mode resonators** (*Invited Paper*), Gualtiero Nunzi Conti, Simone Berneschi, Massimo Brenci, Franco Cosi, Daniele Farnesi, Stefano Pelli, Giancarlo C. Righini, Silvia Soria, Istituto di Fisica Applicata Nello Carrara (Italy) [8236-31]

2:10 pm: **Novel resonance-based CMOS-compatible reconfigurable nanophotonic structures** (*Invited Paper*), Amir H. Atabaki, Qing Li, Payam Alipour, Ali Asghar Eftekhari, Zhixuan Xia, Ali Adibi, Georgia Institute of Technology (USA) [8236-32]

2:35 pm: **Integrated terahertz microcavities, filters, and waveguides** (*Invited Paper*), Farhan Rana, Paul A. George, Christina Manolatu, Cornell Univ. (USA) [8236-33]

Coffee Break 3:00 to 3:25 pm

SESSION 9

Room: 110 (Exhibit Level) Mon. 3:25 to 5:05 pm

Novel Microresonators

Session Chair: Vladimir S. Ilchenko, OEwaves, Inc. (USA)

3:25 pm: **Localization of light and photonic microresonators in an optical fiber with nanoscale radius variation** (*Invited Paper*), Misha Sumetsky, OFS (USA) [8236-34]

3:50 pm: **Neutron whispering-gallery and its application to fundamental and surface physics** (*Invited Paper*), Valery V. Nesvizhevsky, Institut Laue-Langevin (France) [8236-35]

4:15 pm: **Guided resonances for light-assisted self assembly and structural-absorption engineering** (*Invited Paper*), Michelle L. Povinelli, Camilo Mejia Prada, Chenxi Lin, Eric Jaquay, Luis J. Martinez Rodriguez, The Univ. of Southern California (USA); Avik Dutt, Indian Institute of Technology Kharagpur (India) [8236-36]

4:40 pm: **Time-reversed lasing and coherent control of absorption in resonators** (*Invited Paper*), A. Douglas Stone, Hui Cao, Yidong Chong, Yale Univ. (USA); Li Ge, Princeton Univ. (USA); Heeso Noh, Yale Univ. (USA); Wenjie Wan, Shanghai Jiaotong Univ. (China) [8236-37]

SESSION 10

Room: 110 (Exhibit Level) Mon. 5:05 to 6:05 pm

Microcavity Lasers and Applications II

Session Chair: Vladimir S. Ilchenko, OEwaves, Inc. (USA)

5:05 pm: **Dynamic multi-mode analysis of passive Q-switched lasers**, Christoph Pflaum, Zhabiz Rahimi, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8236-38]

5:25 pm: **Improvements in monoblock performance using external reflector**, Alan D. Hays, John E. Nettleton, Nick Barr, Nathaniel Hough, Lew Goldberg, U.S. Army Night Vision & Electronic Sensors Directorate (USA) [8236-39]

5:45 pm: **Characterization of the longitudinal Gouy phase branches in cascaded optical systems**, Sudha K. Nirmala, Surya P. Tewari, Univ. of Hyderabad (India) [8236-40]

Tuesday 24 January

SESSION 11

Room: 110 (Exhibit Level) Tues. 8:00 to 10:30 am

Microresonator-Based Sensors I

Session Chair: Michelle L. Povinelli,
The Univ. of Southern California (USA)

8:00 am: **Nonlinear modes of plasmonic microcavities: theoretical analysis and device applications** (*Invited Paper*), Nicolae C. Panoiu, Claudiu G. Biris, Univ. College London (United Kingdom) [8236-41]

8:25 am: **Developing horizontal slot disk resonators for optical biosensing and more** (*Invited Paper*), Jung H. Shin, Shinyoung Lee, Seok Chan Eom, KAIST (Korea, Republic of) [8236-42]

8:50 am: **Silicon microring sensors** (*Invited Paper*), Zhiping Zhou, Huaxiang Yi, Peking Univ. (China) [8236-43]

9:15 am: **Silicon nitride microresonators for optical manipulation of microparticles and biosensing** (*Invited Paper*), Andrew W. Poon, Hong Cai, Ting Lei, Hong Kong Univ. of Science and Technology (Hong Kong, China) [8236-44]

9:40 am: **Giant sensitivity of coupled optofluidic active ring sensors** (*Invited Paper*), Lei Xu, Fudan Univ. (China) [8236-45]

10:05 am: **Optical microcavities: taking detection to the limit** (*Invited Paper*), Frank Vollmer, Max Planck Institute for the Science of Light (Germany) [8236-46]

Coffee Break 10:30 to 10:50 am

SESSION 12

Room: 110 (Exhibit Level) Tues. 10:50 am to 12:30 pm

Microresonator-Based Sensors II

Session Chair: Jean-Claude M. Diels, The Univ. of New Mexico (USA)

10:50 am: **On-chip whispering-gallery-mode lasers for sensing applications** (*Invited Paper*), Lina He, Sahin K. Ozdemir, Jianguang Zhu, Woosung Kim, Lan Yang, Washington Univ. in St. Louis (USA) [8236-47]

11:15 am: **Integrated whispering-gallery mode resonators for fundamental physics and sensing applications** (*Invited Paper*), Rico Henze, Humboldt-Univ. zu Berlin (Germany); Jonathan M. Ward, Humboldt-Univ. zu Berlin (Germany) and Cork Institute of Technology (Ireland); Markus Gregor, Humboldt-Univ. zu Berlin (Germany); Christoph Pyrlík, Andreas Thies, Andreas Wicht, Ferdinand-Braun-Institut (Germany); Achim Peters, Ferdinand-Braun-Institut (Germany) and Humboldt-Univ. zu Berlin (Germany); Oliver Benson, Humboldt-Univ. zu Berlin (Germany) [8236-48]

11:40 am: **High-sensitivity and wide-directivity ultrasound detection using high-Q polymer micro-ring resonators** (*Invited Paper*), Tao Ling, Sung-Liang Chen, L. Jay Guo, Univ. of Michigan (USA) [8236-49]

12:05 pm: **Fiber-optic resonator sensors based on comb synthesizers** (*Invited Paper*), Gianluca Gagliardi, CNR, Istituto Nazionale di Ottica (Italy) [8236-50]

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

SESSION 13

Room: 110 (Exhibit Level) Tues. 1:30 to 3:20 pm

Microresonator-Based Sensors III

Session Chair: Lan Yang, Washington Univ. in St. Louis (USA)

1:30 pm: **Hybrid optoplasmonic elements for ultrasensitive detection and information processing on the nanoscale** (*Invited Paper*), Svetlana V. Boriskina, Wonmi Ahn, Yan Hong, Björn M. Reinhard, Boston Univ. (USA) [8236-51]

1:55 pm: **Plasmon lasers and circuits** (*Invited Paper*), Renmin Ma, Univ. of California, Berkeley (USA); Xiang Zhang, Univ. of California, Berkeley (USA) and Lawrence Berkeley National Lab. (USA) [8236-52]

2:20 pm: **Fabrication of hybrid optoplasmonic microresonators for high-efficiency photonic-plasmonic mode coupling**, Wonmi Ahn, Svetlana V. Boriskina, Yan Hong, Björn M. Reinhard, Boston Univ. (USA) [8236-53]

2:40 pm: **Porous-wall hollow-glass microsphere as an optical microresonator for chemical vapor detection**, Hanzheng Wang, Lei Yuan, Edward Pienkowski, Missouri Univ. of Science and Technology (USA); Cheol-Woon Kim, MO-SCI Corp. (USA); Hai Xiao, Missouri Univ. of Science and Technology (USA) [8236-54]

3:00 pm: **ICLAS-based detection of low vapor pressure compounds using external cavity QCL and Fabry-Perot interferometer**, Gautam Medhi, Univ. of Central Florida (USA); Andrey V. Muravjov, Zyberwear, Inc. (USA); Chris J. Fredricksen, Robert E. Peale, Univ. of Central Florida (USA); Oliver Edwards, Zyberwear, Inc. (USA) [8236-55]

Coffee Break 3:20 to 3:45 pm

SESSION 14

Room: 110 (Exhibit Level) Tues. 3:45 to 6:00 pm

Resonant Opto-Mechanics

Session Chair: Tobias J. Kippenberg,
Ecole Polytechnique Fédérale de Lausanne (Switzerland)

3:45 pm: **Whispering gallery mode resonators as tools for non-linear optics and optomechanics** (*Invited Paper*), Silé G. Nic Chormaic, Univ. College Cork (Ireland) and Tyndall National Institute (Ireland) and Okinawa Institute of Science and Technology (Japan); Jonathan M. Ward, Univ. College Cork (Ireland) and Humboldt Univ. zu Berlin (Germany); Amy Watkins, Yuqiang Wu, Univ. College Cork (Ireland) [8236-56]

4:10 pm: **Brillouin optomechanics** (*Invited Paper*), Tal E. Carmon, Univ. of Michigan (USA) [8236-57]

4:35 pm: **Surface acoustic wave frequency comb**, Andrey B. Matsko, Anatoliy A. Savchenkov, Vladimir S. Ilchenko, David J. Seidel, Lute Maleki, OEwaves, Inc. (USA) [8236-58]

4:55 pm: **Micro-opto-mechanical damping and amplification in a waveguide-DBR microcavity** (*Invited Paper*), Marcel W. Pruessner, Todd H. Stievater, William S. Rabinovich, U.S. Naval Research Lab. (USA); Jacob B. Khurgin, The Johns Hopkins Univ. (USA) [8236-59]

5:20 pm: **Effects of spatial confinement of electromagnetic field on optical forces due to whispering-gallery modes**, Joel T. Rubin, Lev I. Deych, Queen's College (USA) [8236-60]

5:40 pm: **Evanescence light fields coupling effects and optical propelling of microspheres in water immersed fiber couplers**, Yangcheng Li, Oleksiy Svitelskiy, Dongning Sun, The Univ. of North Carolina at Charlotte (USA); David J. Carnegie, Edik U. Rafailov, Univ. of Dundee (United Kingdom); Vasily N. Astratov, The Univ. of North Carolina at Charlotte (USA) [8236-61]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Generalized model for beam-path variation in ring resonator and its applications in backscattering coupling effect, Meixiong Chen, Jie Yuan, Xingwu Long, Zhenglong Kang, Yingying Li, National Univ. of Defense Technology (China) [8236-74]

Performance of the smoothing of small target spots in frequency-tripled high-power laser, Xiujuan Jiang, Yang Li, Yingna Zheng, Guangdong Univ. of Technology (China) [8236-75]

FDTD analysis of light storage in coupled micro-ring resonators, Dan T. Nguyen, NP Photonics, Inc. (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA) [8236-76]

About some possibilities of influencing the energetic relief of metals in order to favor micro-joining processes, Corina Bokor, Univ. Lucian Blaga din Sibiu (Romania); Ileana Rau, Gheorghe Amza, Polytechnical Univ. of Bucharest (Romania); Wilhelm Kappel, National Institute for Research and Development for Electrical Engineering (Romania); Ilie V. Ivarie, Claudiu I. Ivarie, Sorin Itu, Univ. Lucian Blaga din Sibiu (Romania); Doina Mortoiu, Aurel Vlaicu Univ. of Arad (Romania); Sorin Tarnoveanu, Cosmin Colceriu, Univ. Lucian Blaga din Sibiu (Romania) [8236-77]

Model for a partially coherent pump beam for an alkali laser, Alan H. Paxton, Air Force Research Lab. (USA) [8236-78]

Wednesday 25 January

SESSION 15

Room: 110 (Exhibit Level) Wed. 8:00 to 9:55 am

Resonant Four-Wave Mixing and Applications

Session Chair: Pierre Galarneau, INO (Canada)

8:00 am: **Nonlinearities in silicon photonics: something to exploit or to counteract?** (*Invited Paper*), Andrea Melloni, Francesco Morichetti, Carlo Ferrari, Antonio Canciamilla, Politecnico di Milano (Italy); Marc Sorel, Univ. of Glasgow (United Kingdom) [8236-62]

8:25 am: **Linear and nonlinear effects of electron paramagnetic resonance in high-Q cryogenic sapphire microwave resonators** (*Invited Paper*), Michael E. Tobar, The Univ. of Western Australia (Australia) [8236-63]

8:50 am: **Characterization of picosecond pulse trains from a microresonator optical frequency comb** (*Invited Paper*), Scott B. Papp, Scott A. Diddams, National Institute of Standards and Technology (USA) [8236-60]

9:15 am: **The beam quality of self-phase modulated Gaussian beams**, Sergiy Mokhov, Boris Zeldovich, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8236-65]

9:35 am: **Ab initio theory of nonlinear effects in individual and coupled microdisk resonators**, Lev I. Deych, Queens College (USA) [8236-66]

Coffee Break 9:55 to 10:20 am

SESSION 16

Room: 110 (Exhibit Level) Wed. 2:00 to 3:30 pm

Doped Microresonators

Session Chair: Thomas Graf, Univ. Stuttgart (Germany)

2:00 pm: **Hybrid microspheres for nonlinear Kerr switching devices**, Silvia Soria, Simone Berneschi, Gualtiero Nunzi Conti, Franco Cosi, Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy); Ilya E. Razzdolski, Tatyana V. Murzina, Lomonosov Moscow State Univ. (Russian Federation) [8236-64]

2:20 pm: **Spherical resonators coated by glass and glass-ceramic films** (*Invited Paper*), Davor Ristic, Andrea Chiappini, Alessandro Chiasera, Istituto di Fotonica e Nanotecnologie (Italy); Cristina Armellini, Alessandro Carpentiero, Univ. degli Studi di Trento (Italy); Maurizio Mazzola, Istituto di Fotonica e Nanotecnologie (Italy); Enrico Moser, Univ. degli Studi di Trento (Italy); Stefano Varas, Istituto di Fotonica e Nanotecnologie (Italy); Simone Berneschi, Gualtiero Nunzi Conti, Stefano Pelli, Silvia Soria, Istituto di Fisica Applicata Nello Carrara (Italy); Giorgio Speranza, Lorenzo Lunelli, Cecilia Pederzoli, Fondazione Bruno Kessler (Italy); Francesco Prudenzeno, Politecnico di Bari (Italy); Patrice Féron, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Mile Ivanda, Institut Ruder Boškovic (Croatia); Gilles Cibiel, Ctr. National d'Études Spatiales (France); Giancarlo C. Righini, Istituto di Fisica A [8236-67]

2:45 pm: **Coherent spectroscopy of rare-earth-ion doped whispering-gallery-mode resonators** (*Invited Paper*), Jevon J. Longdell, Dmitry Korystov, David McAuslan, Univ. of Otago (New Zealand) [8236-68]

3:10 pm: **Composite micro-sphere optical resonators for electric field measurement**, Tindaro Ioppolo, Jeff Stubblefield, Dustin Womack, Ulas K. Ayaz, M. Volkan Otugen, Southern Methodist Univ. (USA) [8236-69]

Coffee Break 3:30 to 4:00 pm

SESSION 17

Room: 110 (Exhibit Level) Wed. 4:00 to 5:50 pm

Coupled Microresonators and Effects

Session Chair: Vladimir S. Ilchenko, OEwaves, Inc. (USA)

4:00 pm: **Coupled micro-cavities with Vernier effect for lasers and sensors** (*Invited Paper*), Jian-Jun He, Zhejiang Univ. (China) [8236-70]

4:25 pm: **Silicon photonic resonator sensors and devices** (*Invited Paper*), Lukas Chrostowski, Wei Shi, Xu Wang, The Univ. of British Columbia (Canada); Samantha M. Grist, The Univ. of British Columbia (USA); Jonas Flueckiger, Eric Ouellet, Robert Boeck, Karen C. Cheung, Nicolas A. F. Jaeger, The Univ. of British Columbia (Canada) [8236-79]

4:50 pm: **Longitudinal mode selection in laser cavity by moiré volume Bragg grating**, Daniel Ott, Julien Lumeau, Sergiy Mokhov, Ivan B. Divliansky, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Aleksandr Rysanyanskiy, Nikolai S. Vorobiev, Vadim Smirnov, Christine P. Spiegelberg, OptiGrate Corp. (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8236-71]

5:10 pm: **Beam tapering effect in microsphere chains: from geometrical to physical optics**, Kenneth W. Allen, Jr., Arash Darafsheh, Vasily N. Astratov, The Univ. of North Carolina at Charlotte (USA) [8236-72]

5:30 pm: **Accurate analytical estimates of eigenfrequencies and dispersion in whispering-gallery spheroidal resonators**, Michael Gorodetsky, Lomonosov Moscow State Univ. (Russian Federation) [8236-73]

Courses of Related Interest

- SC860 Resonator Design for Solid State Lasers (Paschotta) Wednesday, 8:30 am to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

LASE PLENARY SESSION

Room: 134 (Exhibit Level) . . . Wed. 10:20 am to 12:30 pm

Session Chairs: Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); Alberto Piqué, U.S. Naval Research Lab. (USA)

10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); Alberto Piqué, U.S. Naval Research Lab. (USA)

10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)

10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

10:35 am: **Impact of Green Technology in Germany**,
Matthias Machnig, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)

10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)

11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)

11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH + Co. KG (Germany)

See page 20 for details.

Lunch/Exhibition Break 12:30 to 2:00 pm

Fiber Lasers IX: Technology, Systems, and Applications

Conference Chair: **Eric C. Honea**, Lockheed Martin Aculight (USA)

Conference Co-Chair: **Sami T. Hendow**, Multiwave Photonics (USA)

Program Committee: **John Ballato**, Clemson Univ. (USA); **Jes Broeng**, NKT Photonics A/S (Denmark); **Adrian L. G. Carter**, Nufern (USA); **John R. Clowes**, Fianium Ltd. (United Kingdom); **Jay W. Dawson**, Lawrence Livermore National Lab. (USA); **Fabio Di Teodoro**, Northrop Grumman Aerospace Systems (USA); **Mark Dubinskii**, U.S. Army Research Lab. (USA); **Jean-Philippe M. Fève**, Directed Energy Solutions (USA); **Almantas Galvanauskas**, Univ. of Michigan (USA); **Denis V. Gapontsev**, Consultant (Russian Federation); **Clifford Headley III**, OFS Labs. (USA); **Yoonchan Jeong**, Seoul National Univ. (Korea, Republic of); **Dahv A. Kliner**, JDSU (USA); **John D. Minelly**, Coherent, Inc. (USA); **Peter F. Moulton**, Q-Peak, Inc. (USA); **Siddharth Ramachandran**, The Boston Univ. Photonics Ctr. (USA); **Craig A. Robin**, Air Force Research Lab. (USA); **L. Brandon Shaw**, U.S. Naval Research Lab. (USA); **Daniel B. Soh**, Sandia National Labs., California (USA); **James R. Taylor**, Imperial College London (United Kingdom); **Andreas Tünnermann**, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Robert G. Waarts**, Robert Waarts Consulting (USA); **Ji Wang**, Corning Incorporated (USA); **Frank W. Wise**, Cornell Univ. (USA); **David E. Zelmon**, Air Force Research Lab. (USA); **Mikhail N. Zervas**, Univ. of Southampton (United Kingdom)

Conference Cosponsors:



Monday 23 January

Welcome and Introduction

Room: 131 (Exhibit Level) Mon. 8:10 to 8:20 am

Eric C. Honea, Lockheed Martin Aculight

SESSION 1

Room: 131 (Exhibit Level) Mon. 8:20 to 10:10 am

Beam Combining I

Session Chair: **Eric C. Honea**, Lockheed Martin Aculight (USA)

8:20 am: **Beam combination of kilowatt fiber amplifiers** (*Invited Paper*), Joshua E. Rothenberg, Gregory D. Goodno, Northrop Grumman Aerospace Systems (USA) [8237-01]

8:50 am: **Phase-locked multi-core photonic crystal fiber laser by end-sealing**, Akira Shirakawa, Hidenori Yamada, Michio Matsumoto, Masaki Tokurakawa, Ken-ichi Ueda, The Univ. of Electro-Communications (Japan) [8237-02]

9:10 am: **Coherent and spectral beam combining of fiber lasers**, Steven J. Augst, Shawn M. Redmond, Charles X. Yu, Daniel J. Ripin, T. Y. Fan, MIT Lincoln Lab. (USA); Gregory D. Goodno, Peter A. Thielen, Joshua E. Rothenberg, Northrop Grumman Aerospace Systems (USA); Antonio Sanchez-Rubio, MIT Lincoln Lab. (USA) [8237-03]

9:30 am: **Multiplexed volume Bragg gratings for spectral beam combining**, Ivan B. Divliansky, Derrek Drachenberg, Vasile Rotar, George Venus, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8237-04]

9:50 am: **Spatial chirp-precompensated high density spectral beam combining**, Eric C. Cheung, James Ho, Timothy S. McComb, Stephen Palese, Northrop Grumman Aerospace Systems (USA) [8237-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 131 (Exhibit Level) Mon. 10:40 am to 12:00 pm

Beam Combining II

Session Chair: **Jay W. Dawson**, Lawrence Livermore National Lab. (USA)

10:40 am: **Coherently phase locked high pulse energy fiber amplifiers**, Stephen Palese, Eric C. Cheung, Fabio Di Teodoro, Timothy S. McComb, C. C. Shih, Mark Weber, Mike Hemmat, Northrop Grumman Aerospace Systems (USA) [8237-36]

11:00 am: **Coherently combined fiber CPA system delivering 3-mJ femtosecond pulses**, Arno Klenke, Enrico Seise, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Sven Breittkopf, Stefan Demmler, Friedrich-Schiller-Univ. Jena (Germany); Jan Rothhardt, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) and Helmholtz-Institute Jena (Germany) [8237-37]

11:20 am: **Passive coherent beam combining of two femtosecond fiber chirped-pulse amplifiers in a Sagnac geometry**, Louis Daniault, Marc Hanna, Lab. Charles Fabry de l'Institut d'Optique (France); Dimitris Papadopoulos, Ecole Nationale Supérieure de Techniques Avancées (France); Yoann Zaouter, Eric Mottay, Amplitude Systemes (France); Frédéric Druon, Patrick Georges, Lab. Charles Fabry de l'Institut d'Optique (France) [8237-38]

11:40 am: **Active coherent combining of multiple parallel femtosecond-pulse CPA channels**, Leo A. Siiman, Tong Zhou, Wei-Zung Chang, Almantas Galvanauskas, Univ. of Michigan (USA) [8237-39]

Lunch Break 12:00 to 1:40 pm

SESSION 3

Room: 131 (Exhibit Level) Mon. 1:40 to 3:10 pm

High Power I

Session Chair: **Mikhail N. Zervas**, SPI Lasers (United Kingdom)

1:40 pm: **Thermally induced mode instability in high power fiber amplifiers** (*Invited Paper*), Arlee V. Smith, Jesse J. Smith, AS-Photonics, LLC (USA) [8237-40]

2:10 pm: **Temporal dynamics of mode instabilities in high power fiber amplifiers**, Hans-Jürgen Otto, Fabian Stutzki, Florian Jansen, Friedrich-Schiller-Univ. Jena (Germany); Tino Eidam, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Cesar Jauregui, Friedrich-Schiller-Univ. Jena (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8237-41]

2:30 pm: **On the thermal origin of mode instabilities in high power fiber lasers**, Cesar Jauregui-Misas, Tino Eidam, Hans-Jürgen Otto, Florian Jansen, Fabian Stutzki, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [8237-42]

2:50 pm: **High power extraction from very large mode area fibers approaching MFDs of 100 μm** , Florian Jansen, Fabian Stutzki, Cesar Jauregui, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8237-43]
 Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 131 (Exhibit Level) Mon. 3:40 to 6:10 pm
High-Power Fiber and Disk Lasers

Joint Session with Conference 8235

Session Chairs: **Norman Hodgson**, Coherent, Inc. (USA);
Dahv A. Kliner, JDSU (USA)

3:40 pm: **High-power disk and fiber lasers: a performance comparison** (*Invited Paper*), Stefan Ruppik, Frank Becker, Frank-Peter Grundmann, Wolfram Rath, Ulrich Hefter, ROFIN-SINAR Laser GmbH (Germany) [8235-25]

4:10 pm: **Multi-kW single fiber laser based on an extra large mode area fiber design**, Andreas Langner, Mario Such, Gerhard Schötz, Heraeus Quarzglas GmbH & Co. KG (Germany); Florian Just, Martin Leich, Christian Mühlig, Jens Kobelke, Anka Schwuchow, Stephan Grimm, Institut für Photonische Technologien e.V. (Germany); Olaf Strauch, Björn Wedel, HIGHYAG Lasertechnologie GmbH (Germany); Georg Rehmann, Charley Bachert, Volker Krause, Laserline GmbH (Germany) [8237-44]

4:30 pm: **High-power disk lasers: advances and applications**, David L. Havrilla, Tracey S. Ryba, TRUMPF Inc. (USA); Marco Holzer, TRUMPF Laser-und Systemtechnik GmbH (Germany) [8235-26]

4:50 pm: **1.2-kW single-mode fiber laser based on 100-W high-brightness pump diodes**, Dahv A. Kliner, Hongbo Yu, Johnny Luu, Kai-Hsiu Liao, Jeff Segall, Martin H. Muendel, Jane Shen, Matthew K. Kutsuris, Donald K. Holdener, Justin Franke, Kelvin Nguyen, Dave L. Woods, David Meng, David L. Vecht, Richard Duesterberg, Lei Xu, Jay A. Skidmore, James Guo, Jane Cheng, Jihua Du, Brad Johnson, Nicolas Guerin, Benlih Huang, Peter Cheng, Reddy Raju, Kong Weng Lee, Jason Cai, Victor V. Rossin, Erik P. Zucker, JDSU (USA) [8237-45]

5:10 pm: **Ultrafast disk lasers and amplifiers**, Dirk H. Sutter, Jochen D. Kleinbauer, Dominik Bauer, Martin Wolf, Chuong Tan, Raphael Gebbs, Aleksander Budnicki, Philipp Wagenblast, TRUMPF Laser GmbH & Co. KG (Germany); Sascha Weiler, TRUMPF Inc. (USA) [8235-27]

5:30 pm: **65 W of average power and 6-MW peak power generation from a mode-locked fiber oscillator**, Martin Baumgartl, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Caroline Lecaplain, Ammar Hideur, Univ. de Rouen (France); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8237-46]

5:50 pm: **800-W CW near diffraction limited beam delivery through a 100-m long multi-mode fiber**, Armin Austerschulte, Moritz M. Vogel, Thomas Rataj, Jan-Philipp Negel, Andreas Voss, Marwan Abdou Ahmed, Thomas Graf, Univ. Stuttgart (Germany) [8237-47]

Tuesday 24 January

SESSION 5

Room: 131 (Exhibit Level) Tues. 8:00 to 9:00 am
High Power II

Session Chair: **Peter F. Moulton**, Q-Peak, Inc. (USA)

8:00 am: **Cascaded Raman fiber laser at 1480 nm with output power of 104 W**, V. R. Supradeepa, Jeffrey Nicholson, Clifford Headley III, Yin-wen Lee, OFS Labs. (USA); Bera Palsdottir, Dan Jakobsen, OFS Fitel Denmark ApS (Denmark) [8237-48]

8:20 am: **High-power continuous wave erbium-doped fiber laser pumped by a 1480-nm Raman fiber laser**, Jeffrey W. Nicholson, OFS Labs. (USA) [8237-49]

8:40 am: **Further power scaling of resonantly cladding-pumped all-glass Er-doped silica based fiber laser**, Jun Zhang, John McElhenny, Viktor Fromzel, Tigran V. Sanamyan, Mark Dubinskii, U.S. Army Research Lab. (USA) [8237-50]

SESSION 6

Room: 131 (Exhibit Level) Tues. 9:05 to 10:15 am
Visible and UV Sources

Session Chair: **Daniel B. Soh**, Sandia National Labs., California (USA)

9:05 am: **Efficient nonlinear frequency conversion scheme for cladding-pumped fiber lasers** (*Invited Paper*), Rafal Cieslak, W. Andrew Clarkson, Univ. of Southampton (United Kingdom) [8237-51]

9:35 am: **High power picosecond fiber laser emitting 50 W at 343 nm at 80 MHz**, Damien Sangla, Julien Saby, Benjamin Cocquelin, François L. Salin, EOLITE Systems (France) [8237-52]

9:55 am: **Frequency conversion from IR to UV of a high average power and high peak power ultrafast fiber amplifier for scientific and industrial applications**, Yoann Zaouter, Amplitude Systemes (France); Marc Hanna, Lab. Charles Fabry de l'Institut d'Optique (France); Franck Morin, Mario Tonin, Rysvan Maleck, Clemens Hönninger, Amplitude Systemes (France); Patrick Georges, Lab. Charles Fabry de l'Institut d'Optique (France); Eric Mottay, Amplitude Systemes (France) [8237-53]

Coffee Break 10:15 to 10:40 am

SESSION 7

Room: 131 (Exhibit Level) Tues. 10:40 am to 12:20 pm
Components

Session Chair: **John D. Minelly**, Coherent, Inc. (USA)

10:40 am: **Advanced components for multi-kW fiber lasers** (*Invited Paper*), Donald L. Sipes, Jr., Jason Tafoya, Daniel Schulz, Optical Engines, Inc. (USA); Chad Carlson, Benjamin Ward, U.S. Air Force Academy (USA) [8237-54]

11:10 am: **Advanced fiber combiner capable of 400-W CW operation for the realization of monolithic counter-propagating pumped high power fiber amplifiers**, Thomas Theeg, Laser Zentrum Hannover e.V. (Germany); Hakan Sayinc, Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-Time Research (QUEST) (Germany) [8237-55]

11:30 am: **High-spectral-flatness mid-infrared supercontinuum fiber source and its applications for component characterizations**, Jihong Geng, AdValue Photonics, Inc. (USA) [8237-56]

11:50 am: **Micro-optics for spatial phase, polarization, and spectral control in passive and active fibers** (*Invited Paper*), Eric G. Johnson, Clemson Univ. (USA) [8237-57]

Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 8

Room: 131 (Exhibit Level) Tues. 1:50 to 3:20 pm
Fiber Designs, Materials and Characterization I

Session Chair: **Siddharth Ramachandran**, The Boston Univ. Photonics Ctr. (USA)

1:50 pm: **Ultraviolet absorption and excitation spectroscopy of rare-earth-doped glass fibers derived from glassy and crystalline preforms** (*Invited Paper*), Peter D. Dragic, Yuh-Shiuan Liu, Tom Galvin, J. Gary Eden, Univ. of Illinois at Urbana-Champaign (USA) [8237-58]

2:20 pm: **Experimental characterization of robust single-mode operation of 50- μm and 60- μm core chirally coupled-core optical fibers**, Xiuquan Ma, Alex Kaplan, Almantas Galvanauskas, Univ. of Michigan (USA) [8237-59]

2:40 pm: **Amplification of a large-mode area single higher order mode in a fiber amplifier**, Clifford Headley III, James Phillips, John Fini, Enrico Gonzales, Samir Ghalimi, Man Yan, Jeffrey Nicholson, Patrick Wisk, Jim Fleming, Eric Monberg, Frank Dimarcello, Robert S. Windeler, Michael Fishteyn, OFS Labs. (USA); Khushvinder Brar, Lockheed Martin Aculight (USA); Siddharth Ramachandran, The Boston Univ. Photonics Ctr. (USA); David DiGiovanni, OFS Labs. (USA) [8237-60]

3:00 pm: **A comparative study of tapered fiber laser configurations**, Juho Kerttula, Valery Filippov, Tampere Univ. of Technology (Finland); Yuri K. Chamorovskii, Vasily Ustimchik, Konstantin M. Golant, Institute of Radio Engineering and Electronics (Russian Federation); Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland) [8237-61]

Coffee Break 3:20 to 3:50 pm

Conference 8237 · Room: 131 (Exhibit Level)

SESSION 9

Room: 131 (Exhibit Level) Tues. 3:50 to 6:00 pm

Fiber Designs, Materials and Characterization II

Session Chair: **Adrian L. G. Carter**, Nufern (USA)

3:50 pm: **Polymer optical fibres: conventional and microstructured fibres** (Invited Paper), Alexander Argyros, The Univ. of Sydney (Australia) [8237-62]

4:20 pm: **Photonic crystal fiber with large-mode area and low-bending loss for high-power compact lasers and amplifiers**, Marek Napierala, Vrije Univ. Brussel (Belgium) and Wrocław Univ. of Technology (Poland); Elzbieta M. Beres-Pawlik, Wrocław Univ. of Technology (Poland); Tomasz Nasilowski, Military Univ. of Technology (Poland); Pawel Mergo, Marie Curie-Sklodowska Univ. (Poland); Francis Berghmans, Hugo Thienpont, Vrije Univ. Brussel (Belgium) [8237-63]

4:40 pm: **Mode analysis of LMA fibers using the correlation filter method**, Daniel Flamm, Christian Schulze, Friedrich-Schiller-Univ. Jena (Germany); Oliver A. Schmidt, Max Planck Institute for the Science of Light (Germany); Siegmund Schröter, Institut für Photonische Technologien e.V. (Germany); Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany) [8237-66]

5:00 pm: **Efficient high power fiber amplifier utilizing the single mode distributed mode filtering bandgap rod fiber**, Marko Laurila, Technical Univ. of Denmark (Denmark); Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Mette M. Jørgensen, Sidsel R. Petersen, Technical Univ. of Denmark (Denmark); Jes Broeng, NKT Photonics A/S (Denmark); Jesper Lægsgaard, Technical Univ. of Denmark (Denmark) [8237-65]

5:20 pm: **Influence of fiber bending and strain on the modal content**, Christian Schulze, Daniel Flamm, Friedrich-Schiller-Univ. Jena (Germany); Oliver A. Schmidt, Max Planck Institute for the Science of Light (Germany); Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany) [8237-64]

5:40 pm: **CGH-based real-time analysis of fiber Bragg gratings in few mode LMA fibers**, Markus Mundus, Friedrich-Schiller Univ. Jena (Germany); Jens U. Thomas, Christian Voigtländer, Ria G. Becker, Cesar Jauregui, Andreas Tünnermann, Stefan Nolte, Friedrich-Schiller Univ. Jena (USA) [8237-67]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

High power all-fiber picosecond laser system for UV light generation, Mizuki Oku, Khanh Kieu, Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) [8237-68]

Numerical evaluation of pulse compressibility and chirp characterization, Igor I. Korel, Boris Nyushkov, Vladimir Denisov, Institute of Laser Physics (Russian Federation) [8237-69]

Sensitivity enhancement of in-line chemical sensing device with C-type fiber and photonic crystal fiber, Sahar Hosseinzadeh Kassani, Jiyoung Park, Kyunghwan Oh, Yonsei Univ. (Korea, Republic of) [8237-70]

Pulse energy scaling of ps to ns pulses in highly integrated fiber amplifiers, Hakan Sayinc, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-time Research (QUEST) (Germany); Thomas Theeg, Sebastian Kanzelmeyer, Laser Zentrum Hannover e.V. (Germany); Jörg Neumann, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-time Research (QUEST) (Germany); Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) [8237-71]

Low noise fiber laser based on gain feedback in a rare-earth doped fiber amplifier chain, Hongdan Wan, Yue Gong, Southeast Univ. (China); Xianqin Li, Jintong Li, Peichun Wu, Wuxi Zhongxing Optoelectronics Technologies Co., Ltd. (China); Xiaohan Sun, Southeast Univ. (China) [8237-72]

The role of the saturable absorber in a mode-locked fiber laser, Dmitriy Churin, Khanh Kieu, Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) [8237-73]

Cavity loss adjustment requirement for dual wave laser generation, Ricardo I. Álvarez-Tamayo, Benemérita Univ. Autónoma de Puebla (Mexico); Manuel Durán-Sánchez, Univ. Tecnológica de Puebla (Mexico); Olivier Pottiez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Baldemar Ibarra-Escamilla, Evgeny A. Kuzin, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . [8237-74]

New mechanical stripping methods for optical fibers, Douglas M. Duke, Wenxin Zheng, William Klimowich, Steven Shaw, America Fujikura Ltd. (USA) [8237-75]

25-ps optical pulse at 850 nm with a fiber-based laser, Youngjae Kim, Bryan Burgoyne, Alain Villeneuve, Jr., Genia Photonics Inc. (Canada) [8237-76]

Compact picosecond laser for industrial applications, Peer Burdack, Thomas Fox, Stefan Spiekermann, Ingo Freitag, InnoLight GmbH (Germany) [8237-77]

Holmium-doped ZBLAN fiber lasers at 1.2 μ m, Xiushan Zhu, College of Optical Sciences, The Univ. of Arizona (USA); Jie Zong, NP Photonics, Inc. (USA); Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA); Arturo Chavez-Pirson, NP Photonics, Inc. (USA); Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA); Narasimha S. Prasad, NASA Langley Research Ctr. (USA) [8237-78]

High power single-mode fiber laser and a multi-mode delivery cable, Kosuke Kashiwagi, Akira Fujisaki, Yoshihiro Emori, Takashi Kayahara, The Furukawa Electric Co., Ltd. (Japan) [8237-79]

Passively Q-switched 2 μ m Tm-doped cladding-pumped all fiber laser with graphene-based saturable absorber, Jiang Liu, Beijing Univ. of Technology (China); Rusheng Wei, Xiangang Xu, Shandong Univ. (China); Pu Wang, Beijing Univ. of Technology (China) [8237-80]

Single-mode WDM for core pumping thulium-doped fiber at 795 nm, Gabriel Pelegrina Bonilla, Katharina Hausmann, Kai Liu, Hakan Sayinc, Uwe Morgner, Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) [8237-81]

Atomic layer deposition for fabrication of ytterbium doped fibers, Joan J. Montiel i Ponsoda, Aalto Univ. School of Electrical Engineering (Finland); Markus Bosund, Beneq Oy (Finland); Lars Norin, Acreo AB (Sweden); Mikko Söderlund, Beneq Oy (Finland); Changgeng Ye, Ari Tervonen, Seppo Honkanen, Aalto Univ. School of Electrical Engineering (Finland) [8237-82]

Switchable multiwavelength erbium-doped fiber ring laser based on nonlinear polarization rotation, Young-Geun Han, Youngbo Shim, Hanyang Univ. (Korea, Republic of) [8237-83]

Generalized transfer function of a quarter-wave-shifted distributed-feedback fiber laser, Thi Kim N. Nguyen, Yann G. Boucher, Pascal Besnard, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) [8237-84]

Arc power calibration for fusion splicing optical fibers with variety diameters, Wenxin Zheng, Bryan Malinsky, AFL Conductor Accessories (USA) [8237-85]

Plasma zone control for adaptable fusion splicing capability, Douglas M. Duke, Wenxin Zheng, Hiroshi Sugawara, Toshiro Mizushima, AFL Conductor Accessories (USA); Kazuyuki Yoshida, Fujikura Ltd. (Japan) [8237-86]

Picosecond swept source laser at 1300 nm, Youngjae Kim, Bryan Burgoyne, Alain Villeneuve, Jr., Genia Photonics Inc. (Canada) [8237-87]

Tailored fiber Bragg gratings inscribed with a phase mask and a deformed wave front by ultrashort pulses, Ria G. Becker, Christian Voigtländer, Jens U. Thomas, Daniel Richter, Anshuman Singh, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8237-88]

High power single mode optical fiber coupler with enhanced mode field diameter, Thomas Theeg, Laser Zentrum Hannover e.V. (Germany); Katharina Hausmann, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-Time Research (QUEST) (Germany); Gabriel Pelegrina Bonilla, Laser Zentrum Hannover e.V. (Germany); Hakan Sayinc, Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-Time Research (QUEST) (Germany) [8237-89]

Thermo-optic wavelength-tunable fiber laser for the interrogation of fiber Bragg grating sensor systems, Hyojin Kim, Myung Yung Jeong, Chang Seok Kim, Pusan National Univ. (Korea, Republic of); YoungOuk Noh, HyungJong Lee, ChemOptics Inc. (Korea, Republic of); MinCheol Oh, Pusan National Univ. (Korea, Republic of) and ChemOptics Inc. (Korea, Republic of) [8237-90]

Quantitative modeling of pulse amplification in multimode cladding pumped Yb/Er co-doped fiber amplifiers, Dan T. Nguyen, Wei Shi, Arturo Chavez-Pirson, NP Photonics, Inc. (USA) [8237-91]

Effects of the gain property on the efficiency of the strongly pumped fiber laser, Jianqiu Cao, Shaofeng Guo, Jinyong Leng, Xiaojun Xu, Jinbao Chen, National Univ. of Defense Technology (China) [8237-92]

- Analytical analysis of coherent combination of amplified ultrashort laser pulses**, Arno Klenke, Enrico Seise, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) and Helmholtz-Institute Jena (Germany) [8237-93]
- All thulium fiber single-mode MOPA delivering 32-nJ picosecond pulses**, William Renard, Guillaume Canat, Michel Lefebvre, Pierre Bourdon, ONERA (France) [8237-94]
- SHARC fibers: a new paradigm for packagable ultralarge-core single-mode fibers**, David A. Rockwell, Vladimir V. Shkunov, Raytheon Space and Airborne Systems (USA); John R. Marciante, Univ. of Rochester (USA) [8237-95]
- Erbium-ytterbium co-doped fiber amplifier with controlled 1060-nm Yb-ASE**, Grzegorz J. Sobon, Pawel Kaczmarek, Arkadiusz J. Antonczak, Jaroslaw Sotor, Adam Waz, Grzegorz Dudzik, Karol Krzempek, Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland) [8237-96]
- High repetition-rate narrow line-width SESAM mode-locked picosecond Yb-doped all fiber laser**, Jiang Liu, Pu Wang, Beijing Univ. of Technology (China) [8237-97]
- Three-stage all-in-fiber MOPA source operating at 1550 nm with 20W output power**, Grzegorz J. Sobon, Pawel Kaczmarek, Arkadiusz J. Antonczak, Jaroslaw Sotor, Adam Waz, Grzegorz Dudzik, Karol Krzempek, Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland) [8237-98]
- Single-longitudinal-mode dual-wavelength erbium-doped fiber laser with wide tunability for the application to CW THz signal radiation**, Young-Geun Han, Cheol-Ju Kang, Hanyang Univ. (Korea, Republic of) [8237-99]
- Core-shell nanoparticle erbium-doped fibers for next generation amplifiers**, David E. Boivin, Alain Pastouret, Ekaterina Buron, Cédric Gonnet, Olivier Cavani, Simon Lempereur, Pierre Sillard, Draka Comteq France SAS (France) [8237-100]
- High power Q-switched rod type fiber laser with single crystal photoelastic modulator**, Rok Petkovšek, Univ. of Ljubljana (Slovenia); Julien Saby, EOLITE Systems (France); Ferdinand Bammer, Thomas Schumi, Technische Univ. Wien (Austria); François L. Salin, EOLITE Systems (France) [8237-101]
- Ultrashort pulse Yb fiber oscillator at 1064 nm by using a WDM cascade**, Hakan Sayinc, Katharina Hausmann, Uwe Morgner, Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) [8237-102]
- Extreme value statistics in Raman fiber lasers**, Dmitry V. Churkin, Oleg A. Gorbunov, Institute of Automation and Electrometry (Russian Federation); Sergey V. Smirnov, Novosibirsk State Univ. (Russian Federation) [8237-103]
- A novel sensing technique based on optical feedback interferometry to monitor fiber laser microfabrication**, Francesco P. Mezzapesa, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy); Lorenzo L. Colombo, CNR-IFN UOS Bari (Italy); Massimo Brambilla, Univ. degli Studi di Bari (Italy); Maurizio Dabbico, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy); Antonio Ancona, Teresa Sibillano, CNR-IFN UOS Bari (Italy); Francesco De Lucia, Univ. degli Studi di Bari (Italy); Pietro M. Lugarà, Gaetano Scamarcio, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy) [8237-104]
- Tellurite glass and fiber development for mid-IR transport and super-continuum applications**, Arturo Chavez-Pirson, Dan Rhonehouse, Zhidong Yao, Dan Nguyen, Kort Wiersma, Jie Zong, NP Photonics, Inc. (USA); Tariq Manzur, Naval Undersea Warfare Ctr. (USA) [8237-105]
- Lasing in thulium doped polarizing photonic crystal fibers (PCF)**, Pankaj Kadwani, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Norbert Modsching, West Saxon Univ. of Applied Sciences (Germany) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); R. Andrew Sims, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Lasse Leick, Jes Broeng, NKT Photonics A/S (Denmark); Lawrence Shah, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8237-107]
- Fiber laser micromachining of magnesium alloy tubes for biocompatible and biodegradable cardiovascular stents**, Ali Gökhan Demir, Barbara Previtali, Daniele Colombo, Qiang Ge, Maurizio Vedani, Lorenza Petriani, Wei Wu, Politecnico di Milano (Italy); Carlo Alberto Biffi, CNR-IENI (Italy) [8237-108]
- Increasing energy in an ytterbium femtosecond fiber laser with a longer gain medium and lower doping**, Katherine J. Bock, Hussein E. Kotb, Univ. of Ottawa (Canada); Mohamed Abou seif, Electronics Research Institute (Egypt); Hanan Anis, Univ. of Ottawa (Canada) [8237-109]
- Avoided-crossing based modal cut-off analysis of 19-cell double-cladding photonic crystal fibers**, Federica Poli, Enrico Coscelli, Univ. degli Studi di Parma (Italy); Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Michele Sozzi, Annamaria Cucinotta, Stefano Selleri, Univ. degli Studi di Parma (Italy); Lasse Leick, Jes Broeng, NKT Photonics A/S (Denmark) [8237-110]
- All-in-one 1236-nm Yb/Raman fiber laser**, Jeffrey W. Nicholson, Thierry Taunay, Eric Monberg, Frank DiMarcello, OFS Labs. (USA); Yaowen Li, Joanna Ng, OFS Specialty Photonics (USA) [8237-111]
- Single-output 3-wavelength multi-watt CW visible fiber laser system**, Mathieu Jacquemet, David Harnois, Quantel Group (France); Andrew Rider, Tim Durrant, Gooch & Housego (Torquay) Ltd. (United Kingdom); Alex Jarov, Alex Skliar, Raicol Crystals Ltd. (Israel); Alain Mugnier, David Pureur, Quantel Group (France) [8237-112]
- Mid-infrared strong spectral broadening in microstructured tapered chalcogenide AsSe fiber**, Mathieu Duhant, William Renard, Guillaume Canat, ONERA (France); Johann Trolès, Perrine Toupin, Sciences Chimiques de Rennes (France); Laurent Brilland, Plate-forme d'Étude et de Recherche sur les Fibres Optiques Spéciales (France); Frédéric Smektala, Univ. de Bourgogne (France); Aurélie Bétourné, Institut Fresnel (France); Pierre Bourdon, ONERA (France); Gilles Renversez, Institut Fresnel (France) [8237-113]
- Broadband multi-mode group-velocity dispersion determination in photonic crystal fibers from 0.4 µm to 1.7 µm**, Pascal Bösset, Tobias Baselt, Frank Ebert, Peter Hartmann, Westsächsische Hochschule Zwickau (Germany) [8237-114]
- Confined-doped ytterbium fibers for beam quality improvement: design, fabrication and performance**, Changgeng Ye, Aalto Univ. School of Electrical Engineering (Finland); Joonas J. Koponen, Teemu Kokki, nLIGHT Corp., Lohja (Finland); Joan J. Montiel i Ponsoda, Ari Tervonen, Seppo Honkanen, Aalto Univ. School of Electrical Engineering (Finland) [8237-115]
- High-power ultrashort fiber laser for solar cells micromachining**, Jean-Bernard Lecourt, Charles Duterte, Flavien Liegeois, Didier Lekime, Yves Hernandez, Domenico Giannone, Multitel A.S.B.L. (Belgium) ... [8237-116]
- Diode lasers with programmable pulse shapes as a versatile seeding source for fiber amplifiers**, Kristian Lauritsen, Gerald Kell, Dietmar Klemme, Thomas Schöna, Rainer Erdmann, PicoQuant GmbH (Germany) ... [8237-117]
- Theoretical mode reconstruction methods based on spatially resolved spectra**, Hans-Jürgen Otto, Florian Jansen, Fabian Stutzki, Cesar Jauregui, Friedrich-Schiller-Univ. Jena (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8237-118]
- 2D mode selection in laser resonators using reflecting volume Bragg gratings**, Apurva Jain, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Christine P. Spiegelberg, OptiGrate Corp. (USA); George Venus, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim Smirnov, OptiGrate Corp. (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8237-119]
- Wavefront reconstruction and modal decomposition of fiber laser beams from intensity images**, Cesar Jauregui-Misas, Christian Gaida, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [8237-120]
- Measurement of photodarkening losses and self-similarity of time evolution**, Stefano Taccheo, Hrvoje Gebavi, Swansea Univ. (United Kingdom); Achille Monteville, Olivier Le Goffic, Daniel Landais, David Mechin, Denis Tregouat, Plate-forme d'Étude et de Recherche sur les Fibres Optiques Spéciales (France); Benoit Cadier, Thierry Robin, ixFiber SAS (France); Daniel Milanese, Politecnico di Torino (Italy); Tim Durrant, Gooch & Housego Plc (United Kingdom) [8237-121]
- Broadly tunable high-power random fibre laser**, Sergey A. Babin, Institute of Automation and Electrometry (Russian Federation); Atalla E. El-Taher, Paul Harper, Aston Univ. (United Kingdom); Evgenii V. Podivilov, Institute of Automation and Electrometry (Russian Federation); Sergei K. Turitsyn, Aston Univ. (United Kingdom) [8237-122]
- 3-µm optical fiber laser based on pouted mode resonance filter**, Yuan Li, Ryan H. Woodward, Menelaos K. Poutous, The Univ. of North Carolina at Charlotte (USA); Ramesh K. Shori, Naval Air Warfare Ctr. Weapons Div. (USA); Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA) [8237-123]
- Q switched PM Tm: fiber laser oscillator for mid-IR generation**, Pankaj Kadwani, R. Andrew Sims, Lawrence Shah, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8237-124]
- High power ultra-violet quasi-CW fiber based laser system**, Manuel J. Leonardo, Gregory L. Keaton, Kiyomi Monro, Manuel Martinez, Derek J. Richard, Mobius Photonics, Inc. (USA) [8237-125]
- Gain-switched laser diode seeded ytterbium doped fiber amplifier delivering 14-ps pulses at repetition rates up to 40 MHz**, Manuel Ryser, Martin Neff, Sönke Pilz, Univ. Bern (Switzerland); Andreas Burn, Bern Univ. of Applied Sciences (Switzerland); Valerio Romano, Univ. Bern (Switzerland) and Bern Univ. of Applied Sciences (Switzerland) [8237-126]

Injection seeded Q-switched ring cavity fiber laser with transform-limited pulses in the C-band, Wei Shi, NP Photonics, Inc. (USA); Renjie Zhou, NP Photonics, Inc. (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Eliot Petersen, NP Photonics, Inc. (USA) and University of Arizona (USA); Arturo Chavez-Pirson, NP Photonics, Inc. (USA); Mark Stephen, NASA Goddard Space Flight Ctr. (USA); Nasser Peyghambarian, NP Photonics, Inc. (USA) and College of Optical Sciences, The Univ. of Arizona (USA) [8237-127]

Mid-infrared generation in ZnGeP₂ pumped by a monolithic power scalable 2-µm source, Nikita Simakov, Alan Davidson, Alexander V. Hemming, Shayne P. Bennetts, Mark Hughes, Neil Carmody, Phil J. Davies, John Haub, Defence Science and Technology Organisation (Australia). [8237-128]

Anti-symmetric hybrid photonic crystal fibers with enhanced filtering and bending properties, Enrico Coscelli, Federica Poli, Univ. degli Studi di Parma (Italy); Sidsel R. Petersen, Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Annamaria Cucinotta, Stefano Selleri, Univ. degli Studi di Parma (Italy); Lasse Leick, Jes Broeng, NKT Photonics A/S (Denmark). [8237-129]

True crystalline fibers: double-clad LMA design concept of Tm:YAG-core fiber and its mode simulation, Xiaodong Mu, Helmuth Meissner, Huai-Chuan Lee, Onyx Optics Inc. (USA); Mark Dubinskii, U.S. Army Research Lab. (USA) [8237-130]

Robustly single-mode large-area fibers with asymmetric bend compensation, John Fini, OFS Labs. (USA) [8237-131]

Ytterbium-doped large-mode-area photonic crystal fiber amplifier with gain shaping for use at long wavelengths, Sidsel R. Petersen, Mette M. Jørgensen, NKT Photonics A/S (Denmark); Enrico Coscelli, Federica Poli, Stefano Selleri, Univ. degli Studi di Parma (Italy); Marko Laurila, Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Jesper Lægsgaard, Technical Univ. of Denmark (Denmark). [8237-132]

Design optimization of a photonic crystal fiber rod amplifier having distributed modal filtering, Mette M. Jørgensen, Sidsel R. Petersen, Marko Laurila, Technical Univ. of Denmark (Denmark); Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Jesper Lægsgaard, Technical Univ. of Denmark (Denmark) [8237-133]

Fiber based generation of azimuthally polarized light, Christoph Joher, Cesar Jauregui-Misas, Christian Voigtländer, Fabian Stutzki, Stefan Nolte, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [8237-134]

Experimental characterization of Hänsch-Couillaud-based stabilization for coherent combining of ultrashort laser pulses, Sven Breilkopf, Friedrich-Schiller-Univ. Jena (Germany); Enrico Seise, Arno Klenke, Manuel Krebs, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany) [8237-135]

Suppression of instability in high-power passively phased fiber laser arrays, Will Ray, Oak Ridge National Lab. (USA); Erik Bochove, Air Force Research Lab. (USA); Yehuda Braiman, Oak Ridge National Lab. (USA); Sami Shakir, TASC, Inc. (USA) [8237-136]

Optical frequency comb generation with a flat-top spectrum from a mode-locked Yb fiber laser, Tai Hyun Yoon, Gwang Hoon Jang, Korea Univ. (Korea, Republic of) [8237-137]

Programmable laser at 1053 nm with 55-nm tuning range and pulse adjustability from less 100 ps to over 1 ns, Bryan Burgoyne, Youngjae Kim, Alain Villeneuve, Jr., Genia Photonics Inc. (Canada). [8237-138]

High pulse energy sub-nanosecond Tm-doped fiber laser, Andras Cserteg, Sebastien Guillemet, Yves Hernandez, Domenico Giannone, Multitel A.S.B.L. (Belgium) [8237-139]

All-fiber Er-doped amplifier seeded by a gain-switched laser diode, Laura Abrardi, Thomas Feurer, Univ. Bern (Switzerland) [8237-140]

Linear precompensation of FM-to-AM conversion due to spectral dispersion and frequency conversion system, Jean-François Gleyze, Commissariat à l'Énergie Atomique (France) [8237-141]

Characterization of mid-infrared emissions from C₂H₂, CO, CO₂, and HCN-filled hollow fiber lasers, Andrew M. Jones, Kansas State Univ. (USA); Chenchen Mao, Bastian Baumgart, Vasudevan A. V. Nampoothiri, Neil Campbell, The Univ. of New Mexico (USA); Yingying Y. Wang, Coralie Fourcade-Dutin, Fetah Benabid, Univ. of Bath (United Kingdom); Wolfgang Rudolph, The Univ. of New Mexico (USA); Brian R. Washburn, Kristan L. Corwin, Kansas State Univ. (USA) [8237-142]

New approach to fabrication of a Faraday isolator for high power laser applications, Carolin Rothhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Mirosław Rekas, Gerhard Kalkowski, Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [8237-143]

High-average-power actively-mode-locked Tm³⁺ fiber lasers, Michael Eckerle, Christelle Kieleck, Philipp Hübner, Institut Franco-Allemand de Recherches de Saint-Louis (France); Stuart D. Jackson, The Univ. of Sydney (Australia); Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France) [8237-144]

Wednesday 25 January

SESSION 10

Room: 131 (Exhibit Level) Wed. 8:10 to 9:50 am

Fiber Laser Applications

Session Chair: L. Brandon Shaw, U.S. Naval Research Lab. (USA)

8:10 am: **Fiber lasers and amplifiers for space-based science and exploration** (*Invited Paper*), Anthony W. Yu, NASA Goddard Space Flight Ctr. (USA) [8237-06]

8:40 am: **New applications for short pulse length and high average power Q-switched fiber lasers**, Anthony P. Hoult, IPG Photonics Corp. (USA) [8237-07]

9:00 am: **Progress in ultrafast fiber lasers for ultralow-jitter signal sources**, Jungwon Kim, Kwangyun Jung, Chur Kim, Hyoji Kim, Taekeun Kim, Suhyeon Park, Youjian Song, Heewon Yang, KAIST (Korea, Republic of) [8237-08]

9:20 am: **Application of high-performance OEM fibre lasers in manufacturing** (*Invited Paper*), Stephen Norman, SPI Lasers (United Kingdom) [8237-09]

Coffee Break 9:50 to 10:20 am

LASE PLENARY SESSION

Room: 134 (Exhibit Level) Wed. 10:20 am to 12:30 pm

Session Chairs: Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); Alberto Piqué, U.S. Naval Research Lab. (USA)

10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); Alberto Piqué, U.S. Naval Research Lab. (USA)

10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)

10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

10:35 am: **Impact of Green Technology in Germany**, Matthias Machnig, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)

10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)

11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)

11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH + Co. KG (Germany)

See page 20 for details.

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 11

Room: 131 (Exhibit Level) Wed. 2:00 to 3:30 pm

Fiber Laser Markets

Session Chair: Sami T. Hendow, Multiwave Photonics (USA)

2:00 pm: **Innovations in high power fiber laser applications** (*Invited Paper*), Eckhard Beyer, Fraunhofer IWS Dresden (Germany) and Dresden Univ. of Technology (Germany) [8237-10]

2:30 pm: **Fiber laser beam combining and power scaling progress: AFRL Laser Division** (*Invited Paper*), Torrey J. Wagner, Air Force Research Lab. (USA) [8237-11]

3:00 pm: **From CW to fs: fiber lasers for high-end product manufacturing** (*Invited Paper*), Roland Mayerhofer, Dieter Mairhoermann, Richard Hendel, Michael Mueller, Markus Roehner, Stephan Geiger, ROFIN-BAASEL Lasertechnik GmbH & Co KG (Germany) [8237-12]

Coffee Break 3:30 to 4:00 pm

SESSION 12

Room: 131 (Exhibit Level) Wed. 4:00 to 5:00 pm

Narrow Line Sources and Fiber Nonlinearities I

Session Chair: Mark Dubinskii, U.S. Army Research Lab. (USA)

4:00 pm: **Distributed light scattering model for the SBS and SRS threshold powers in small and large mode area passive optical fibers**, Marc D. Mermelstein, OFS Labs. (USA) [8237-13]

4:20 pm: **Frequency domain analysis of dynamic refractive index changes in fiber amplifiers**, Henrik Tünnermann, Jörg Neumann, Dietmar Kracht, Peter Weßels, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum-Engineering and Space-Time Research (QUEST) (Germany) [8237-14]

4:40 pm: **All-fiber broad-range self-sweeping Yb-doped fiber laser**, Ivan Lobach, Sergey A. Babin, Sergey Kablukov, Evgenii V. Podivilov, Institute of Automation and Electrometry (Russian Federation) [8237-15]

SESSION 13

Room: 131 (Exhibit Level) Wed. 5:00 to 6:00 pm

Late-Breaking News

Session Chair: Sami T. Hendow, Multiwave Photonics (USA)

The submission deadline for the Late Breaking News Session was 9 January 2012.

See room sign for schedule, or visit www.spie.org/LA103.

Accepted papers will be printed as submitted without further revision in the front matter of the proceedings (the front matter is not citable).

Thursday 26 January

SESSION 14

Room: 131 (Exhibit Level) Thurs. 8:00 to 10:00 am

Narrow Line Sources and Fiber Nonlinearities II

Session Chair: Clifford Headley III, OFS Labs. (USA)

8:00 am: **Gain-tailored SBS suppressing photonic crystal fibers for high power applications**, Craig A. Robin, Iyad Dajani, Clint Zeringue, Air Force Research Lab. (USA); Benjamin Ward, U.S. Air Force Academy (USA) [8237-16]

8:20 am: **YAG-derived fiber for high-power narrow-linewidth fiber lasers**, Peter D. Dragic, Yuh-Shiuan Liu, Univ. of Illinois at Urbana-Champaign (USA); John Ballato, Thomas Hawkins, Paul Foy, COMSET Clemson Univ. (USA) [8237-17]

8:40 am: **High power single-frequency 780-nm fiber laser source for RB trapping and cooling applications**, Alain Mugnier, Mathieu Jacquemet, Eric Le Mercier, Ronan Lebreff, David Pureur, Quantel Group (France) [8237-18]

9:00 am: **Er-doped single-frequency photonic crystal fiber amplifier with 70 W of output power for gravitational wave detection**, Vincent Kuhn, Dietmar Kracht, Jörg Neumann, Peter Wessels, Laser Zentrum Hannover e.V. (Germany) [8237-19]

9:20 am: **High-power single-frequency photonic bandgap fiber amplifier at 1178 nm**, Meishin Chen, Akira Shirakawa, Yoshiaki Yamahara, Ken-ichi Ueda, The Univ. of Electro-Communications (Japan); Christina B. Olausson, Jens K. Lyngsø, Jes Broeng, NKT Photonics A/S (Denmark) [8237-20]

9:40 am: **Characterization of a narrowband Raman MOPA with short master oscillator**, Alexander Siekiera, Rainer Engelbrecht, Andreas Nothofer, Bernhard Schmauss, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8237-21]

Coffee Break 10:00 to 10:30 am

SESSION 15

Room: 131 (Exhibit Level) Thurs. 10:30 am to 12:00 pm

Mid IR Sources

Session Chair: Fabio Di Teodoro, Northrop Grumman Aerospace Systems (USA)

10:30 am: **Development of resonantly cladding-pumped holmium-doped fibre lasers** (*Invited Paper*), Alexander V. Hemming, Shayne P. Bennetts, Nikita Simakov, John Haub, Defence Science and Technology Organisation (Australia); Adrian L. G. Carter, Nufern (USA) [8237-22]

11:00 am: **An all-fiber PM MOPA pumped high-power OPO at 3.82 μm based on large aperture PPMgLN**, Dejiao Lin, Shaif-ul Alam, Optoelectronics Research Ctr. (United Kingdom); Yonghang Shen, Tao Chen, Zhejiang Univ. (China); David J. Richardson, Optoelectronics Research Ctr. (United Kingdom) [8237-23]

11:20 am: **High-energy monolithic single-frequency pulsed fiber laser at ~2 μm in MOPA configuration**, Wei Shi, NP Photonics, Inc. (USA); Eliot Petersen, NP Photonics, Inc. (USA) and Univ. of Arizona (USA); Dan T. Nguyen, Zhidong Yao, Arturo Chavez-Pirson, NP Photonics, Inc. (USA); Nasser Peyghambarian, NP Photonics, Inc. (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Jirong Yu, NASA Langley Research Ctr. (USA) [8237-24]

11:40 am: **Integrated 100-W polarized narrow linewidth thulium fiber MOPA system**, Lawrence Shah, R. Andrew Sims, Pankaj Kadwani, Christina C. Willis, Joshua D. Bradford, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Zachary Roth, Aaron Pung, 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) [8237-25]

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

SESSION 16

Room: 131 (Exhibit Level) Thurs. 1:30 to 3:00 pm

Mode Locked and Ultrafast Fiber Sources

Session Chair: Almantas Galvanauskas, Univ. of Michigan (USA)

1:30 pm: **Mode-locked Tm and Ho fiber lasers** (*Invited Paper*), Qing Wang, Jihong Geng, Tao Luo, Shibin Jiang, AdValue Photonics, Inc. (USA) [8237-26]

2:00 pm: **High peak and average power generation by cascaded nonlinear compression of fiber CPA system**, Steffen Hädrich, Friedrich-Schiller-Univ. Jena (Germany); Jan Rothhardt, Helmholtz Institute Jena (Germany); Henning Carstens, Stefan Demmler, Thomas Gottschall, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8237-27]

2:20 pm: **High energy 2 micron femtosecond fiber laser**, Lihmei Yang, Vladimir Protopopov, Jian Liu, PolarOnyx, Inc. (USA) [8237-28]

2:40 pm: **Stretcher fibers for chirped pulse amplifiers at 1030 nm and 1550 nm**, Lars Grüner-Nielsen, Dan Jakobsen, Bera Palsdottir, Poul Kristensen, Kim G. Jespersen, OFS Fitel Denmark ApS (Denmark) [8237-29]

Coffee Break 3:00 to 3:30 pm

Conference 8237 · Room: 131 (Exhibit Level)

SESSION 17

Room: 131 (Exhibit Level) Thurs. 3:30 to 5:40 pm

Pulsed Fiber Laser Sources

Session Chair: **Robert G. Waarts**, Robert Waarts Consulting (USA)

3:30 pm: **Toward kW nanosecond fiber lasers with rod type fibers** (*Invited Paper*), François L. Salin, EOLITE Systems (France). [8237-30]

4:00 pm: **9-mJ pulse energy Q-switched large-pitch fiber laser system with excellent beam quality**, Florian Jansen, Fabian Stutzki, Cesar Jauregui, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8237-31]

4:20 pm: **MW+ peak power sub-nsec 10-kHz repetition rate polarization-maintaining fiber-amplifiers using tapered Yb-doped fibers**, Youming Chen, Jean-Luc Fournon, Frank Kimpel, Shantanu Gupta, Fibertek, Inc. (USA). [8237-32]

4:40 pm: **High-power fiber based architecture providing extensive temporal and spectral pulse format control**, Fabio Di Teodoro, Timothy S. McComb, Eric C. Cheung, Northrop Grumman Aerospace Systems (USA) [8237-33]

5:00 pm: **High energy in-band pumped erbium doped pulsed fibre laser**, Shaif-ul Alam, Ee Leong Lim, David J. Richardson, Optoelectronics Research Ctr. (United Kingdom) [8237-34]

5:20 pm: **Q-switched and mode-locked pulses amplified with short thulium-doped silicate fibers**, Qing Wang, Jihong Geng, Tao Luo, Shibin Jiang, AdValue Photonics, Inc. (USA) [8237-35]

Courses of Related Interest

- SC1053 Ultrafast Laser Pulse Shaping and Adaptive Pulse Compression (Dantus) Tuesday, 1:30 to 5:30 pm
- SC744 Ultrafast Fiber Lasers (Fermann) Sunday, 1:30 to 5:30 pm
- SC748 High-Power Fiber Sources (Nilsson) Sunday, 8:30 am to 5:30 pm
- SC1020 Splicing of Specialty Fibers and Glass Processing of Fused Fiber Components for Fiber Lasers (Wang) Sunday, 8:30 am to 12:30 pm
- SC974 Interconnection and Splicing of High-Power Optical Fibers (Yablon) Monday, 8:30 am to 12:30 pm
- SC746 Introduction to Ultrafast Technology (Trebbino) Tuesday, 1:30 to 5:30 pm
- SC1012 Coherent Mid-Infrared Sources and Applications (Vodopyanov) Sunday, 1:30 to 5:30 pm
- SC931 Applied Nonlinear Frequency Conversion (Paschotta) Monday, 8:30 am to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm
- SC1060 Fundamentals of Nonlinear Optics (Powers) Sunday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Best Student Oral Presentation Awards

Room: 131 (Exhibit Level) Thurs. 5:40 to 5:50 pm

STUDENT PRESENTATION COMPETITION

Throughout the conference, qualifying student oral presentations will be evaluated by a conference steering committee, led by Craig Robin. 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.

Nominations were due 5 December 2011.

AWARD: Cash prize will be awarded at the end of the conference to the best student oral presentation.

Award Sponsors:



High Energy/Average Power Lasers and Intense Beam Applications VII

Conference Chairs: **Steven J. Davis**, Physical Sciences Inc. (USA); **Michael C. Heaven**, Emory Univ. (USA); **J. Thomas Schriempf**, Naval Sea Systems Command (USA)

Program Committee: **David L. Carroll**, CU Aerospace LLC (USA); **Jarmila Kodymová**, Institute of Physics of the ASCR, v.v.i. (Czech Republic); **Timothy J. Madden**, Air Force Research Lab. (USA); **William E. McDermott**, Univ. of Denver (USA); **Wilson T. Rawlins**, Physical Sciences Inc. (USA)

Sunday 22 January

SESSION 1

Room: 112 (Exhibit Level) Sun. 8:30 to 10:00 am

EOIL and DPAL I

Session Chair: **Steven J. Davis**, Physical Sciences Inc. (USA)

- 8:30 am: **Chemistry of I* excitation in a hybrid catalytic electric-discharge oxygen-iodine laser** (*Invited Paper*), Wilson T. Rawlins, Seonkyung Lee, Steven J. Davis, Physical Sciences Inc. (USA) [8238A-01]
- 9:00 am: **ElectricOIL performance enhancement via increases in gOL**, David L. Carroll, Gabriel Benavides, Joseph Zimmerman, CU Aerospace LLC (USA); Brian Woodard, Univ. of Illinois at Urbana-Champaign (USA); Andrew D. Palla, Joseph T. Verdeyen, CU Aerospace LLC (USA); Wayne C. Solomon, Univ. of Illinois at Urbana-Champaign (USA) [8238A-02]
- 9:20 am: **XPAL theory and modeling with comparison to experiments**, David L. Carroll, Joseph T. Verdeyen, Andrew D. Palla, CU Aerospace LLC (USA) [8238A-03]
- 9:40 am: **Optical gain and excitation phenomena in optically pumped alkali atom-rare gas mixtures**, Kristin L. Galbally-Kinney, Dan L. Maser, William J. Kessler, Wilson T. Rawlins, Steven J. Davis, Physical Sciences Inc. (USA) [8238A-04]
- Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 112 (Exhibit Level) Sun. 10:30 to 11:30 am

EOIL and DPAL II

Session Chair: **Wilson T. Rawlins**, Physical Sciences Inc. (USA)

- 10:30 am: **Investigation of radial temperature gradients in diode pumped alkali lasers using tunable diode laser absorption spectroscopy**, Charles D. Fox, Glen P. Perram, Air Force Institute of Technology (USA) [8238A-05]
- 10:50 am: **The kinetics of optically excited Ne* and Kr* metastables in helium at high pressure**, Michael C. Heaven, Jiande Han, Humayun Kabir, Emory Univ. (USA) [8238A-06]
- 11:10 am: **Potential energy surfaces for the interactions of excited Rb and Cs atoms with methane**, Michael C. Heaven, Emory Univ. (USA) [8238A-07]
- Lunch Break 11:30 am to 1:00 pm

SESSION 3

Room: 112 (Exhibit Level) Sun. 1:00 to 2:30 pm

Laser Applications

Session Chair: **J. Thomas Schriempf**, Naval Sea Systems Command (USA)

- 1:00 pm: **Maritime HEL efficacy analysis** (*Invited Paper*), Stephen M. Hammel, Space and Naval Warfare Systems Command (USA) [8238A-08]
- 1:30 pm: **Average power scaling of UV excimer lasers drives flat panel display and LIDAR applications**, Ralph F. Delmdahl, Rainer Paetzel, Coherent GmbH (Germany) [8238A-09]
- 1:50 pm: **Development of a double TIG laser process**, Jörg Hermsdorf, Laser Zentrum Hannover e.V. (Germany) [8238A-10]
- 2:10 pm: **Phase controlled stimulated Brillouin scattering phase conjugation mirrors and its applications to the laser fusion driver**, Hong Jin Kong, Sangwoo Park, Seongwoo Cha, KAIST (Korea, Republic of); Milan Kalal, Czech Technical Univ. in Prague (Czech Republic) [8238A-11]

SESSION 4

Room: 112 (Exhibit Level) Sun. 2:30 to 3:10 pm

CO, CO₂, HF

Session Chair: **David L. Carroll**, CU Aerospace LLC (USA)

- 2:30 pm: **MOPA carbon monoxide laser system emitting nanosecond pulses**, Andrey A. Ionin, Igor Kinyaevskiy, Yuri Klimachev, Andrey Kotkov, Andrey Kozlov, P.N. Lebedev Physical Institute (Russian Federation) . [8238A-12]
- 2:50 pm: **A simplified model for HF chemical laser amplifier**, Wen Guang Liu, Xing Chen, Hongyan Wang, Wenyu Li, Weihong Hua, National Univ. of Defense Technology (China) [8238A-14]

Courses of Related Interest

- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

LASE

Tuesday 24 January 2012 • Part of Proceedings of SPIE Vol. 8238

Atmospheric and Oceanic Propagation of Electromagnetic Waves VI

Conference Chair: **Olga Korotkova**, Univ. of Miami (USA)

Program Committee: **Larry C. Andrews**, Univ. of Central Florida (USA); **Yahya Kemal Baykal**, Çankaya Univ. (Turkey); **Yangjian Cai**, Soochow Univ. (China); **Frank D. Eaton**, Air Force Research Lab. (USA); **Greg Gbur**, The Univ. of North Carolina at Charlotte (USA); **G. Charmaine Gilbreath**, U.S. Naval Research Lab. (USA); **Merrick C. Haller**, Oregon State Univ. (USA); **Vladimir P. Lukin**, V.E. Zuev Institute of Atmospheric Optics (Russian Federation); **Alex S. Mahalov**, Arizona State Univ. (USA); **Ronald L. Phillips**, Florida Space Institute (USA); **Jixiong Pu**, Huaqiao Univ. (China); **Robert K. Tyson**, The Univ. of North Carolina at Charlotte (USA); **Daomu Zhao**, Zhejiang Univ. (China)

Tuesday 24 January

SESSION 5

Room: 112 (Exhibit Level) Tues. 1:30 to 3:20 pm

Modeling of Turbulence and its Influence on EM Radiation

Session Chair: **Nathan H. Farwell**, Univ. of Miami (USA)

1:30 pm: **Creating a Cn² profile as a function of altitude based on scintillation measurements along a slant path** (*Invited Paper*), Larry C. Andrews, Univ. of Central Florida (USA); Ronald L. Phillips, David Wayne, Paul Sauer, Troy Leclerc, Robert Crabbs, Florida Space Institute (USA) [8238B-20]

2:00 pm: **Target-in-the-loop adaptive laser beam projection on an extended target: turbulence speckle effects mitigation**, Mikhail A. Vorontsov, Ernst E. Polnau, Micah Gatz, Thomas Weyrauch, Univ. of Dayton (USA); Svetlana L. Lachinova, Optonicus (USA); Dan Marker, Air Force Research Lab. (USA) [8238B-21]

2:20 pm: **Experimental demonstration of target-in-the-loop coherent beam combining over a 7-km propagation path**, Thomas Weyrauch, Univ. of Dayton (USA); Mikhail A. Vorontsov, Univ. of Dayton (USA) and Optonicus (USA); Gary W. Carhart, Leonid A. Beresnev, U.S. Army Research Lab. (USA); Andrey P. Rostov, Optonicus (USA); Jony Jiang Liu, U.S. Army Research Lab. (USA) [8238B-22]

2:40 pm: **Atmospheric transmission for cesium DPAL using TDLAS**, Christopher A. Rice, Glen P. Perram, Air Force Institute of Technology (USA) [8238B-23]

3:00 pm: **Probability density function of partially coherent beams propagating in the atmospheric turbulence**, Olga Korotkova, Univ. of Miami (USA); Svetlana Avramov-Zamurovic, Charles Nelson, Reza Malek-Madani, U.S. Naval Academy (USA) [8238B-24]

Coffee Break 3:20 to 3:50 pm

SESSION 6

Room: 112 (Exhibit Level) Tues. 3:50 to 5:10 pm

Mitigation of Atmospheric and Oceanic Turbulence: Theory and Experiments

Session Chair: **Olga Korotkova**, Univ. of Miami (USA)

3:50 pm: **Turbulence-corrected adaptive laser beam focusing on a remote image-resolved target**, Anatoliy I. Khizhnyak, Vladimir B. Markov, Advanced Systems & Technologies, Inc. (USA) [8238B-25]

4:10 pm: **Scintillation-resistant wavefront sensing based on a multi-aperture phase reconstruction (MAPR) technique**, Mathieu Aubailly, Univ. of Maryland, College Park (USA); Mikhail A. Vorontsov, Univ. of Dayton (USA); Jony Jiang Liu, U.S. Army Research Lab. (USA) [8238B-26]

4:30 pm: **Turbulent flow characterization using OCT**, Mircea Mujat, R. Daniel Ferguson, Nicusor V. Iftimia, Daniel X. Hammer, Emily P. Plumb, Physical Sciences Inc. (USA); Ivo Nedyalkov, Martin Wosnik, The Univ. of New Hampshire (USA); Hartmut H. Legner, Physical Sciences Inc. (USA) [8238B-28]

4:50 pm: **Laser beam propagation in oceanic turbulence**, Nathan H. Farwell, Olga Korotkova, Univ. of Miami (USA) [8238B-29]

Courses of Related Interest

- SC188 Laser Beam Propagation for Applications in Laser Communications, Laser Radar, and Active Imaging (Phillips, Andrews) Wednesday, 8:30 am to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

High Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications

Conference Chairs: **Eckhard Beyer**, Fraunhofer IWS Dresden (Germany); **Timothy Morris**, TRUMPF Inc. (USA)

Program Committee: **Milan Brandt**, RMIT Univ. (Australia); **Craig Bratt**, Fraunhofer USA, Inc. (USA); **Edward Chlebus**, Wroclaw Univ. of Technology (Poland); **Ingomar Kelbassa**, RWTH Aachen (Germany); **Wolfgang Knapp**, Cooperation Laser Franco-Allemande (France); **Isamu Miyamoto**, Osaka Univ. (Japan); **Thomas P. Pearsall**, European Photonics Industry Consortium (France); **Silke Pflueger**, Laserline Inc. (USA); **Michael Schmidt**, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); **Jens Standfuss**, Fraunhofer IWS Dresden (Germany); **Anja Techel**, Fraunhofer IWS Dresden (Germany); **Luigi Tricarico**, Politecnico di Bari (Italy); **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan); **Andreas Wetzig**, Fraunhofer IWS Dresden (Germany); **Minlin Zhong**, Tsinghua Univ. (China)

Tuesday 24 January

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Controlling the thermally induced focal shift in laser processing heads, Jan-Philipp Negel, Felix Abt, David Blázquez-Sánchez, Armin Austerschulte, Margit Hafner, Thomas Liebig, Philipp von Strobl-Albeg, Rudolf Weber, Marwan Abdou-Ahmed, Andreas Voss, Thomas Graf, Univ. Stuttgart (Germany) [8239-36]

Process reliability of critical weldings, Jens Hahn, SITEC Industrietechnologie GmbH (Germany) [8239-37]

Design of a laser-friction stir welding process on innovative materials, Giuseppe Casalino, Chiara Furio, Sabina Luisa Campanelli, Antonio D. Ludovico, Politecnico di Bari (Italy) [8239-39]

Parameters in selective laser melting for processing metallic powders, Tomasz Kurzynowski, Edward Chlebus, Bogumila Kuznicka, Jacek Reiner, Wroclaw Univ. of Technology (Poland) [8239-40]

Wednesday 25 January

SESSION 1

Room: 112 (Exhibit Level) Wed. 8:00 to 10:00 am

Invited Session

Session Chair: **Eckhard Beyer**, Fraunhofer IWS Dresden (Germany)

8:00 am: **Laser plasma sources for EUV lithography (Invited Paper)**, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8239-01]

8:30 am: **The story of laser brazing technology (Invited Paper)**, Peter Hoffmann, ERLAS Erlanger Lasertechnik GmbH (Germany) [8239-02]

9:00 am: **Innovations in laser cladding and direct metal deposition (Invited Paper)**, Christoph Leyens, Technische Univ. Dresden (Germany) [8239-03]

9:30 am: **Structural strengthening of rocket nozzle extension by means of laser metal deposition (Invited Paper)**, Michel Honoré, Force Institute (Denmark); Lise Brox, Michael Hallberg, Volvo Aero Corp. (Sweden) . . . [8239-04]

Coffee Break 10:00 to 10:20 am

LASE PLENARY SESSION

Room: 134 (Exhibit Level) . . .Wed. 10:20 am to 12:30 pm

Session Chairs: **Friedhelm Dorsch**, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)

10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

10:35 am: **Impact of Green Technology in Germany**, **Matthias Machnig**, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)

10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)

11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)

11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH & Co. KG (Germany)

See page 20 for details.

Lunch/Exhibition Break 12:30 to 2:00 pm

Conference 8239 · Room: 112 (Exhibit Level)

SESSION 2

Room: 112 (Exhibit Level) Wed. 2:00 to 3:40 pm

Lasers and Laser Systems in Macro Processing

Session Chair: **Silke Pflueger**, Laserline Inc. (USA)

2:00 pm: **The role of high power lasers in macro trends affecting product design and manufacturing in heavy industry**, Ed Hansen, ESAB North America (USA) [8239-05]

2:20 pm: **Frequency doubled high-power disk lasers in pulsed and continuous-wave operation**, Alexander Hangst, TRUMPF Laser- und Systemtechnik GmbH (Germany); Sascha Weiler, TRUMPF Inc. (USA); Dirk H. Sutter, Christian Stolzenburg, Ivo Zawischa, Steffen Kalfhues, Alexander Killi, TRUMPF Laser GmbH & Co. KG (Germany); Marco Holzer, Uwe Kriegshauser, TRUMPF Laser- und Systemtechnik GmbH (Germany) [8239-06]

2:40 pm: **Lasers for industrial production processing: tailored tools with increasing flexibility**, Wolfram Rath, ROFIN-SINAR Laser GmbH (Germany) [8239-07]

3:00 pm: **High power diode lasers: generation of line focus geometries and its applications**, Jens Meinschien, Melanie Brodner, Dirk Hauschild, Vitalij N. Lissotschenko, Alexei S. Mikhailov, Thomas Mitra, Stephan Schneider, LIMO Lissotschenko Mikrooptik GmbH (Germany) [8239-08]

3:20 pm: **High-power transmission characterization of Chalcogenide glasses using a Tm: fiber laser system**, Pankaj Kadwani, Joshua D. Bradford, R. Andrew Sims, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); J. David Musgraves, Kathleen A. Richardson, Clemson Univ. (USA); Lawrence Shah, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8239-09]

Coffee Break 3:40 to 4:10 pm

SESSION 3

Room: 112 (Exhibit Level) Wed. 4:10 to 5:50 pm

Applications: Welding

Session Chair: **Timothy Morris**, TRUMPF Inc. (USA)

4:10 pm: **Advantages of fibre lasers in 3D metal cutting and welding applications supported by a 'beam in motion (BIM)' beam delivery system**, Torsten Scheller, JENOPTIK Automatisierungstechnik GmbH (Germany) [8239-10]

4:30 pm: **T-joints of Ti alloys with hybrid laser-MIG welding: macro-graphic and micro-hardness analyses**, Luigi Tricarico, Roberto Spina, Gianfranco Palumbo, Donato Sorgente, Leonardo Daniele Scintilla, Politecnico di Bari (Italy); Marco Brandizzi, Ctr. Ricerche Fiat S.C.p.A. (Italy); Annunziata Anna Satriano, Consorzio CALEF (Italy) [8239-12]

4:50 pm: **Improvements of the welding performance of plasma arcs by a superimposed fibre laser beam**, Achim Mahrle, Sascha Rose, Michael Schnick, Thomas Pinder, Technische Univ. Dresden (Germany); Eckhard Beyer, Fraunhofer IWS Dresden (Germany); Uwe Füssel, Technische Univ. Dresden (Germany) [8239-13]

5:10 pm: **Bead characterization of disk-laser butt welding of thin AA 2024 sheets**, Fabrizia Caiazzo, Vittorio Alfieri, Francesco Cardaropoli, Gaetano Corrado, Vincenzo Sergi, Univ. degli Studi di Salerno (Italy) [8239-41]

5:30 pm: **Through the Optical Combiner Monitoring in remote fiber laser welding of zinc coated steels**, Daniele Colombo, Barbara Previtali, Politecnico di Milano (Italy); Manuel Lai, Daniele Bassan, Ctr. Ricerche Fiat S.C.p.A. (Italy); Giovanni Masotti, El.En. S.p.A. (Italy) [8239-38]

Thursday 26 January

SESSION 4

Room: 112 (Exhibit Level) Thurs. 8:00 to 10:10 am

Applications: Surface Treatment and Cladding

Session Chair: **Christoph Leyens**, Technische Univ. Dresden (Germany)

8:00 am: **Identification of phase transformation using optical emission spectroscopy for direct metal deposition process** (*Invited Paper*), Lijun Song, Jyoti Mazumder, Univ. of Michigan (USA) [8239-15]

8:30 am: **A novel additive manufacturing process of using direct diode lasers to hard-face and repair of components for enhanced surface wear and corrosion resistance**, Frank Gaebler, Keith Parker, Coherent, Inc. (USA) [8239-16]

8:50 am: **Laser heat treatment with latest system components**, Steffen Bonss, Jan Hannweber, Udo Karsunke, Stefan Kuehn, Marko Seifert, Eckhard Beyer, Fraunhofer IWS Dresden (Germany) [8239-17]

9:10 am: **Local heat treatment of high strength steels with zoom-optics and 10kW-diode laser**, Markus Baumann, Volker Krause, Laserline GmbH (Germany) [8239-18]

9:30 am: **Laser cladding by using solid-state and direct diode laser sources**, Jürgen Metzger, TRUMPF Laser- und Systemtechnik GmbH (Germany); David L. Havrilla, David C. Locke, TRUMPF Inc. (USA); Antonio Candel-Ruiz, TRUMPF Laser- und Systemtechnik GmbH (Germany) [8239-19]

9:50 am: **Multi-kW laser cladding using cylindrical collimators and square-formed fibers**, Mats Blomqvist, Stuart Campbell, Optoskand AB (Sweden); Jyrki Latokartano, Jari Tuominen, Tampere Univ. of Technology (Finland) [8239-20]

Coffee Break 10:10 to 10:40 am

SESSION 5

Room: 112 (Exhibit Level) Thurs. 10:40 am to 12:30 pm

Applications: Cutting

Session Chair: **Andreas Wetzig**, Fraunhofer IWS Dresden (Germany)

10:40 am: **Wavelength dependency in high power laser cutting and welding** (*Invited Paper*), Stephan Ziermann, David L. Havrilla, TRUMPF Inc. (USA); Benjamin Krummenauer, TRUMPF Laser- und Systemtechnik GmbH (Germany) [8239-21]

11:10 am: **Energy balance in disk and CO₂ laser beam inert gas fusion cutting**, Leonardo Daniele Scintilla, Luigi Tricarico, Politecnico di Bari (Italy); Andreas Wetzig, Eckhard Beyer, Fraunhofer IWS Dresden (Germany) . . [8239-22]

11:30 am: **Applicability of various beam sources for high power laser cutting of non-oriented electrical steel**, René Siebert, Fraunhofer IWS Dresden (Germany); Harry Thonig, TRUMPF Sachsen GmbH (Germany); Andreas Wetzig, Eckhard Beyer, Fraunhofer IWS Dresden (Germany) . . [8239-23]

11:50 am: **Tailor cutting of crystalline solar cells by laser micro jet**, Florent Bruckert, Pedro Torres, Benjamin Carron, Bernold Richerzhagen, Paul Piron, Synova S.A. (Switzerland); Eric Pilat, Marc Pirot, Rémi Monna, Institut National de l'Energie Solaire (France) [8239-24]

12:10 pm: **Combining remote ablation cutting and remote welding: opportunities and application areas**, Jan Musiol, Technische Univ. München (Germany); Matthias Luetke, Fraunhofer IWS Dresden (Germany); Markus Schweier, Jens Hatwig, Technische Univ. München (Germany); Andreas Wetzig, Fraunhofer IWS Dresden (Germany); Michael F. Zaeh, Technische Univ. München (Germany); Eckhard Beyer, Fraunhofer IWS Dresden (Germany) [8239-25]

Lunch/Exhibition Break 12:30 to 2:00 pm

Photonics West maps:

Moscone Center Maps pp. 2–4

Walking Map p. 4

SESSION 6

Room: 112 (Exhibit Level) Thurs. 2:00 to 3:30 pm

Beam Delivery and Diagnostics I

Session Chair: **Kunihiko Washio**,
Paradigm Laser Research Ltd. (Japan)

2:00 pm: **Mid-infrared imaging Fourier transform spectrometry for high power fiber and CO₂ laser irradiated plexiglass, fiberglass, and painted metals** (*Invited Paper*), Roberto Acosta, Kevin C. Gross, Michael A. Marciniak, Glen P. Perram, Air Force Institute of Technology (USA) [8239-26]

2:30 pm: **Spectroscopic closed loop control of penetration depth in laser beam welding process**, Teresa Sibillano, Domenico Rizzi, Antonio Ancona, Francesco P. Mezzapesa, Pietro M. Lugarà, CNR-IFN UOS Bari (Italy); Ali Riza Konuk, Ronald Aarts, Bert Huis in 't Veld, Univ. Twente (Netherlands) . [8239-27]

2:50 pm: **NIR-camera-based online diagnostics of laser beam welding processes**, Friedhelm Dorsch, Holger Braun, Steffen Kessler, Dieter Pfitzner, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); Volker Rominger, TRUMPF Laser- und Systemtechnik GmbH (Germany) [8239-28]

3:10 pm: **High-power fiber optic cable with integrated active sensors**, Mats Blomqvist, Ola Blomster, Hans Bergstrand, Magnus Pålsson, Optoskand AB (Sweden) [8239-29]

Coffee Break 3:30 to 4:00 pm

SESSION 7

Room: 112 (Exhibit Level) Thurs. 4:00 to 6:00 pm

Beam Delivery and Diagnostics II

Session Chair: **Wolfgang Knapp**,
Cooperation Laser Franco-Allemande (France)

4:00 pm: **Beam delivery systems and processing heads for 1µm high brightness laser cutting systems**, Hagen Zimer, Roman Niedrig, Björn Wedel, HIGHYAG Lasertechnologie GmbH (Germany) [8239-30]

4:20 pm: **Unique beam delivery and processing tools for high power solid state laser processing**, Tracey S. Ryba, David L. Havrilla, TRUMPF Inc. (USA); Marco Holzer, Martin Bea, TRUMPF Laser- und Systemtechnik GmbH (Germany) [8239-31]

4:40 pm: **Maximum uptime and minimum focus shift in high-power 1µm laser beam delivery**, Thomas R. Kugler, Laser Mechanisms, Inc. (USA) [8239-32]

5:00 pm: **Ultra low absorption glasses and optical coatings for reduced thermal focus shift in high power optics**, Christopher S. Wood, Derrick Carpenter, Ove Lyngnes, Nick Traggis, Precision Photonics Corp. (USA); David Gritz, Heraeus Quartz America LLC (USA) [8239-33]

5:20 pm: **Self-compensation of thermal lensing in optics for high-brightness solid-state lasers**, Stefan Piehler, Andreas Voss, Marwan Abdou-Ahmed, Thomas Graf, Univ. Stuttgart (Germany) [8239-34]

5:40 pm: **Fabrication and characteristic of a new multicore fiber for high power delivery**, Huifeng Wei, Yangtze Optical Fibre and Cable Co., Ltd. (China); Peiguang Yan, Chunyu Guo, Shuangchen Ruan, Shenzhen Univ. (China); Su Chen, Jiangtao Guo, Jiang Li, Yangtze Optical Fibre and Cable Co., Ltd. (China) [8239-35]

Courses of Related Interest

- SC748 High-Power Fiber Sources (Nilsson) Sunday, 8:30 am to 5:30 pm
- SC1020 Splicing of Specialty Fibers and Glass Processing of Fused Fiber Components for Fiber Lasers (Wang) Sunday, 8:30 am to 12:30 pm
- SC974 Interconnection and Splicing of High-Power Optical Fibers (Yablon) Monday, 8:30 am to 12:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

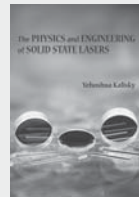
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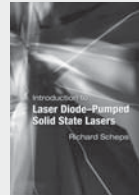
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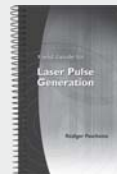
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LASE

Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XI

Conference Chair: **Konstantin L. Vodopyanov**, Stanford Univ. (USA)

Conference Co-Chair: **Yehoshua Y. Kalisky**, Nuclear Research Ctr. Negev (Israel)

Program Committee: **Darrell J. Armstrong**, Sandia National Labs. (USA); **Pinhas Blau**, Soreq Nuclear Research Ctr. (Israel); **Majid Ebrahim-Zadeh**, ICFO - Instituto de Ciencias Fotónicas (Spain); **Peter Günter**, ETH Zurich (Switzerland); **Angus J. Henderson**, Lockheed Martin Aculight (USA); **Baldemar Ibarra-Escamilla**, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); **Yun-Shik Lee**, Oregon State Univ. (USA); **Rita D. Peterson**, Air Force Research Lab. (USA); **Peter E. Powers**, Univ. of Dayton (USA); **Kenneth L. Schepler**, Air Force Research Lab. (USA); **Peter G. Schunemann**, BAE Systems (USA); **Andrei V. Shchegrov**, KLA-Tencor Corp. (USA); **Wei Shi**, NP Photonics, Inc. (USA); **Ramesh K. Shori**, Naval Air Warfare Ctr. Weapons Div. (USA)

Tuesday 24 January

SESSION 1

Room: 113 (Exhibit Level) Tues. 8:10 to 10:00 am

Visible and UV Lasers I

Session Chairs: **Yehoshua Y. Kalisky**, Nuclear Research Ctr. Negev (Israel); **Peter E. Powers**, Univ. of Dayton (USA)

8:10 am: **Controlling of sub-cycle pulse in UV-Vis-IR by multilayer optics** (*Invited Paper*), Vladimir Pervak, Ludwig-Maximilians-Univ. München (Germany) [8240-01]

8:40 am: **Generation of yellow-orange picosecond pulses at 595 nm by sum-frequency mixing of fiber-amplified gain-switched laser diodes**, Kristian Lauritsen, Thomas Schönau, Rainer Erdmann, PicoQuant GmbH (Germany) [8240-02]

9:00 am: **Highly efficient Q-switched green microchip laser based on second harmonic generation in MgO-doped PPLN**, Haitao Zhao, Kostyantyn Sukhoy, Univ. of Manitoba (Canada); Ivan T. Lima, Jr., Univ. of Manitoba (Canada) and North Dakota State Univ. (USA); Arkady Major, Univ. of Manitoba (Canada) [8240-03]

9:20 am: **Power-scalable tunable UV, visible, and NIR generation from an ultrafast fiber OPA based on four wave mixing in PCF**, Michael J. Yarrow, Fianium Ltd. (United Kingdom); William J. Wadsworth, Univ. of Bath (United Kingdom); Laure Lavoute, Univ. of Bath (United Kingdom) and Amplitude Systemes (France); John R. Clowes, Anatoly Grudinin, Fianium Ltd. (United Kingdom) [8240-04]

9:40 am: **Continuous-wave fourth harmonic generation in a whispering-gallery resonator**, Jeremy Moore, Matthew Tomes, Tal E. Carmon, Mona Jarrahi, Univ. of Michigan (USA) [8240-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 113 (Exhibit Level) Tues. 10:30 am to 12:30 pm

Terahertz Generation

Session Chair: **Peter Günter**, ETH Zurich (Switzerland)

10:30 am: **Intracavity generation of continuous wave terahertz radiation** (*Invited Paper*), Maik Scheller, Desert Beam Technologies LLC (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Abraham Young, Univ. of Arizona (USA); Joe M. Yarborough, Mahmoud Fallahi, Jerome V. Moloney, Martin Koch, Stephan W. Koch, Desert Beam Technologies LLC (USA); Christian d'Aubigny, Christopher Walker, Univ. of Arizona (USA) [8240-06]

11:00 am: **Terahertz-induced optical modulation in quantum-well microcavity**, Yun-Shik Lee, Joseph L. Tomaino, Andrew D. Jameson, Oregon State Univ. (USA); Galina Khitrova, Hyatt M. Gibbs, College of Optical Sciences, The Univ. of Arizona (USA); Andrea C. Klettke, Mackillo Kira, Stephan W. Koch, Philipps-Univ. Marburg (Germany) [8240-07]

11:20 am: **Efficient parametric THz generation pumped by monolithic pulsed fiber lasers at $\sim 2 \mu\text{m}$ in MOPA configuration**, Wei Shi, NP Photonics, Inc. (USA); Eliot Petersen, NP Photonics, Inc. (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Qiang Fang, Khanh Kieu, College of Optical Sciences, The Univ. of Arizona (USA); Arturo Chavez-Pirson, NP Photonics, Inc. (USA); Nasser Peyghambarian, NP Photonics, Inc. (USA) and College of Optical Sciences, The Univ. of Arizona (USA) [8240-08]

11:40 am: **Coherent electro-optical detection of THz-wave generated from synchronously pumped picosecond THz parametric oscillator**, Yuma Takida, Tatsuya Ohira, Yuzuru Tadokoro, Hiroshi Kumagai, Shigeki Nashima, Osaka City Univ. (Japan) [8240-09]

12:00 pm: **Single-cycle terahertz pulses with amplitudes exceeding 1 MV/cm generated by optical rectification in LiNbO₃ and application to nonlinear optics** (*Invited Paper*), Hideki Hirori, Koichiro Tanaka, Kyoto Univ. (Japan) [8240-10]

Lunch/Exhibition Break 12:30 to 1:40 pm

SESSION 3

Room: 113 (Exhibit Level) Tues. 1:40 to 3:30 pm

Optical Parametric Devices

Session Chairs: **Darrell J. Armstrong**, Sandia National Labs. (USA); **Peter G. Schunemann**, BAE Systems (USA)

1:40 pm: **Optical parametric oscillation in orientation patterned GaAs waveguides** (*Invited Paper*), Moshe B. Oron, Pinhas Blau, Shaul Pearl, Mordechai Katz, Soreq Nuclear Research Ctr. (Israel) [8240-11]

2:10 pm: **Sub-nanosecond 1-kHz low-threshold non-critical OPO based on periodically poled KTP crystal pumped at 1064 nm**, Georgi Marchev, Valentin Petrov, Aleksey Tyazhev, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Valdas Pasiskevicius, Nicky Thilmann, Fredrik Laurell, Royal Institute of Technology (Sweden); Ivan Buchvarov, Sofia Univ. St. Kliment Ohridski (Bulgaria) [8240-12]

2:30 pm: **Comparison of linear and RISTRA cavities for a 1064-nm pumped CdSiP₂ OPO**, Georgi Marchev, Aleksey Tyazhev, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Georg Stöppler, Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France); Peter G. Schunemann, BAE Systems (USA); Valentin Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [8240-13]

2:50 pm: **Improved space bandwidth product in image upconversion**, Jeppe S. Dam, Peter Tidemand-Lichtenberg, Christian Pedersen, Technical Univ. of Denmark (Denmark) [8240-14]

3:10 pm: **Image upconversion: a low noise infrared sensor?**, Jeppe S. Dam, Peter Tidemand-Lichtenberg, Christian Pedersen, Technical Univ. of Denmark (Denmark) [8240-15]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 120 (Exhibit Level) Tues. 4:00 to 6:00 pm

Visible and UV Lasers II

Joint Session with Conference 8235

Session Chairs: **W. Andrew Clarkson**, Univ. of Southampton (United Kingdom); **Andrei V. Shchegrov**, KLA-Tencor Corp. (USA)

4:00 pm: **Coherent quasi-CW 153-nm light source at high repetition rate** (*Invited Paper*), Yutaka Nomura, Institute for Molecular Science (Japan) and Japan Science and Technology Agency (Japan); Yoshiaki Ito, The Univ. of Tokyo (Japan); Akira Ozawa, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan); Xiaoyang Wang, Chuangtian Chen, Technical Institute of Physics and Chemistry (China); Shik Shin, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan); Shuntaro Watanabe, Tokyo Univ. of Science (Japan) and Japan Science and Technology Agency (Japan); Yohei Kobayashi, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan) [8240-16]

4:30 pm: **Frequency-doubled diode laser for direct pumping of ultrashort Ti:sapphire lasers**, André Müller, Ole B. Jensen, Technical Univ. of Denmark (Denmark); Angelika Unterhuber, Tuan Le, Andreas Stingl, FEMTOLASERS Produktions GmbH (Austria); Karl-Heiz Hasler, Bernd Sumpf, Götz Erbert, Ferdinand-Braun-Institut (Germany); Peter E. Andersen, Paul M. Petersen, Technical Univ. of Denmark (Denmark) [8235-45]

4:50 pm: **Mode hop free tunable blue laser**, Kang Li, Univ. of Glamorgan (United Kingdom); Hongying Wang, Xi'an Univ. of Arts and Science (China); Jungang Huang, Ray Chaney, Nigel J. Copner, Univ. of Glamorgan (United Kingdom) [8235-46]

5:10 pm: **High-power compact green laser source based on wavelength-stabilized pump laser diodes**, Kendra Gallup, Xiaodong Yang, Wentao Hu, Charles Wang, Jeffrey E. Ungar, Laurent Vaissie, Laser Operations LLC / QPC Lasers (USA) [8235-47]

5:30 pm: **Designable nonlinear optical device: QPM quartz for VUV spectrum** (*Invited Paper*), Sunao Kurimura, National Institute for Materials Science (Japan); Masaki Harada, National Institute for Materials Science (Japan) and Nikon Corp. (Japan); Ken-ichi Muramatsu, Motoi Ueda, Nikon Corp. (Japan); Muneyuki Adachi, National Institute for Materials Science (Japan) and NIDEK Co., Ltd. (Japan); Tsuyoshi Yamada, Tokio Ueno, NIDEK Co., Ltd. (Japan) [8240-17]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Bright soliton propagation in inhomogeneous N-coupled nonlinear Schrödinger system using Darboux-transformation, Mani Rajan Senthil, Anna Univ. Chennai (India) [8240-42]

Multilayer core asymmetric Bragg reflection waveguides for monolithic three-wave mixing, Payam Abolghasem, Amr S. Helmy, Univ. of Toronto (Canada) [8240-43]

Cerenkov third harmonic generation via cascaded $\chi^{(2)}$ processes in a periodic-poled LiTaO₃ waveguide, Xiaopeng Hu, Changdong Chen, Gang Zhao, Shining Zhu, Nanjing Univ. (China) [8240-44]

Nonlinear wideband optical filters for laser protection applications, Ariela Donval, Yuval Ofir, Tali Fisher, Ofir Lipman, Moshe Oron, KiloLambda Technologies, Ltd. (Israel) [8240-45]

Generation of white-light through frequency upconversion in praseodymium-ytterbium codoped nano-structured fluorogermanate glass, Artur S. Gouveia-Neto, Nathalia P. Rios, Luciano A. Bueno, Univ. Federal Rural de Pernambuco (Brazil) [8240-46]

Modeling parametric waveguide terahertz generation, Peter E. Powers, Joseph Haus, Chen Ye, Univ. of Dayton (USA); Wei Shi, Arturo Chavez-Pirson, NP Photonics, Inc. (USA) [8240-47]

Second harmonic generation and optical parametric amplification using fan-shaped optical superlattice, Xinjie Lv, Gang Zhao, Shining Zhu, Nanjing Univ. (China) [8240-48]

High amplification of BEFWM with the liquid fluorocarbon, Frank F. Wu, Anatoliy I. Khizhnyak, Vladimir B. Markov, MetroLaser, Inc. (USA) [8240-49]

Supercontinuum generation in standard telecom fiber using picoseconds pulses, Julián M. Estudillo-Ayala, Roberto Rojas-Laguna, Univ. de Guanajuato (Mexico); Juan C. Hernández-García, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Ruth I. Mata-Chávez, Monica Trejo-Duran, Daniel Jauregui-Vazquez, Juan M. Sierra-Hernandez, José A. Andrade-Lucio, Univ. de Guanajuato (Mexico) [8240-51]

Parametric down conversion in one dimensional-photonic band gap structure, Prathan Buranasiri, King Mongkut's Institute of Technology Ladkrabang (Thailand) [8240-52]

Analyses of optical packet switching techniques based on nonlinear materials with respect to various label formats, Matej Komanec, Stanislav Zvanovec, Czech Technical Univ. in Prague (Czech Republic) [8240-53]

Sum-frequency generation of continuous-wave tunable ultraviolet coherent light in BBO-installed external cavity, Kenta Mukoyama, Kazuhiro Tokuyama, Hiroshi Kumagai, Osaka City Univ. (Japan); Norihiro Inoue, Naoaki Fukuda, Toshio Takiya, Hitachi Zosen Corp. (Japan) [8240-54]

Tunable terahertz parametric oscillator synchronously pumped by mode-locked picosecond Ti:Sapphire laser with MgO-doped LiNbO₃, Yuzuru Tadokoro, Yuma Takida, Tatsuya Ohira, Hiroshi Kumagai, Shigeaki Nashima, Osaka City Univ. (Japan) [8240-55]

Nonlinear optical properties of Er³⁺ ions doped TeO₂-Li₂O-W₂O glass by 800nm femtosecond laser excitation, Ghizal F. Ansari, All Saints' College of Technology (India); Sachin K. Mahajan, Jitendra Parashar, Sr., Samrat Ashok Technological Institute (India) [8240-56]

Influence of losses induced by macrobends in the supercontinuum generation using standard fiber, Roberto Rojas-Laguna, Julián M. Estudillo-Ayala, Ruth I. Mata-Chávez, Everardo Vargas-Rodríguez, José A. Andrade-Lucio, Univ. de Guanajuato (Mexico); Carlos O. Rodríguez-Ramírez, Univ. Politécnica de San Luis Potosí (Mexico) [8240-57]

Experimental and numerical investigation of highly absorbing nonlinear organic chromophores, Gene Parilov, Mary J. Potasek, Simphotek Inc. (USA) [8240-58]

Arrangement of an advanced acousto-optical processor for modeling the triple correlations of low-power optical pulse trains, Alexandre S. Shcherbakov, Vahram Chavushyan, Ana V. Hanessian de la Graza, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [8240-59]

Quasi phase matching through periodic step structure, Takafumi Ohfuchi, Hitachi Zosen Corp. (Japan); Nobuyuki Hirano, Hiroya Matsukawa, Osaka City Univ. (Japan); Koichiro Nakayama, Hitachi Zosen Corp. (Japan); Hiroshi Kumagai, Osaka City Univ. (Japan); Norihiro Inoue, Naoaki Fukuda, Toshio Takiya, Hitachi Zosen Corp. (Japan) [8240-60]

Optical parametric generation and amplification in 2.7-3.1 μm spectral range using periodically poled lithium niobate with femtosecond pumping, Ieva Pipinyte, Valdemar Stankevicius, Viktorija Pyragaitė, Ona Balachninaite, Vilnius Univ. (Lithuania); Robert Eckardt, Gooch & Housego, Cleveland (USA); Valdas Sirutkaitis, Vilnius Univ. (Lithuania) [8240-61]

Fabrication and characteristic of long photonic crystal fiber taper, Peiguang Yan, Shenzhen Univ. (China); Huiweifeng Wei, Yangtze Optical Fibre and Cable Co., Ltd. (China); Shuangchen Ruan, Chunyu Guo, Jie Shu, Junqing Zhao, Shenzhen Univ. (China) [8240-62]

A multi-phonon light scattering and resolution of acousto-optic devices, Alexandre S. Shcherbakov, Vahram Chavushyan, Ana V. Hanessian de la Graza, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Sergey A. Nemov, St. Petersburg State Polytechnical Univ. (Russian Federation) [8240-63]

Wednesday 25 January

SESSION 5

Room: 113 (Exhibit Level) Wed. 8:00 to 9:50 am

Nonlinear Fiber Devices and Applications

Session Chairs: **Wei Shi**, NP Photonics, Inc. (USA);
Yun-Shik Lee, Oregon State Univ. (USA)

8:00 am: **Mid-IR supercontinuum generation from chalcogenide fibers** (*Invited Paper*), Jas Sanghera, U.S. Naval Research Lab. (USA) [8240-18]

8:30 am: **Photonic crystal fibers for supercontinuum generation pumped by a gain-switched CW fiber laser**, Casper Larsen, Technical Univ. of Denmark (Denmark); Danny Noordegraaf, Kim P. Hansen, NKT Photonics A/S (Denmark); Kent E. Mattsson, Ole Bang, Technical Univ. of Denmark (Denmark) . . [8240-19]

8:50 am: **Single frequency acoustically tailored Raman fiber amplifier**, Christopher L. Vergien, Iyad Dajani, Craig A. Robin, Clint Zeringue, Air Force Research Lab. (USA) [8240-20]

9:10 am: **Higher-order modulation instability in nonlinear fiber optics**, Miro Erkintalo, Tampere Univ. of Technology (Finland); Kamal Hammani, Bertrand Kibler, Christophe Finot, Guy Millot, Univ. de Bourgogne (France); Nail Akhmediev, The Australian National Univ. (Australia); John M. Dudley, Univ. de Franche-Comté (France); Goëry Genty, Tampere Univ. of Technology (Finland) [8240-21]

9:30 am: **Demonstration of minute continuous-wave triggered supercontinuum generation at 1 µm for high-speed biophotonic applications**, Yi Qiu, Chi Zhang, Kenneth K. Y. Wong, Kevin K. Tsia, The Univ. of Hong Kong (Hong Kong, China) [8240-22]

Coffee Break 9:50 to 10:20 am

LASE PLENARY SESSION

Room: 134 (Exhibit Level) . . . Wed. 10:20 am to 12:30 pm

Session Chairs: **Friedhelm Dorsch**, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany);
Alberto Piqué, U.S. Naval Research Lab. (USA)

10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)

10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

10:35 am: **Impact of Green Technology in Germany**,
Matthias Machnig, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)

10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)

11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)

11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH & Co. KG (Germany)

See page 20 for details.

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

SESSION 6

Room: 113 (Exhibit Level) Wed. 1:30 to 3:40 pm

Ultrafast Nonlinear Devices and Applications

Session Chairs: **Peter E. Powers**, Univ. of Dayton (USA);
Darrell J. Armstrong, Sandia National Labs. (USA)

1:30 pm: **Three-dimensional light bullets** (*Invited Paper*), Stefano Minardi, Falk Eilenberger, Friedrich-Schiller-Univ. Jena (Germany); Yaroslav Kartashov, ICFO - Institut de Ciències Fotòniques (Spain); Alexander Szameit, Friedrich-Schiller-Univ. Jena (Germany); Ulrich Röpke, Jens Kobelke, Kay Schuster, Hartmut Bartelt, Institut für Photonische Technologien e.V. (Germany); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany); Lluís Torner, ICFO - Institut de Ciències Fotòniques (Spain); Falk Lederer, Andreas Tünnermann, Thomas Pertsch, Friedrich-Schiller-Univ. Jena (Germany) [8240-23]

2:00 pm: **High-energy 450-MHz CdSiP₂ picosecond optical parametric oscillator near 6.3 microns for biomedical applications**, Chaitanya Kumar Suddapalli, ICFO - Institut de Ciències Fotòniques (Spain); Antonio Agnesi, Paolo Dallochio, Federico Pirzio, Giancarlo C. Reali, Univ. degli Studi di Pavia (Italy); Kevin T. Zawilski, Peter G. Schunemann, BAE Systems (USA); Majid Ebrahim-Zadeh, ICFO - Institut de Ciències Fotòniques (Spain) [8240-24]

2:20 pm: **Ultrafast mid-IR generation in CdSiP₂ (CSP) using a mode-locked near-IR fiber laser pump source**, Benjamin R. Johnson, Daniel Creeden, David Kelly, Kevin T. Zawilski, Peter G. Schunemann, BAE Systems (USA) . . [8240-25]

2:40 pm: **Few cycle high energy pulse compression at MHz repetition rate**, Wolfgang Köhler, FEMTOLASERS Produktions GmbH (Austria); Thomas Ganz, Peter Baum, MPQ-LMU Lab. for Attosecond and High-Field Physics (Germany) [8240-26]

3:00 pm: **A highly efficient broadband picosecond pump high gain OPCPA system demonstrating 50% conversion to signal for Ti-sapphire seed pulses: an ideal seed for high-contrast, large-energy CPA laser systems**, Waseem Shaikh, Ian Musgrave, Rutherford Appleton Lab. (United Kingdom) [8240-27]

3:20 pm: **Broadband OPCPA pumped by ultra-narrowband gaseous iodine laser**, Ondrej Novák, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. (Czech Republic); Hana Turciová, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Martin Divoký, Martin Smrž, Jaroslav Huynh, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. (Czech Republic); Petr Straka, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8240-28]

Coffee/Exhibition Break 3:40 to 5:00 pm

Thursday 26 January

SESSION 7

Room: 113 (Exhibit Level) Thurs. 8:00 to 10:00 am

Mid-IR Frequency Comb and Supercontinuum Generation

Session Chair: **Konstantin L. Vodopyanov**, Stanford Univ. (USA)

8:00 am: **Microresonator-based optical frequency comb generation** (*Invited Paper*), Yoshitomo Okawachi, Kasturi Saha, Jacob S. Levy, Y. Henry Wen, Cornell Univ. (USA); Mark A. Foster, The Johns Hopkins Univ. (USA); Michal F. Lipson, Alexander L. Gaeta, Cornell Univ. (USA) [8240-29]

8:30 am: **Mid-infrared frequency combs based on microresonators** (*Invited Paper*), Christine Y. Wang, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); Tobias Herr, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Pascal Del'Haye, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); Albert Schliesser, Max-Planck-Institut für Quantenoptik (Germany) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Johannes Hofer, Max-Planck-Institut für Quantenoptik (Germany); Aurore Vicet, Guilhem Boissier, Pierre Grech, Institut d'Electronique du Sud, CNRS, Univ. Montpellier 2 (France); Ronald Holzwarth, Max-Planck-Institut für Quantenoptik (Germany) and Menlo Systems GmbH (Germany); Theodor W. Hänsch, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany); Nathalie Picqué, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany) and Institut des Sciences Moléculaires d'Orsay, CNRS, Univ. Paris-Sud (France); Tobias J. Kippenberg, Max-Planck-Institut für Quantenoptik (Germany) and Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8240-30]

9:00 am: **Remote molecular spectroscopy with a broadband mid-IR frequency comb**, Nick C. Leindecker, Alireza Marandi, Robert L. Byer, Konstantin L. Vodopyanov, Stanford Univ. (USA) [8240-31]

9:20 am: **Second-order coherence properties of supercontinuum: from modal representation to experiments**, Goëry Genty, Miro Erkintalo, Tampere Univ. of Technology (Finland); Minna M. Surakka, Jari Turunen, Univ. of Eastern Finland (Finland); Ari T. Friberg, Aalto Univ. (Finland) [8240-32]

9:40 am: **High-quality 3.6-fs pulses by compression of an octave-spanning supercontinuum**, Jan Rothhardt, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Stefan Demmler, Friedrich-Schiller-Univ. Jena (Germany); Alexander M. Heidt, Stellenbosch Univ. (South Africa); Alexander Hartung, Hartmut Bartelt, Institut für Photonische Technologien e.V. (Germany); Erich G. Rohwer, Stellenbosch Univ. (South Africa); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany). [8240-33]

Coffee Break 10:00 to 10:30 am

SESSION 8

Room: 113 (Exhibit Level) Thurs. 10:30 am to 12:00 pm

Nonlinear Materials and Characterization I

Session Chairs: **Angus J. Henderson**, Lockheed Martin Aculight (USA); **Rita D. Peterson**, Air Force Research Lab. (USA)

10:30 am: **Applications of extremely nondegenerate two-photon absorption in semiconductors** (*Invited Paper*), Eric W. Van Stryland, Dmitry A. Fishman, Scott Webster, Claudiu M. Cirloganu, David J. Hagan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). [8240-34]

11:00 am: **Twofold enhancement of two photon absorption by tailored photon statistics**, Henning Kurzke, Michael Seefeldt, Axel M. Heuer, Ralf Menzel, Univ. Potsdam (Germany) [8240-35]

11:20 am: **Two-photon pumped amplified spontaneous emission in seeded CdSe/CdS nanorods**, Tze Chien Sum, Guichuan Xing, Nanyang Technological Univ. (Singapore); Yile Liao, Sabyasachi Chakraborty, National Univ. of Singapore (Singapore); Cheng Hon Huan, Nanyang Technological Univ. (Singapore); Yin Thai Chan, National Univ. of Singapore (Singapore) . . [8240-36]

11:40 am: **Optical characterization of colloidal gold nanoparticles prepared by sputtering deposition**, Hemerson Castro, Univ. Federal de Alagoas (Brazil); Heberton Wender, Sergio Teixeira, Univ. Federal do Rio Grande do Sul (Brazil); Márcion A. R. C. Alencar, Jandir Hickmann, Univ. Federal de Alagoas (Brazil) [8240-37]

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

SESSION 9

Room: 113 (Exhibit Level) Thurs. 1:30 to 3:00 pm

Nonlinear Materials and Characterization II

Session Chair: **Baldemar Ibarra-Escamilla**, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)

1:30 pm: **Chi(3) third harmonic generation and triple photon generation** (*Invited Paper*), Benoit Boulanger, Audrey Dot, Adrien Borne, Patricia Segonds, Institut NEEL (France); Kamel Bencheikh, Juan Ariel Levenson, Lab. de Photonique et de Nanostructures, CNRS (France); Simon Richard, HORIBA Jobin Yvon S.A.S. (France) [8240-38]

2:00 pm: **Growth of single-crystal cesium germanium chloride from the melt**, Nicholas J. Condon, Steven R. Bowman, Shawn O'Connor, U.S. Naval Research Lab. (USA) [8240-39]

2:20 pm: **Investigation and characterization of optical homogeneity of mid-IR nonlinear optical crystals for product yield improvement activities**, Benjamin R. Johnson, Kevin T. Zawilski, Peter G. Schunemann, BAE Systems (USA) [8240-40]

2:40 pm: **Simultaneous multiphoton absorption in rutile (TiO₂) across the half-bandgap**, Christopher C. Evans, Jonathan D. B. Bradley, Harvard Univ. (USA); Erwin A. Marti-Panameno, Benemérita Univ. Autónoma de Puebla (Mexico); Eric Mazur, Harvard Univ. (USA) [8240-41]

Don't miss the free Photonics West Exhibition

24-26 January 2012
South Hall ABC and North Hall D
Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm
Thursday · 10:00 am to 4:00 pm

High-Power Diode Laser Technology and Applications X

Conference Chair: **Mark S. Zediker**, Foro Energy, Inc. (USA)

Program Committee: **Friedrich G. Bachmann**, LUMERA LASER GmbH (Germany); **Stefan W. Heinemann**, Fraunhofer USA, Inc. (USA); **Volker Krause**, Laserline GmbH (Germany); **Robert J. Martinsen**, nLIGHT Corp. (USA); **Kurt J. Linden**, Spire Corp. (USA); **Erik P. Zucker**, JDSU (USA)

Sunday 22 January

SESSION 1

Room: 130 (Exhibit Level) Sun. 8:20 to 10:10 am

High Power Systems

Session Chair: **Robert J. Martinsen**, nLIGHT Corp. (USA)

8:20 am: **kW-class direct diode lasers with comparable brightness to fiber, disk, and carbon dioxide lasers** (*Invited Paper*), Robin K. Huang, James Burgess, Michael Kaiman, Robert Overman, John Glenn, Bien Chann, TeraDiode, Inc. (USA) [8241-01]

8:50 am: **A 13-kW fiber-coupled diode laser for pumping applications**, David Matthews, Klaus Kleine, Laserline Inc. (USA); Volker Krause, Arnd Koesters, Daniel Duennwald, Laserline GmbH (Germany); Silke Pflueger, Laserline Inc. (USA) [8241-02]

9:10 am: **High brightness fibre coupled diode lasers of up to 4-kW output power for material processing**, Michael Voß, Jens Meinschien, Peter Bruns, Lutz Aschke, LIMO Lissotschenko Mikrooptik GmbH (Germany) [8241-03]

9:30 am: **kW-class line sources for direct applications**, Tobias P. Koenning, Kimberly R. Alegria, Zuolan Wang, Steve Patterson, DILAS Diode Laser, Inc. (USA) [8241-04]

9:50 am: **3000-W CW diode laser cladding system**, Lingling Xiong, Xi'an Institute of Optics and Precision Mechanics (China); Min Wang, Yanfang Zheng, Di Wu, Pu Zhang, Xi'an Focuslight Technologies Co., Ltd. (China); Xiaoning Li, Zhenfu Wang, Xingsheng Liu, Xi'an Institute of Optics and Precision Mechanics (China) [8241-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 130 (Exhibit Level) Sun. 10:40 am to 12:00 pm

Laser Diode Reliability

Session Chair: **Kurt J. Linden**, Spire Corp. (USA)

10:40 am: **Emission properties of diode laser bars during pulsed high-power operation**, Jens W. Tomm, Martin Hempel, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Petra Hennig, JENOPTIK Laser GmbH (Germany); Thomas Elsaesser, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [8241-06]

11:00 am: **Scalable high-power and high-brightness fiber coupled diode laser devices**, Bernd Köhler, Paul Wolf, Andreas Unger, DILAS Diodenlaser GmbH (Germany); Armin Segref, DILAS Diode Laser, Inc. (USA); Heiko Kissel, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [8241-47]

11:20 am: **High performance diode lasers emitting at 780-820 nm**, Ling Bao, Mark A. Devito, Mike Grimshaw, nLIGHT Corp. (USA); Paul O. Leisher, Rose-Hulman Institute of Technology (USA); Hailong Zhou, Weimin Dong, Xingguo Guan, Shiguo Zhang, Robert J. Martinsen, Jim Haden, nLIGHT Corp. (USA) [8241-08]

11:40 am: **High power single emitters for fiber coupled diode packages**, Moshe Levy, Noam Rapaport, Dan Yanson, Yoram Karni, Moshe Shamay, Renana Tessler, Yaroslav Don, SCD Semiconductor Devices (Israel) . . [8241-09]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: 130 (Exhibit Level) Sun. 1:30 to 5:10 pm

High Power Packaging and Cooling

Session Chair: **Volker Krause**, Laserline GmbH (Germany)

1:30 pm: **Modular VCSEL solution for uniform line illumination in the kW range** (*Invited Paper*), Holger Moench, Stephan Gronenborn, Pavel Pekarski, Philips Research (Germany); Michael Miller, Philips Technologie GmbH U-L-M Photonics (Germany); Gero Heusler, Raimond Dumoulin, Xi Gu, Armand Pruijboom, Philips Lighting B.V. (Netherlands) [8241-10]

2:00 pm: **High reliability 20-KW QCW area array diode laser**, Xiaoning Li, Xi'an Institute of Optics and Precision Mechanics (China); Lijun Kang, Jingwei Wang, Pu Zhang, Xi'an Focuslight Technologies Co., Ltd. (China); Lingling Xiong, Xingsheng Liu, Xi'an Institute of Optics and Precision Mechanics (China) [8241-11]

2:20 pm: **Automated alignment of optical components for high-power diode lasers**, Sebastian Haag, Vicente Guerrero Lule, Nicolas Pyschny, Fraunhofer-Institut für Produktionstechnologie (Germany) [8241-12]

2:40 pm: **Operating condition limitations of high density QCW arrays**, Jeremy Junghans, Joseph L. Levy, Ryan Feeler, Northrop Grumman Cutting Edge Optronics (USA) [8241-13]

3:00 pm: **Long pulse compact and high brightness near 1-kW QCW diode laser stack**, Stewart W. Wilson, Gregory B. Altshuler, Palomar Medical Technologies, Inc. (USA); Mikhail V. Inochkin, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Andrey Erofeev, Palomar Medical Technologies, Inc. (USA); Valery Y. Khramov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Felix I. Feldchtein, Dental Photonics, Inc. (USA) [8241-14]

Coffee Break 3:20 to 3:50 pm

3:50 pm: **Record-brightness laser-diode bars for fiber coupling**, Mehmet Dogan, Science Research Lab., Inc. (USA); Rajiv Pathak, Coherent, Inc. (USA); Steve Ellison, Advanced Reseach Corp. (USA); Henry Eppich, Keith D. Lang, Richard H. Chin, Science Research Lab., Inc. (USA); Aland K. Chin, Somerville Laser Technology, LLC (USA); Jonah H. Jacob, Science Research Lab., Inc. (USA) [8241-15]

4:10 pm: **High power semiconductor laser array packaged on micro-channel cooler using gold-tin soldering technology**, Jingwei Wang, Xi'an Focuslight Technologies Co., Ltd. (China) [8241-16]

4:30 pm: **Newly developed high power laser diode bars**, Nobuto Kageyama, Takenori Morita, Kousuke Torii, Motoki Takauji, Takehito Nagakura, Junya Maeda, Hirofumi Miyajima, Harumasa Yoshida, Hamamatsu Photonics K.K. (Japan) [8241-17]

4:50 pm: **10-W CW blue-violet laser diode array on the micro-channel cooler**, Nobuyasu Suzuki, Kiyoshi Morimoto, Panasonic Corp. (Japan) [8241-18]

Monday 23 January

SESSION 4

Room: 130 (Exhibit Level) Mon. 8:00 to 10:10 am

High Brightness / Frequency Stabilized

Session Chair: **Erik P. Zucker**, JDSU (USA)

8:00 am: **Wavelength-stabilized fiber-coupled diode laser module with >500-W output and 20-mm x mrad beam quality** (*Invited Paper*), Daniel M. Grasso, Nathan Shou, Henry Chen, Rajiv Pathak, Pamela Liang, Coherent, Inc. (USA); Sungwon Roh, LG Innotek (Korea, Republic of); Dicky Lee, Coherent, Inc. (USA) [8241-19]

8:30 am: **Very high brightness diode laser**, Stefan W. Heinemann, Benjamin E. Lewis, Fraunhofer USA, Inc. (USA); Aleksandr Rysnyanskiy, K. Shavitrnanuruk, Vadim Smirnov, Christine P. Spiegelberg, Leonid B. Glebov, Optigrate Corp. (USA) [8241-20]

8:50 am: **VBG controlled narrow bandwidth diode laser arrays**, Joseph L. Levy, Ryan Feeler, Jeremy Junghans, Northrop Grumman Cutting Edge Optronics (USA) [8241-21]

9:10 am: **10-W Reliable 100- μ m wide broad area lasers with internal grating stabilization**, Paul Crump, Jörg Fricke, Christoph M. Schultz, Hans Wenzel, Steffen Knigge, Olaf Brox, Andre Maassdorf, Frank Bugge, Götz Erbert, Ferdinand-Braun-Institut (Germany) [8241-22]

9:30 am: **High brightness 975-nm pumps with ultra-stable wavelength stabilization**, Alexander Ovtchinnikov, Valentin P. Gapontsev, Nikolay Moshegov, Pavel A. Trubenko, Alexey Komissarov, Igor Berishev, Nikolay Strougov, Vadim V. Chuyanov, Oleg Raisky, IPG Photonics Corp. (USA) [8241-23]

9:50 am: **High-peak-power and high-brightness pulsed single and array diode laser sources**, Yan Xiao, Don Olson, Toby Garrod, Manoj Kanskar, Alfalight, Inc. (USA) [8241-24]

Coffee Break 10:10 to 10:40 am

SESSION 5

Room: 130 (Exhibit Level) Mon. 10:40 am to 12:00 pm

High Power Laser Devices I

Session Chair: Stefan W. Heinemann, Fraunhofer USA, Inc. (USA)

10:40 am: **High-power diode laser pumps for alkali lasers (DPALs)**, Heiko Kissel, Bernd Köhler, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [8241-25]

11:00 am: **High efficiency high brightness diode lasers at 1470 nm/1550 nm for medical and defense applications**, Jeffrey E. Ungar, Robert M. Lammert, Wentao Hu, Laurent Vaissie, Laser Operations LLC / QPC Lasers (USA) [8241-26]

11:20 am: **Slab-coupled optical waveguide lasers and amplifiers**, Gary M. Smith, Joseph P. Donnelly, Leo J. Missaggia, Michael K. Connors, Shawn M. Redmond, Kevin J. Creedon, David C. Mathewson, Reuel B. Swint, Antonio Sanchez-Rubio, George W. Turner, MIT Lincoln Lab. (USA) [8241-27]

11:40 am: **High power broad-area diode lasers optimized for fiber laser pumping**, Jürgen Gilly, m2k-laser GmbH (Germany); Heiko Kissel, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany); Márc T. Kelemen, m2k-laser GmbH (Germany) [8241-28]

Lunch Break 12:00 to 1:30 pm

SESSION 6

Room: 130 (Exhibit Level) Mon. 1:30 to 3:10 pm

High Power Laser Devices II

Session Chair: Stefan W. Heinemann, Fraunhofer USA, Inc. (USA)

1:30 pm: **Progress in increasing the maximum achievable output power of broad area diode lasers**, Paul Crump, Hans Wenzel, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) [8241-29]

1:50 pm: **Compact sources for the generation of high-peak power wavelength-stabilized laser pulses in the picoseconds and nanoseconds ranges**, Hans Wenzel, Andreas Klehr, Sven Schwertfeger, Armin Liero, Thomas Hoffmann, Olaf Brox, Madlen Thomas, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) [8241-30]

2:10 pm: **High efficiency kW-class semiconductor laser bars with passive cooling**, John G. Bai, Zhigang Chen, nLIGHT Corp. (USA); Paul O. Leisher, Rose-Hulman Institute of Technology (USA); Mark DeFranza, Mike Grimshaw, Mark A. DeVito, Robert J. Martinsen, Jim Haden, nLIGHT Corp. (USA) . [8241-31]

2:30 pm: **Extremely low losses 14xx single mode laser diode leading to 550-mW output power module with 0-75°C case temperature and 10-W consumption**, Jean-René Burie, Patrick Garabédian, Christophe Starck, Jean-Pierre Pagnod-Rossiaux, Mauro Bettiati, Miguel Do Nascimento, Jean Noel Reygrobellet, Jean-Claude Bertreux, François Laruelle, 3S PHOTONICS SA (France) [8241-32]

2:50 pm: **Improvement of wall plug efficiency in near infrared lateral single-mode LDs at high temperature**, Tetsuya Yagi, Takuto Maruyama, Masatsugu Kusunoki, Naoyuki Shimada, Motoharu Miyashita, Mitsubishi Electric Corp. (Japan) [8241-33]

Coffee Break 3:10 to 3:40 pm

SESSION 7

Room: 130 (Exhibit Level) Mon. 3:40 to 5:40 pm

High Power Laser Devices III

Session Chair: Friedrich G. Bachmann, LUMERA LASER GmbH (Germany)

3:40 pm: **Industrial high power diode lasers: reliability, power, and brightness**, Stephan G. Strohmaier, Haiyan An, Thilo Vethake, TRUMPF Photonics (USA) [8241-34]

4:00 pm: **High-power single emitters and laser bars with improved performance developed at JENOPTIK**, Martin Zorn, Ralf Huelsewede, Olaf Hirsekorn, Ulrike Haesler, Jürgen Sebastian, JENOPTIK Diode Lab GmbH (Germany); Petra Hennig, JENOPTIK Laser GmbH (Germany) [8241-45]

4:20 pm: **Advances in performance and beam quality of 9xx-nm laser range finding application**, Christian Lauer, Harald König, Günther Grönninger, Sebastian Hein, Alvaro Gomez-Iglesias, Michael Furitsch, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany); Heiko Kissel, Paul Wolf, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) . . . [8241-36]

4:40 pm: **Comparative study of the performance of semiconductor laser based coherent Doppler lidars**, Peter John L. Rodrigo, Christian Pedersen, Technical Univ. of Denmark (Denmark) [8241-37]

5:00 pm: **1540-nm surface-emitting distributed feedback (SE-DFB) laser for range finding application**, Toby Garrod, Don Olson, Yan Xiao, Manoj Kanskar, Alfalight, Inc. (USA) [8241-38]

5:20 pm: **External-cavity high-power dual-wavelength tapered amplifier with tunable THz frequency difference**, Mingjun Chi, Ole B. Jensen, Paul M. Petersen, Technical Univ. of Denmark (Denmark) [8241-39]

Tuesday 24 January

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Experimental studies for improvement of thermal effects in a high power fiber-coupled diode laser module operating at 808 nm, Ashraf F. El-Sherif, Military Technical College (Egypt) [8241-40]

Physics of failure investigation in high power broad-area InGaAs-AlGaAs strained quantum well lasers, Yongkun Sin, Neil Ives, Stephen LaLumondiere, Brendan Foran, Nathan Presser, William Lotshaw, Steven C. Moss, The Aerospace Corp. (USA) [8241-41]

The optical system designing for the laser array with high power, Jun Chang, Lifei Zhang, Dalin Song, Beijing Institute of Technology (China) [8241-42]

6:00 pm: Influence of manufacturing imperfections onto the diode laser output combined beam quality, Y. G. Soskind, DHPC Technologies (USA) [8241-43]

Testing of a compact and self-contained active heat sink for advanced high-power laser diodes, John Vetrovec, Amardeep S. Litt, Drew A. Copeland, Aqwest, LLC (USA); Jeremy Junghans, Northrop Grumman Cutting Edge Optronics (USA) [8241-44]

Application of room temperature pulsed Fabry-Perot quantum cascade laser in situ monitor concentration of methane, Lei Li, Jilin Univ. (China) [8241-46]

Courses of Related Interest

- SC974 Interconnection and Splicing of High-Power Optical Fibers (Yablon) Monday, 8:30 am to 12:30 pm
- SC1020 Splicing of Specialty Fibers and Glass Processing of Fused Fiber Components for Fiber Lasers (Wang) Sunday, 8:30 am to 12:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Vertical External Cavity Surface Emitting Lasers (VECSELS) II

Conference Chair: **Anne C. Tropper**, Univ. of Southampton (United Kingdom)

Program Committee: **Martin D. Dawson**, Univ. of Strathclyde (United Kingdom); **Juan L. Chilla**, Coherent, Inc. (USA); **Eli Kapon**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Ursula Keller**, ETH Zurich (Switzerland); **Jerome V. Moloney**, College of Optical Sciences, The Univ. of Arizona (USA); **Oleg G. Okhotnikov**, Tampere Univ. of Technology (Finland); **Edik U. Rafailov**, Univ. of Dundee (United Kingdom); **Alexei Sirbu**, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Monday 23 January

Opening Remarks

Room: 121 (Exhibit Level) Mon. 8:00 to 8:15 am

Anne C. Tropper, Univ. of Southampton (United Kingdom)

SESSION 1

Room: 121 (Exhibit Level) Mon. 8:15 to 10:15 am

Ultrafast VECSELS I

Session Chair: **Ursula Keller**, ETH Zurich (Switzerland)

8:15 am: **MIXSELS for frequency combs** (*Invited Paper*), Thomas Südmeyer, Valentin J. Wittwer, Selina Pekarek, M. Hoffmann, Oliver D. Sieber, Matthias C. Golling, Ursula Keller, ETH Zurich (Switzerland) [8242-01]

8:45 am: **Picosecond to sub-picosecond pulse generation from mode-locked 1.55- μm VECSELS** (*Invited Paper*), Sophie Bouchoule, Zhuang Zhao, Elisabeth Galopin, Harmand Jean-Christophe, Jinyan Song, Ctr. National de la Recherche Scientifique (France); Jean Decobert, Alcatel-Thales III-V Lab. (France); Jean-Louis Oudar, Ctr. National de la Recherche Scientifique (France) [8242-02]

9:15 am: **Passively mode-locked GaSb-based VECSELS emitting sub-400-fs pulses at 2 μm** (*Invited Paper*), Mircea Guina, Antti Härkönen, Jonna Paaajaste, Jukka-Pekka Alanko, Soile Suomalainen, Christian Grebing, Gunter Steinmeyer, Tampere Univ. of Technology (Finland) [8242-03]

9:45 am: **Harmonically and fundamentally mode-locked InGaAs-AlGaAs disk laser generating pulse repetition rates in the 100 GHz or pulse durations in the 100-fs range** (*Invited Paper*), Uwe Griebner, Peter Klopp, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Martin Zorn, Markus Weyers, Ferdinand-Braun-Institut (Germany) [8242-04]

Coffee Break 10:15 to 10:45 am

SESSION 2

Room: 121 (Exhibit Level) Mon. 10:45 am to 12:30 pm

High Power

Session Chair: **Juan L. Chilla**, Coherent, Inc. (USA)

10:45 am: **20-watt CW TEM₀₀ intracavity doubled optically pumped semiconductor laser at 532 nm** (*Invited Paper*), Jill D. Berger, Douglas W. Anthon, Andrea Caprara, Juan L. Chilla, Sergei V. Govorkov, Arnaud Y. Lepert, Wayne Mefferd, Qi-Ze Shu, Luis Spinelli, Coherent, Inc. (USA) [8242-05]

11:15 am: **High-power quantum dot semiconductor disk lasers** (*Invited Paper*), Jussi Rautiainen, Tampere Univ. of Technology (Finland); Mantas Butkus, Univ. of Dundee (United Kingdom); Igor Krestnikov, Innolume GmbH (Germany); Edik U. Rafailov, Univ. of Dundee (United Kingdom); Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland) [8242-06]

11:45 am: **Recent advances in the development of yellow-orange GaInNAs-based semiconductor disk lasers** (*Invited Paper*), Tomi Leinonen, Ville-Markus Korpijärvi, Antti Härkönen, Mircea Guina, Tampere Univ. of Technology (Finland) [8242-07]

12:15 pm: **Strategies for power scaling VECSELS**, Tsuei-Lian Wang, Jörg Hader, Yushi Kaneda, Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA); Bernardette Kunert, Wolfgang Stolz, Philipps Univ. Marburg (Germany) [8242-08]

Lunch Break 12:30 to 2:00 pm

SESSION 3

Room: 121 (Exhibit Level) Mon. 2:00 to 3:30 pm

Cavity Design

Session Chair: **Anne C. Tropper**, Univ. of Southampton (United Kingdom)

2:00 pm: **Monolithic approaches to VECSEL devices** (*Tutorial*), Stephane Calvez, Martin D. Dawson, Jennifer E. Hastie, Univ. of Strathclyde (United Kingdom) [8242-09]

2:45 pm: **Wavelength tuning of VECSELS by cavity geometry**, Chris Hessenius, Mahmoud Fallahi, Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA); Robert G. Bedford, Air Force Research Lab. (USA) [8242-10]

3:00 pm: **Development of EP-VECSELS for mode locking applications** (*Invited Paper*), Jonathan R. Orchard, David T. Childs, Li Chih Lin, Benjamin J. Stevens, David M. Williams, Richard A. Hogg, The Univ. of Sheffield (United Kingdom); Mantas Butkus, Edik U. Rafailov, Univ. of Dundee (United Kingdom); Stephan Gronenborn, Johanna Kolb, Holger Moench, Philips Research (Germany); Michael Miller, Philips Technologie GmbH U-L-M Photonics (Germany); Martin Hoffmann, Yohann Barbarin, Wolfgang P. Pallmann, Deran H. Maas, Philipp Kreuter, Bernd Witzigmann, Matthias C. Golling, Thomas Südmeyer, Ursula Keller, ETH Zurich (Switzerland) [8242-11]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 121 (Exhibit Level) Mon. 4:00 to 5:45 pm

Single Frequency and Mid-IR

Session Chair: **Oleg G. Okhotnikov**, Tampere Univ. of Technology (Finland)

4:00 pm: **GaSb-based semiconductor disk lasers: recent advances in power scaling and narrow linewidth operation** (*Invited Paper*), Joachim Wagner, Marcel Rattunde, Benno Rösener, Sebastian Kaspar, Tino Töpfer, Christian Manz, Klaus Köhler, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8242-12]

4:30 pm: **589-nm single-frequency VECSEL for sodium guidestar applications**, Chris Hessenius, Mahmoud Fallahi, Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA); Robert G. Bedford, Air Force Research Lab. (USA) [8242-20]

4:45 pm: **Evaluation of the single-frequency operation of a short vertical external-cavity semiconductor laser at 852 nm**, Fabiola A. Camargo, Lab. Charles Fabry (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Paris-Sud (France); Lu Bai, Sylvie Janicot, Lab. Charles Fabry (France); Isabelle Sagnes, Ctr. National de la Recherche Scientifique (France); Arnaud Garnache, Univ. Montpellier 2 (France); Patrick Georges, Gaëlle Lucas-Leclin, Lab. Charles Fabry (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Paris-Sud (France) [8242-14]

5:00 pm: **GaSb-based semiconductor disk laser above 2- μm wavelength with <100-kHz linewidth and 1000-mW output power**, Sebastian Kaspar, Tino Töpfer, Marcel Rattunde, Benno Rösener, Christian Manz, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8242-15]

5:15 pm: **IV-VI mid-infrared VECSEL on Si-substrate** (*Invited Paper*), Matthias Fill, Ferdinand Felder, Mohamed Rahim, Amir Khair, Hans Zogg, ETH Zurich (Switzerland) [8242-16]

Tuesday 24 January

SESSION 5

Room: 121 (Exhibit Level) Tues. 8:00 to 10:00 am

Intracavity Nonlinear Conversion

Session Chair: **Stephane Calvez**, Univ. of Strathclyde (United Kingdom)8:00 am: **VECSELS: non-equilibrium effects and THz emission** (*Invited Paper*), Stephan W. Koch, Philipps-Univ. Marburg (Germany) . . [8242-17]8:30 am: **Advances in narrow-linewidth continuous wave semiconductor disk laser pumped optical parametric oscillators** (*Invited Paper*), Nils Hempler, Gordon Robertson, M Squared Lasers Ltd. (United Kingdom); Craig Hamilton, Solus Technologies Ltd. (United Kingdom); Gareth T. Maker, Graeme P. A. Malcolm, M Squared Lasers Ltd. (United Kingdom) [8242-18]9:00 am: **CW Raman lasers intracavity pumped by VECSELS** (*Invited Paper*), Jennifer E. Hastie, Daniele C. Parrotta, Martin D. Dawson, Alan J. Kemp, Univ. of Strathclyde (United Kingdom) [8242-19]9:30 am: **2.7- μ m single-frequency TEM₀₀ operation of Sb-based diode-pumped external-cavity VCSEL**, Arnaud Garnache, Univ. Montpellier 2 (France) [8242-13]9:45 am: **UV laser emission around 330 nm via intracavity frequency doubling of a tunable red AlGaInP-VECSEL**, Hermann Kahle, Thomas Schwarzbäck, Marcus Eichfelder, Robert K. Roßbach, Michael Jetter, Peter Michler, Univ. Stuttgart (Germany) [8242-21]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 121 (Exhibit Level) Tues. 10:30 am to 12:15 pm

Ultrafast VECSELS II

Session Chair: **Uwe Griebner**, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany)10:30 am: **High-average power modelocked VECSELS and MIXSELS** (*Tutorial*), Ursula Keller, ETH Zurich (Switzerland) [8242-22]11:15 am: **Multiphoton imaging with compact semiconductor disk lasers** (*Invited Paper*), Pablo Loza-Alvarez, Rodrigo Aviles-Espinosa, ICFO - Institut de Ciències Fotòniques (Spain); David Artigas-García, ICFO - Institut de Ciències Fotòniques (Spain) and Univ. Politècnica de Catalunya (Spain) [8242-23]11:45 am: **Frequency-tuneable ultrashort pulse VECSEL sources** (*Invited Paper*), Keith G. Wilcox, Univ. of Southampton (United Kingdom) [8242-24]

Lunch/Exhibition Break 12:15 to 1:30 pm

SESSION 7

Room: Room 121 (Exhibit Level) Tues. 1:30 to 3:30 pm

Active Region Design

Session Chair: **Edik U. Rafailov**, Univ. of Dundee (United Kingdom)1:30 pm: **Quantum dot gain structures for VECSELS** (*Tutorial*), Udo W. Pohl, Technische Univ. Berlin (Germany) [8242-25]2:15 pm: **Recent progress in near-infrared VECSEL grown by metal organic vapour phase epitaxy** (*Tutorial*), Wolfgang Stolz, Philipps-Univ. Marburg (Germany) [8242-26]3:00 pm: **Influence of non-radiative carrier losses on pulsed and CW VECSEL performance** (*Invited Paper*), Alexandre Laurain, Jörg Hader, Tsuei-Lian Wang, Joe M. Yarborough, Yi-Ying Lai, College of Optical Sciences, The Univ. of Arizona (USA); Ganesh Balakrishnan, Thomas J. Rotter, Pankaj Ahirwar, The Univ. of New Mexico (USA); Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA) [8242-27]

Coffee Break 3:30 to 4:00 pm

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

SC1012 Coherent Mid-Infrared Sources and Applications (Vodopyanov) Sunday, 1:30 to 5:30 pm

SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm

SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

SESSION 8

Room: Room 121 (Exhibit Level) Tues. 4:00 to 5:45 pm

Latest Concepts

Session Chair: **Jerome V. Moloney**, The Univ. of Arizona (USA)4:00 pm: **Non-diffracting beams from surface-emitting lasers** (*Invited Paper*), Grigori S. Sokolovskii, Univ. of Dundee (United Kingdom) and Ioffe Physico-Technical Institute (Russian Federation); Sergey N. Losev, Vladimir I. Kuchinskii, Ioffe Physico-Technical Institute (Russian Federation); Wilson Sibbett, Univ. of St. Andrews (United Kingdom); Edik U. Rafailov, Univ. of Dundee (United Kingdom) [8242-28]4:30 pm: **Dual-frequency operation of a vertical external-cavity semiconductor laser at 852 nm**, Fabiola A. Camargo, Jessica Barrientos, Lab. Charles Fabry (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Paris-Sud (France); Ghaya Baili, Loïc Morvan, Daniel Dolfi, Thales Research & Technology (France); Isabelle Sagnes, Ctr. National de la Recherche Scientifique (France); Arnaud Garnache, Univ. Montpellier 2 (France); Fabien Bretenaker, Lab. Aimé Cotton (France) and Ctr. National de la Recherche Scientifique (France); Patrick Georges, Lab. Charles Fabry (France); Gaëlle Lucas-Leclin, Lab. Charles Fabry (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Paris-Sud (France) [8242-29]4:45 pm: **Organic VECSELS: towards low-cost UV-visible lasers** (*Invited Paper*), Sébastien Chénais, Univ. Paris 13 (France) and Ctr. National de la Recherche Scientifique (France); Hadi Rabbani-Haghighi, Univ. Paris 13 (France); Alain Siove, Sébastien Forget, Univ. Paris 13 (France) and Ctr. National de la Recherche Scientifique (France) [8242-30]5:15 pm: **VECSEL development in AFRL** (*Invited Paper*), Robert G. Bedford, Air Force Research Lab. (USA) [8242-31]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Characterization of gain parameters in quantum-dot and quantum-well based VECSEL structures, Mario Mangold, Valentin J. Wittwer, Oliver D. Sieber, Martin Hoffmann, Matthias C. Golling, Thomas Südmeyer, Ursula Keller, ETH Zurich (Switzerland) [8242-32]

Wetting-layer-pumped continuous-wave quantum dot VECSEL, Hani J. Khashi, Adrian H. Quarterman, Oliver J. Morris, Univ. of Southampton (United Kingdom); Mohamed Henini, The Univ. of Nottingham (United Kingdom); Anne C. Tropper, Keith G. Wilcox, Univ. of Southampton (United Kingdom) . . [8242-33]

Sub-80-fs timing jitter of a stabilized SESAM modelocked VECSEL, Valentin J. Wittwer, Robbert van der Linden, ETH Zurich (Switzerland); Bojan Resan, Kurt J. Weingarten, Time-Bandwidth Products AG (Switzerland); Thomas Südmeyer, Ursula Keller, ETH Zurich (Switzerland) [8242-34]

High-average power femtosecond VECSELS with tunable repetition rates up to 10 GHz, Oliver D. Sieber, Valentin J. Wittwer, Martin Hoffmann, Matthias C. Golling, Thomas Südmeyer, Ursula Keller, ETH Zurich (Switzerland) [8242-35]

Strain compensation of InGaAs/GaAs SDL gain mirrors grown by molecular beam epitaxy, Sanna Ranta, Tomi Leinonen, Miki Tavast, Teemu Hakkarainen, Tampere Univ. of Technology (Finland); Ilpo Suominen, Cavitar Ltd. (Finland); Mircea Guina, Tampere Univ. of Technology (Finland) [8242-36]

A wavelength-tuneable picosecond-pulse passively mode-locked VECSEL, Oliver J. Morris, Keith G. Wilcox, Adrian H. Quarterman, Hani J. Khashi, Univ. of Southampton (United Kingdom); Ian Farrer, Harvey E. Beere, David A. Ritchie, Univ. of Cambridge (United Kingdom); Anne C. Tropper, Univ. of Southampton (United Kingdom) [8242-37]

MBE growth of electrically pumped VECSELS, Matthias C. Golling, Wolfgang P. Pallmann, Christian A. Zaugg, Thomas Südmeyer, Ursula Keller, ETH Zurich (Switzerland) [8242-38]

Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XVII

Conference Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Xianfan Xu**, Purdue Univ. (USA); **Bo Gu**, IPG Photonics Corp. (China); **Yoshiki Nakata**, Osaka Univ. (Japan)

Program Committee: **Craig B. Arnold**, Princeton Univ. (USA); **J. Thomas Dickinson**, Washington State Univ. (USA); **Jan J. Dubowski**, Univ. de Sherbrooke (Canada); **Bruno Frei**, Solneva SA (Switzerland); **Sami T. Hendow**, Multiwave Photonics (USA); **Andrew S. Holmes**, Imperial College London (United Kingdom); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA); **Michel Meunier**, Ecole Polytechnique de Montréal (Canada); **Andreas Michalowski**, Univ. Stuttgart (Germany); **Beat Neuenschwander**, Berner Fachhochschule Technik und Informatik (Switzerland); **Hiroyuki Niino**, National Institute of Advanced Industrial Science and Technology (Japan); **Alberto Piqué**, U.S. Naval Research Lab. (USA); **Stephan W. Roth**, BLZ Bayerisches Laserzentrum GmbH (Germany); **Razvan Stoian**, Lab. Hubert Curien (France); **Koji Sugioka**, RIKEN (Japan)

Monday 23 January

Opening Remarks

Room: 122 (Exhibit Level) Mon. 8:15 to 8:20 am

Guido Hennig, Daetwyler Graphics AG (Switzerland)

SESSION 1

Room: 122 (Exhibit Level) Mon. 8:20 to 9:50 am

Direct Writing

Session Chairs: **Xianfan Xu**, Purdue Univ. (USA); **Hiroyuki Niino**, National Institute of Advanced Industrial Science and Technology (Japan)

8:20 am: **Near-field nanopatterning on rough surfaces using optically trapped microspheres** (*Invited Paper*), Craig B. Arnold, Princeton Univ. (USA) [8243-01]

8:50 am: **Picosecond fiber laser microfabrication of THz wire-grid polarizers on polymer membrane substrates**, Tim D. Gerke, Fianium Ltd. (USA); Dylan Fast, Vladimir Kozlov, Microtech Instruments, Inc. (USA) . [8243-02]

9:10 am: **Laser direct writing of high refractive index polymer/TiO₂ nanocomposites**, Qingchuan Guo, Reza Ghadiri, Cemal Esen, Olaf Medenbach, Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) [8243-03]

9:30 am: **Bimetallic grayscale photomasks written using flat-top beam vs. Gaussian beam**, Reza Qarehbaghi, Glenn H. Chapman, Waris Boonyasiriwat, Simon Fraser Univ. (Canada) [8243-04]

Coffee Break 9:50 to 10:20 am

SESSION 2

Room: 122 (Exhibit Level) Mon. 10:20 am to 12:00 pm

Fundamental Aspects of Laser-Material Interaction

Session Chairs: **Hiroyuki Niino**, National Institute of Advanced Industrial Science and Technology (Japan); **Xianfan Xu**, Purdue Univ. (USA)

10:20 am: **Multiple interactions between an excimer laser beam and a ZnO single crystal target**, Enam Khan, Steve Langford, J. Thomas Dickinson, Washington State Univ. (USA) [8243-05]

10:40 am: **Optimization of the volume ablation rate for metals at different laser pulse-durations from ps to fs**, Beat Neuenschwander, Beat Jaeggli, Marc Schmid, Urs Hunziker, Berner Fachhochschule Technik und Informatik (Switzerland) [8243-06]

11:00 am: **Time- and space resolved microscopy of induced ablation with ultrashort laser pulses**, Matthias Domke, Stephan Rapp, Gerhard Heise, Heinz P. Huber, Hochschule München (Germany) [8243-07]

11:20 am: **Ultrafast coherent phonon excitation and non-thermal melting: a molecular dynamics study**, Yaguo Wang, Xianfan Xu, Purdue Univ. (USA) [8243-08]

11:40 am: **Laser ablation plasmas for diagnostics of structured electronic and optical materials during or after laser processing**, Rick Russo, Lawrence Berkeley National Lab. (USA); Alexander A. Bolshakov, Jong Yoo, Applied Spectra, Inc. (USA); Jhanis Gonzalez, Lawrence Berkeley National Lab. (USA) [8243-10]

Lunch Break 12:00 to 1:40 pm

SESSION 3

Room: 122 (Exhibit Level) Mon. 1:40 to 3:10 pm

Laser Modification of Materials

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Bo Gu**, IPG Photonics Corp. (China)

1:40 pm: **Novel semiconductors and nanoscale patterning using pulsed lasers** (*Invited Paper, Presentation Only*), Michael J. Aziz, Harvard Univ. (USA) [8243-11]

2:10 pm: **Annealing of sol-gel derived metal-oxide thin films by a UV laser pulse train**, Jie Zhang, Panasonic Boston Lab. (USA) [8243-12]

2:30 pm: **F2 laser modification of silicone-coated polycarbonate for lightweight automobile window**, Masayuki Okoshi, Yoshihiko Nojima, National Defense Academy (Japan); Hidetoshi Nojiri, RENIAS Co., Ltd. (Japan); Narumi Inoue, National Defense Academy (Japan) [8243-13]

2:50 pm: **Laser-induced transient stress distribution inside a single crystal by time-resolved birefringence imaging**, Takaya Tochio, Masaaki Sakakura, Shingo Kanehira, Yasuhiko Shimotsuma, Kiyotaka Miura, Kazuyuki Hirao, Kyoto Univ. (Japan) [8243-14]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 122 (Exhibit Level) Mon. 3:40 to 6:00 pm

Laser Nanoscale Materials Processing and Manufacturing

Joint Session with Conference 8245

Session Chair: **Richard F. Haglund, Jr.**, Vanderbilt Univ. (USA)

3:40 pm: **Surface plasmon-assisted nanolithography with nanometric accuracy** (*Invited Paper*), Kosei Ueno, Hokkaido Univ. (Japan) [8243-15]

4:10 pm: **XPS study of InP/InGaAs/InGaAsP microstructure irradiated by KrF and ArF lasers in different environments**, Neng Liu, Khalid Moumanis, Sonia Blais, Jan J. Dubowski, Univ. de Sherbrooke (Canada) [8245-13]

4:30 pm: **Designed near fields for parallel surface nanostructures**, Frank Hubenthal, Sören Maag, Abdul-Aleem Jamali, Bernd Witzigmann, Frank Träger, Univ. Kassel (Germany) [8245-14]

4:50 pm: **Laser ablation and nano-material fabrication in supercritical fluids** (*Invited Paper*), Ken-ichi Saitow, Hiroshima Univ. (Japan) [8243-16]

5:20 pm: **Dynamics of TiO₂ nanoparticle formation and deposition for nanostructured thin films**, Jason Readle, Alex A. Puzosky, Christopher Rouleau, Oak Ridge National Lab. (USA); Rudresh Ghosh, Rene Lopez, The Univ. of North Carolina at Chapel Hill (USA); Gyula Eres, Murari Regmi, Oak Ridge National Lab. (USA); Gerd Duscher, The Univ. of Tennessee (USA); Mina Yoon, David B. Geohegan, Oak Ridge National Lab. (USA) [8245-15]

5:40 pm: **Template-assisted metal nanoneedle/nanoprotrusion array fabrication at a sub-diffraction-limited scale**, Yuto Tanaka, Keio Univ. (Japan) and Harvard Univ. (USA); Jonathan D. B. Bradley, Eric Mazur, Harvard Univ. (USA); Minoru Obara, Keio Univ. (Japan) [8243-17]

Tuesday 24 January

SESSION 5

Room: 122 (Exhibit Level) Tues. 8:20 to 10:10 am

Ultrafast Laser 3D-Fabrication

Joint Session with Conference 8247

Session Chairs: **Yoshiki Nakata**, Osaka Univ. (Japan);
Beat Neuenschwander, Berner Fachhochschule Technik und Informatik (Switzerland)

8:20 am: **Applications of picosecond laser and pulse-burst in precision manufacturing** (*Invited Paper*), Ralf Knappe, LUMERA LASER GmbH (Germany) [8243-18]

8:50 am: **High sensitive concentration analysis of biochemical liquids using a microfluidic chip fabricated by femtosecond laser**, Yasutaka Hanada, Koji Sugioka, Katsumi Midorikawa, RIKEN (Japan) [8243-19]

9:10 am: **Ultrahigh precision surface structuring by synchronizing a galvo scanner with an ultrashort pulsed laser system in MOPA arrangement**, Beat Jaeggi, Beat Neuenschwander, Urs Hunziker, Thomas Meier, Markus Zimmermann, Karl-Heinz Selbmann, Ivan Gut, Berner Fachhochschule Technik und Informatik (Switzerland); Guido Hennig, Daetwyler Graphics AG (Switzerland) [8243-20]

9:30 am: **Three-dimensional silver nanostructure fabrication through multiphoton photoreduction**, Kevin Vora, Seung-Yeon Kang, Shobha Shukla, Eric Mazur, Harvard Univ. (USA) [8247-35]

9:50 am: **Material specific effects and limitations during ps-laser generation of micro structures**, Jens Hildenhagen, Klaus Dickmann, Uli Engelhardt, Marco Smarra, Fachhochschule Münster (Germany) [8247-36]

Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 122 (Exhibit Level) Tues. 10:40 am to 12:10 pm

Ultrafast Laser-induced Modification of Glasses or Transparent Materials

Joint Session with Conference 8247

Session Chair: **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

10:40 am: **Laser processing with ultrashort vortex pulses** (*Invited Paper*), Cyril Hnatovsky, Vladlen G. Shvedov, Wieslaw Z. Krolikowski, Andrei V. Rode, The Australian National Univ. (Australia) [8243-22]

11:10 am: **Machining of glass and quartz using nanosecond and picosecond laser pulses**, David Ashkenasi, Tristan Kaszemeikat, Norbert Mueller, Andreas Lemke, Laser- und Medizin-Technologie GmbH, Berlin (Germany); Hans Joachim Eichler, Technische Univ. Berlin (Germany) . [8243-23]

11:30 am: **Water assisted microhole drilling in fused silica using burst-train femtosecond laser pulses**, Takayuki Tamaki, Nara National College of Technology (Japan); Saeid Rezaei, Jianzhao Li, Peter R. Herman, Univ. of Toronto (Canada) [8247-37]

11:50 am: **Fabrication of photo-induced microstructure embedded inside ZnO crystal**, Yuichiro Ishikawa, Yasuhiko Shimotsuma, Akio Kaneta, Masaaki Sakakura, Masayuki Nishi, Kiyotaka Miura, Kazuyuki Hirao, Yoichi Kawakami, Kyoto Univ. (Japan) [8243-24]

Lunch/Exhibition Break 12:10 to 1:20 pm

SESSION 7

Room: 122 (Exhibit Level) Tues. 1:20 to 3:00 pm

Ultrafast Laser Surface Processing

Joint Session with Conference 8247

Session Chairs: **Beat Neuenschwander**, Berner Fachhochschule Technik und Informatik (Switzerland);
Yoshiki Nakata, Osaka Univ. (Japan)

1:20 pm: **Comparison of picosecond and femtosecond laser ablation for surface engraving of metals and semiconductor**, John Lopez, Rémi Torres, Anne Lidoff, Charly Loumena, ALPhANOV (France); Martin Delaigue, Clemens Hönninger, Eric Mottay, Sylvain Ricaud, Amplitude Systemes (France) . [8243-25]

1:40 pm: **Correlating texturing, milling, and scribing of ceramics and metals using ns and fs pulsed fiber lasers**, Sami T. Hendow, Multiwave Photonics (USA); Arzu M. Ozkan, Lumyn Technologies LLC (USA); Eric P. Mottay, Amplitude Systemes (France) [8243-26]

2:00 pm: **Sub-wavelength multi-period ripple phenomena on stainless steel irradiated with high repetition rate femtosecond laser pulses**, Ladan E. Abolghasemi, Univ. of Toronto (Canada); Abbas Hosseini, FiLaser Inc. (Canada); Peter R. Herman, Univ. of Toronto (Canada) [8247-38]

2:20 pm: **Structural changes of copper induced by high repetition rate femtosecond laser pulses**, Stéphane Valette, David Bruneel, Ecole Centrale de Lyon (France); Eric Audouard, Univ. Jean Monnet Saint-Etienne (France); Ronan Le Harzic, Fraunhofer-Institut für Biomedizinische Technik (Germany); Stéphane Benayoun, Ecole Centrale de Lyon (France) [8247-39]

2:40 pm: **Femtosecond-laser-induced nanowires with very high aspect ratios at the surface fused silica**, Arnaud Royon, Gautier Papon, Mathieu Dumergue, Jean-Christophe Delagnes, Kevin Bourhis, Yannick Petit, Thierry Cardinal, Yannick Deshayes, Lionel S. Canioni, Univ. Bordeaux 1 (France) [8247-40]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Room: 122 (Exhibit Level) Tues. 3:30 to 5:40 pm

Fundamentals and Diagnostics in Ultrafast Laser Processing

Joint Session with Conference 8247

Session Chair: **Michel Meunier**, Ecole Polytechnique de Montréal (Canada)

3:30 pm: **Probing ultrafast laser-matter interactions with fs x-rays** (*Invited Paper*), Klaus Sokolowski-Tinten, Univ. Duisburg-Essen (Germany) [8243-27]

4:00 pm: **In and out of resonance plasmonics enhanced ultrafast laser nanoablation of surfaces**, Alexandre Robitaille, Étienne Boullais, Michel Meunier, Ecole Polytechnique de Montréal (Canada) [8247-41]

4:20 pm: **Raman spectroscopy as a diagnostic means of sapphire dicing using ultrashort pulsed lasers**, Jiyeon Choi, Dongsig Shin, Yongkwon Cho, Jeong Suh, Korea Institute of Machinery & Materials (Korea, Republic of) [8243-28]

4:40 pm: **Influence of pulse duration on the hole formation during short and ultrashort pulse laser deep drilling**, Sven Doering, Soeren Richter, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tuennermann, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) [8247-42]

5:00 pm: **Direct investigation of the ablation rate evolution during laser drilling of high aspect ratio micro-holes**, Francesco P. Mezzapesa, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy); Teresa Sibillano, Lorenzo L. Columbo, CNR-IFN UOS Bari (Italy); Francesca Di Niso, Univ. degli Studi di Bari (Italy); Antonio Ancona, CNR-IFN UOS Bari (Italy); Maurizio Dabbicco, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy); Francesco De Lucia, Univ. degli Studi di Bari (Italy); Pietro M. Lugarà, Gaetano Scamarcio, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy) [8243-29]

5:20 pm: **Real-time automatic depth control of laser processing at kilohertz rates**, Paul J. Webster, Kevin D. Mortimer, Joe X. Z. Yu, James M. Fraser, Queen's Univ. (Canada) [8243-30]

LASE

Conference 8243 · Room: 122 (Exhibit Level)

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Development of laser-base application system with high precision and speed, Kwanghyun Ryu, Suk-hoon Shin, Hyeong-chan Park, Tae-sang Hwang, ASTJETEC Co., Ltd. (Korea, Republic of) [8243-46]

Reproduction a unit of power of the laser radiation in compliance with the redefinition of the optical watt, Jan A. Owsik, Military Univ. of Technology (Poland); Anatoly A. Liberman, Anatoly A. Kovalev, Sergey A. Moskalyuk, All-Russia Research Institute of Optical and Physical Measurements (Russian Federation); Anna Z. Rembielinska, LOT Polish Airlines (Poland) [8243-47]

Nanostructure formation on lithium niobate surfaces by high-repetition rate sub-15-fs near-infrared laser pulses, Martin H. Straub, Benjamin Weigand, Karsten König, Univ. des Saarlandes (Germany) [8243-48]

Acoustic damage detection in laser-cut CFRP composite materials, Michiteru Nishino, Advanced Laser and Process Technology Research Association (Japan); Yoshihisa Harada, Takayuki Suzuki, Hiroyuki Niino, National Institute of Advanced Industrial Science and Technology (Japan) [8243-49]

Femtosecond laser doping and nanostructuring of silicon for photovoltaics, Benjamin Franta, Meng-Ju Sher, Yu-Ting Lin, Katherine C. Phillips, Eric Mazur, Harvard Univ. (USA) [8243-50]

Generation of new nanostructures in designed matrix by interfering femtosecond laser processing, Kazuma Momoo, Yoshiki Nakata, Noriaki Miyanaga, Osaka Univ. (Japan) [8243-51]

High aspect ratio of near-field nano-lens for deep nano-crater patterning, Ichiro Fujimura, Mitsuhiro Terakawa, Keio Univ. (Japan) [8243-52]

Wednesday 25 January

SESSION 9

Room: 122 (Exhibit Level) Wed. 8:50 to 9:50 am

Laser Surface Texturing / Polishing

Session Chair: Stephan W. Roth,
BLZ Bayerisches Laserzentrum GmbH (Germany)

8:50 am: **Periodic nano trench structure fabricated by high speed scanning CW laser**, Satoru Kaneko, Takeshi Ito, Chihiro Kato, Satomi Tanaka, Kanagawa Industrial Technology Ctr. (Japan); Akira Matsuno, Takashi Nire, Photon Corp. (Japan); Mamoru Yoshimoto, Tokyo Institute of Technology (Japan) . . . [8243-31]

9:10 am: **Tribological enhancement of surface properties by multi-scale femtosecond laser texturing: relation between laser treatment, topography, and wettability**, Pavel Bizi-Bandoki, Stéphane Valette, Stéphane Benayoun, Ecole Centrale de Lyon (France); Eric Audouard, Univ. Jean Monnet Saint-Etienne (France) [8243-32]

9:30 am: **Laser polishing**, Andre Temmler, RWTH Aachen (Germany); Edgar Willenborg, Fraunhofer-Institut für Lasertechnik (Germany) [8243-33]

Coffee Break 9:50 to 10:20 am

LASE PLENARY SESSION

Room: 134 (Exhibit Level) . . .Wed. 10:20 am to 12:30 pm

Session Chairs: Friedhelm Dorsch,
TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany);
Alberto Piqué, U.S. Naval Research Lab. (USA)

10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)

10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

10:35 am: **Impact of Green Technology in Germany**,
Matthias Machnig, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)

10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)

11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)

11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH & Co. KG (Germany)

See page 20 for details.

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 10

Room: 122 (Exhibit Level) Wed. 2:00 to 3:00 pm

Laser Surface Texturing and 3D Microstructuring

Session Chair: Stefan Roth, Leica Camera AG (Germany)

2:00 pm: **Formation of tribological structures by laser ablation**, Niels Schilling, Mike Paschke, Udo Klotzbach, Fraunhofer IWS Dresden (Germany); Sami T. Hendow, Multiwave Photonics (Portugal) [8243-34]

2:20 pm: **Laser-induced front side etching of commercial glasses with short and ultra-short laser pulses**, Pierre Lorenz, Klaus Zimmer, Martin Ehrhardt, Anja Wehrmann, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany) [8243-35]

2:40 pm: **Facile and flexible fabrication of gapless microlens arrays using a femtosecond laser microfabrication and replication process**, Hwei Liu, Feng Chen, Xi'an Jiaotong Univ. (China) [8243-36]

Coffee Break 3:00 to 3:30 pm

SESSION 11

Room: 122 (Exhibit Level) Wed. 3:30 to 5:50 pm

**Novel Laser Systems and Optics
for Laser Micro/Nanomachining**

Session Chairs: **Bo Gu**, IPG Photonics Corp. (China);
Guido Hennig, Daetwyler Graphics AG (Switzerland)

3:30 pm: **Control of material properties by simultaneous photoexcitations at multiple light spots using a spatial light modulator** (*Invited Paper*), Masaaki Sakakura, Takaya Tochio, Masahiro Shimizu, Naomi Yasuda, Kyoto Univ. (Japan); Masatoshi Ohnishi, Qualtec Co. Inc. (Japan); Yasuhiko Shimotsuma, Kiyotaka Miura, Kazuyuki Hirao, Kyoto Univ. (Japan) [8243-37]

4:00 pm: **Green line-shaped focus and multiple-foci parallel processing in photovoltaic and other applications on Si**, Mikhail Ivanenko, Klaus Bagschik, Wyacheslav Grimm, Aliaksei Krasnaberski, LIMO Lissotschenko Mikrooptik GmbH (Germany) [8243-38]

4:20 pm: **Investigation of micro lens multi spot generator for parallel micromachining of silicon with picosecond and nanosecond laser**, Maik Zimmermann, Stephan W. Roth, BLZ Bayerisches Laserzentrum GmbH (Germany) and Erlangen Graduate School in Advanced Optical Technologies (Germany); Michael Schmidt, BLZ Bayerisches Laserzentrum GmbH (Germany) and Erlangen Graduate School in Advanced Optical Technologies (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8243-39]

4:40 pm: **Using acoustic energy for structuring light fields in laser processing and imaging** (*Invited Paper*), Marti Duocastella, Craig B. Arnold, Princeton Univ. (USA) [8243-40]

5:10 pm: **New nanosecond Q-switched 213 and 224-nm lasers for fiber Bragg grating writing in hydrogen-free optical fibers**, Mathieu Gagné, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) [8243-41]

5:30 pm: **Laser cutting of carbon fiber reinforced plastics (CFRP)**, Hiroyuki Niino, Yoshizou Kawaguchi, Tadatake Sato, Aiko Narazaki, Ryoza Kurosaki, Yoshihisa Harada, National Institute of Advanced Industrial Science and Technology (Japan); Takahiro Nagashima, Zyunpei Kase, Masafumi Matsushita, Koichi Furukawa, Michiteru Nishino, Advanced Laser and Process Technology Research Association (Japan) [8243-42]

Thursday 26 January

SESSION 12

Room: 121 (Exhibit Level) Thurs. 3:30 to 5:30 pm

Photovoltaics

Joint Session with Conference 8244

Session Chair: **Rainer Kling**, ALPhANOV (France)

3:30 pm: **Structuring of functional thin films and surfaces with picosecond-pulsed lasers** (*Invited Paper*), Gediminas Raciukaitis, Paulius Gecys, Mindaugas Gedvilas, Bogdan Voisiat, Ctr. for Physical Sciences and Technology (Lithuania) [8243-43]

4:00 pm: **Laser sintering of Si and Ge nano- and microparticle films toward solar cells by solution process**, Akira Watanabe, Tohoku Univ. (Japan) [8244-31]

4:20 pm: **Laser processes for future solar cells** (*Invited Paper*), Andreas Letsch, Robert Bosch GmbH (Germany) [8243-44]

4:50 pm: **Selective ablation of thin films in latest generation CIGS solar cells with picosecond pulses**, Andreas Burn, Martin Muralt, Berner Fachhochschule Technik und Informatik (Switzerland); Reiner Witte, Bruno Frei, Solneva SA (Switzerland); Stephan Bücheler, EMPA (Switzerland); Valerio Romano, Berner Fachhochschule Technik und Informatik (Switzerland) [8243-45]

5:10 pm: **High quality micro-machining using ultracompact picosecond lasers**, Oliver Haupt, Stefan Spiekermann, Ingo Freitag, InnoLight GmbH (Germany) [8244-32]

Courses of Related Interest

- SC689 Precision Laser Micromachining (Schaeffer) Wednesday, 1:30 to 5:30 pm
- SC743 Micromachining with Femtosecond Lasers (Nolte, Schaffer) Monday, 1:30 to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Laser-based Micro- and Nanopackaging and Assembly VI

Conference Chairs: **Friedrich G. Bachmann**, LUMERA LASER GmbH (Germany); **Wilhelm Pfleging**, Karlsruher Institut für Technologie (Germany); **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)

Conference Co-Chairs: **Jun Amako**, Seiko Epson Corp. (Japan); **Willem Hoving**, Avantes B.V. (Netherlands); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

Program Committee: **Craig B. Arnold**, Princeton Univ. (USA); **Francois Courvoisier**, Univ. de Franche-Comté (France); **Ramona Eberhardt**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Bo Gu**, IPG Photonics Corp. (China); **Duncan P. Hand**, Heriot-Watt Univ. (United Kingdom); **Minghui Hong**, National Univ. of Singapore (Singapore); **Lan Jiang**, Beijing Institute of Technology (China); **Nam Seong Kim**, EO Technics Co., Ltd. (Korea, Republic of); **Sonja M. Kittel**, Robert Bosch GmbH (Germany); **Rainer Kling**, ALPhANOV (France); **Udo Klotzbach**, Fraunhofer IWS Dresden (Germany); **Thomas Klotzbücher**, Institut für Mikrotechnik Mainz GmbH (Germany); **Xinbing Liu**, Panasonic Boston Lab. (USA); **Marius Przybylski**, ATL Lasertechnik GmbH (Germany); **Yasu Osako**, Electro Scientific Industries, Inc. (USA); **Roberto Osellame**, Politecnico di Milano (Italy); **Andreas Ostendorf**, Ruhr-Univ. Bochum (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA); **Razvan Stoian**, Lab. Hubert Curien (France); **Koji Sugioka**, RIKEN (Japan); **Akira Watanabe**, Tohoku Univ. (Japan); **Xianfan Xu**, Purdue Univ. (USA)

Tuesday 24 January

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Massive process parallelization for laser surface modification: approach and boundaries, Viktor Schütz, Uwe Stute, Laser Zentrum Hannover e.V. (Germany) [8244-33]

Wednesday 25 January

SESSION 1

Room: 121 (Exhibit Level) Wed. 8:00 to 9:50 am

Welding, Bonding, Brazing

Session Chair: **Friedrich G. Bachmann**, LUMERA LASER GmbH (Germany)

8:00 am: **Welding of transparent materials with ultrashort laser pulses** (*Invited Paper*), Sören Richter, Sven Döring, Felix Zimmermann, Friedrich-Schiller-Univ. Jena (Germany); Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8244-01]

8:30 am: **Direct welding of fused silica with femtosecond fiber laser**, Huan Huang, Jian Liu, Lihmei Yang, PolarOnyx, Inc. (USA) [8244-02]

8:50 am: **Highly precise and robust packaging of optical components**, Michael Leers, Matthias Winzen, Heinrich Faidel, Heinz-Dieter Plum, Jörn Miesner, Wolfgang Brandenburg, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [8244-35]

9:10 am: **High throughput high accuracy laser soldering of optoelectronic chips**, Torsten Vahrenkamp, Achim Weber, Detlef Rose, Stefan Heinecke, ficonTEC Service GmbH (Germany); Robert Parkin, Loughborough Univ. (United Kingdom); Horst Kreitlow, ficonTEC Service GmbH (Germany) [8244-03]

9:30 am: **End cap splicing of photonic crystal fibers with outstanding quality for high power applications**, Steffen Böhme, Andrea Kliner, Simone Fabian, Thomas Schreiber, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8244-04]

Coffee Break 9:50 to 10:20 am

LASE PLENARY SESSION

Room: 134 (Exhibit Level) . . .Wed. 10:20 am to 12:30 pm

Session Chairs: **Friedhelm Dorsch**, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)

10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

10:35 am: **Impact of Green Technology in Germany**, **Matthias Machnig**, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)

10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)

11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)

11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH & Co. KG (Germany)

See page 20 for details.

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

SESSION 2

Room: 121 (Exhibit Level) Wed. 1:30 to 3:20 pm

Structuring and Modification of Thin Films

Session Chair: **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)

1:30 pm: **Amorphous Si crystallization by 405-nm GaN laser diodes for high performance TFT applications: advantages of using 405-nm wavelength** (*Invited Paper*), Kiyoshi Morimoto, Panasonic Semiconductor Discrete Devices Co., Ltd. (Japan); Nobuyasu Suzuki, Panasonic Corp. (Japan); Xinbing Liu, Panasonic Boston Lab. (USA); Katsuya Samonji, Kazuhiko Yamanaka, Panasonic Semiconductor Discrete Devices Co., Ltd. (Japan); Masaaki Yuri, Panasonic Corp. (Japan) [8244-05]

2:00 pm: **Heat-induced structure formation in metal films generated by single ultrashort laser pulses**, Jürgen Koch, Claudia Unger, Boris N. Chichkov, Laser Zentrum Hannover e.V. (Germany) [8244-06]

2:20 pm: **Laser micromachining of organic LEDs**, Tino Petsch, Jens Haenel, Maurice Clair, Christian Scholz, 3D-Micromac AG (Germany) [8244-08]

2:40 pm: **Analysis and characterization of the laser decal transfer process**, Scott A. Mathews, Raymond C. Y. Auyeung, Alberto Piqué, U.S. Naval Research Lab. (USA) [8244-09]

3:00 pm: **Laser origami: a new technique for assembling 3D microstructures**, Alberto Piqué, Scott A. Mathews, Nicholas A. Charipar, Andrew J. Birnbaum, U.S. Naval Research Lab. (USA) [8244-10]

Coffee Break 3:20 to 3:40 pm

SESSION 3

Room: 121 (Exhibit Level) Wed. 3:40 to 6:10 pm

Laser Nano-Structuring

Session Chair: Yongfeng Lu, Univ. of Nebraska-Lincoln (USA)

3:40 pm: **3D processing using femtosecond lasers for aperiodic volume optics (Invited Paper)**, Rafael Piestun, Univ. of Colorado at Boulder (USA) [8244-11]

4:10 pm: **Nano-structured surfaces by laser interference lithography and fs-laser direct writing as substrates for surface-enhanced Raman spectroscopy**, Thomas Klotzbücher, Lhoucine Ben Mohammadi, Nina Hundertmark, Frank Kullmann, Frederik Fleissner, Institut für Mikrotechnik Mainz GmbH (Germany) [8244-12]

4:30 pm: **In situ diagnostics on fs-laser induced modification of glasses for selective etching**, Martin Hermans, Jens Gottmann, Anna Schiffer, RWTH Aachen (Germany) [8244-13]

4:50 pm: **Large area direct fabrication of periodic arrays using interference patterning**, Andres F. Lasagni, Teja Roch, Denise Langheinrich, Matthias Bieda, Heidi Perez, Andreas Wetzig, Eckhard Beyer, Fraunhofer IWS Dresden (Germany) [8244-14]

5:10 pm: **Integration of a three-dimensional filter in a microfluidic chip for separation of microscale particles**, Nicola Bellini, Politecnico di Milano (Italy); Yu Gu, Massachusetts Institute of Technology (USA); Lorenzo Amato, Giulio Cerullo, Politecnico di Milano (Italy); Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) [8244-15]

5:30 pm: **Surface-enhanced Raman spectroscopy using Au-coated vertically aligned carbon nanotubes**, Xiangnan He, H. Huang, Masoud Mahjouri-Samani, Yang Gao, Wei Xiong, M. Mitchell, Wei Hu, Yunshen Zhou, Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) [8244-16]

5:50 pm: **Enhancement of laser-induced breakdown spectroscopy signals using both hemispherical cavity and magnetic field**, Lianbo Guo, Univ. of Nebraska-Lincoln (USA) and Wuhan National Lab. for Optoelectronics (China); Xiangnan He, B.Y. Zhang, C.M. Li, Wei Hu, Yunshen Zhou, Univ. of Nebraska-Lincoln (USA); Z.X. Cai, Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China); Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) [8244-17]

Thursday 26 January

SESSION 4

Room: 121 (Exhibit Level) Thurs. 8:50 to 10:00 am

Laser Micro-Structuring and Modification I

Session Chair: Udo Klotzbach, Fraunhofer IWS Dresden (Germany)

8:50 am: **Laser structuring of metallic mould inserts by using μ s, ns, and ps-laser ablation (Invited Paper)**, Steffen G. Scholz, Cardiff Univ. (United Kingdom) [8244-18]

9:20 am: **Laser-chemical precision machining of micro forming tools at low laser powers**, Salar Mehrafsun, Peiran Zhang, Frank Vollertsen, Gert Goch, Bremer Institut für angewandte Strahltechnik GmbH (Germany) [8244-19]

9:40 am: **Process limitations in microassembling using holographic optical tweezers**, Reza Ghadiri, Qingchuan Guo, Cemal Esen, Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) [8244-21]

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 121 (Exhibit Level) Thurs. 10:30 am to 12:20 pm

Laser Micro-Structuring and Modification II

Session Chair: Willem Hoving, Avantes B.V. (Netherlands)

10:30 am: **Laser machining of carbon fibre reinforced polymeric (CFRP) composite materials (Invited Paper)**, Lin Li, The Univ. of Manchester (United Kingdom) [8244-22]

11:00 am: **Plastic optofluidic chip fabricated by femtosecond laser ablation**, Rebeca Martinez, Shane M. Eaton, Giulio Cerullo, Roberta Ramponi, Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) [8244-23]

11:20 am: **Control of element distribution in glass with femtosecond laser**, Masahiro Shimizu, Masaaki Sakakura, Masayuki Nishi, Yasuhiko Shimotsuma, Kazuyuki Hirao, Kiyotaka Miura, Kyoto Univ. (Japan) [8244-24]

11:40 am: **Compact high power ps laser and its application in large area engraving**, Keming Du, EdgeWave GmbH (Germany); Stephan Brüning, Schepers GmbH (Germany); Arnold Gillner, Fraunhofer-Institut für Lasertechnik (Germany) [8244-25]

12:00 pm: **Rotating optics for laser taper-drilling in research and production**, David Ashkenasi, Tristan Kaszemeikat, Norbert Mueller, Laser- und Medizin-Technologie GmbH, Berlin (Germany); Hans Joachim Eichler, Technische Univ. Berlin (Germany); Tino Petsch, Jens Haenel, Markus Lasch, Christian Scholz, 3D-Micromac AG (Germany) [8244-26]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 6

Room: 121 (Exhibit Level) Thurs. 1:30 to 3:00 pm

Batteries

Session Chair: Wilhelm Pflöging, Karlsruhe Institut für Technologie (Germany)

1:30 pm: **From reel to pack: laser processes in the production of lithium-ion-batteries (Invited Paper)**, Benjamin Schmieder, Manz Automation AG (Germany) [8244-27]

2:00 pm: **Laser adjusted three-dimensional Li-Mn-O cathode architectures for secondary rechargeable lithium-ion cells**, Johannes Pröll, Robert Kohler, Maika Torge, Michael Bruns, Karlsruhe Institut für Technologie (Germany); Marius Przybylski, ATL Lasertechnik GmbH (Germany); Julian Fischer, Sven Ulrich, Wilhelm Pflöging, Karlsruhe Institut für Technologie (Germany) [8244-28]

2:20 pm: **Influence of laser-generated surface structures on electrochemical performance of lithium cobalt oxide**, Robert Kohler, Johannes Pröll, Heino Besser, Karlsruhe Institut für Technologie (Germany); Marius Przybylski, ATL Lasertechnik GmbH (Germany); Julian Fischer, Sven Ulrich, Wilhelm Pflöging, Karlsruhe Institut für Technologie (Germany) [8244-29]

2:40 pm: **Transient thermal analysis and mechanical strength testing of pulsed laser welded ground ribbons to battery joints**, Yaomin Lin, Guangqiang Jiang, Alfred E. Mann Foundation for Scientific Research (USA) [8244-30]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: 121 (Exhibit Level) Thurs. 3:30 to 5:30 pm

Photovoltaics

Joint Session with Conference 8243

Session Chair: Rainer Kling, ALPhANOV (France)

3:30 pm: **Structuring of functional thin films and surfaces with picosecond-pulsed lasers (Invited Paper)**, Gediminas Raciukaitis, Paulius Gecys, Mindaugas Gedvilas, Bogdan Voisiat, Ctr. for Physical Sciences and Technology (Lithuania) [8243-43]

4:00 pm: **Laser sintering of Si and Ge nano- and microparticle films toward solar cells by solution process**, Akira Watanabe, Tohoku Univ. (Japan) [8244-31]

4:20 pm: **Laser processes for future solar cells (Invited Paper)**, Andreas Letsch, Robert Bosch GmbH (Germany) [8243-44]

4:50 pm: **Selective ablation of thin films in latest generation CIGS solar cells with picosecond pulses**, Andreas Burn, Martin Muralt, Berner Fachhochschule Technik und Informatik (Switzerland); Reiner Witte, Bruno Frei, Solneva SA (Switzerland); Stephan Bücheler, EMPA (Switzerland); Valerio Romano, Berner Fachhochschule Technik und Informatik (Switzerland) [8243-45]

5:10 pm: **High quality micro-machining using ultracompact picosecond lasers**, Oliver Haupt, Stefan Spiekermann, Ingo Freitag, InnoLight GmbH (Germany) [8244-32]

Synthesis and Photonics of Nanoscale Materials IX

Conference Chairs: **Frank Träger**, Univ. Kassel (Germany); **Jan J. Dubowski**, Univ. de Sherbrooke (Canada); **David B. Geohegan**, Oak Ridge National Lab. (USA)

Program Committee: **Carmen N. Afonso**, Consejo Superior de Investigaciones Científicas (Spain); **Paolo Biagioni**, Politecnico di Milano (Italy); **J. Thomas Dickinson**, Washington State Univ. (USA); **Haim Grebel**, New Jersey Institute of Technology (USA); **Costas P. Grigoropoulos**, Univ. of California, Berkeley (USA); **Tony F. Heinz**, Columbia Univ. (USA); **Ilko K. Ilev**, U.S. Food and Drug Administration (USA); **Hiroshi Kumagai**, Osaka City Univ. (Japan); **Thomas K. Lippert**, Paul Scherrer Institut (Switzerland); **Vladimir M. Shalaev**, Purdue Univ. (USA); **Xianfan Xu**, Purdue Univ. (USA); **Yaqiong Xu**, Vanderbilt Univ. (USA)

Monday 23 January

SESSION 1

Room: 112 (Exhibit Level) Mon. 8:20 to 10:10 am

Frontiers in Plasmonics

Session Chair: **Frank Träger**, Univ. Kassel (Germany)

8:20 am: **The nano-optics of plasmonic optical tweezers, SERS substrates, and multi-colored silicon nanowires** (*Invited Paper*), Kenneth B. Crozier, Harvard Univ. (USA) [8245-01]

8:55 am: **Plasmon resonances in structures with atomic-scale gaps** (*Invited Paper*), Johannes Kern, Swen Grossmann, Nadja Tarakina, Monika Emmerling, Martin Kamp, Tim Häckel, Julius-Maximilians-Univ. Würzburg (Germany); Jer-Shing Huang, National Tsing Hua Univ. (Taiwan); Paolo Biagioni, CNISM, Politecnico di Milano (Italy); Jord C. Prangma, Bert Hecht, Julius-Maximilians-Univ. Würzburg (Germany) [8245-02]

9:30 am: **Multi-photon autocorrelation in Au dipole antennas**, Paolo Biagioni, Daniele Brida, Politecnico di Milano (Italy); Jer-Shing Huang, National Tsing-Hua Univ. (Taiwan); Johannes Kern, Julius-Maximilians-Univ. Würzburg (Germany); Lamberto Duò, Politecnico di Milano (Italy); Bert Hecht, Julius-Maximilians-Univ. Würzburg (Germany); Marco Finazzi, Giulio Cerullo, Politecnico di Milano (Italy) [8245-03]

9:50 am: **Ultrafast plasmon dynamics of individual nano-rod antennas**, Dario Polli, Margherita Zavelani-Rossi, Giuseppe Della Valle, Marco Marangoni, Politecnico di Milano (Italy); Pierre-Michel Adam, Univ. de Technologie Troyes (France); Giulio Cerullo, Politecnico di Milano (Italy) [8245-04]

Coffee Break 10:10 to 10:45 am

SESSION 2

Room: 112 (Exhibit Level) Mon. 10:45 am to 12:00 pm

Nanoparticle Synthesis and Applications

Session Chair: **Jan J. Dubowski**, Univ. de Sherbrooke (Canada)

10:45 am: **Elucidating effects of nanoscale structural variations on local plasmonic modes via photon localization microscopy** (*Invited Paper*), Alexander S. McLeod, Alexander Weber-Bargioni, Jeff B. Neaton, Stefano Cabrini, P. James Schuck, Lawrence Berkeley National Lab. (USA) . . . [8245-05]

11:20 am: **Noble metal nanoparticles on quartz supports as SERS substrates excited by a diode laser system for SERDS**, Robert Ossig, Kassel (Germany); Yong-Hyok Kwon, Heinz-Detlef Kronfeldt, Technische Univ. Berlin (Germany); Frank Träger, Frank Hubenthal, Univ. Kassel (Germany) [8245-17]

11:40 am: **Putting plasmonic near-field probes in perspective: the case for campanile geometry**, Wei Bao, Univ. of California, Berkeley (USA) and Lawrence Berkeley National Lab. (USA); P. James Schuck, Lawrence Berkeley National Lab. (USA); Miquel B. Salmeron, Univ. of California, Berkeley (USA) and Lawrence Berkeley National Lab. (USA); Alexander Weber-Bargioni, Lawrence Berkeley National Lab. (USA) [8245-07]

Lunch Break 12:00 to 1:15 pm

SESSION 3

Room: 112 (Exhibit Level) Mon. 1:15 to 3:10 pm

Graphene and Carbon Nanotubes

Session Chair: **David B. Geohegan**, Oak Ridge National Lab. (USA)

1:15 pm: **Laser direct writing of micro graphene patterns** (*Invited Paper*), Yongfeng Lu, J. B. Park, Yunshen Zhou, Univ. of Nebraska-Lincoln (USA) [8245-08]

1:50 pm: **In situ optical diagnostics of graphene synthesis**, Alex A. Poretzky, David B. Geohegan, Norbert Thonnard, Jason Readle, Christopher Rouleau, Gyula Eres, Murari Regmi, Gerd Duscher, Mina Yoon, Oak Ridge National Lab. (USA) [8245-09]

2:10 pm: **Laser direct growth of graphene on semiconductor substrate**, Dapeng Wei, Xianfan Xu, Purdue Univ. (USA) [8245-10]

2:30 pm: **Femtosecond laser assisted photobleaching of single-wall carbon nanotubes**, Satoru Shoji, Hideaki Kobayashi, Thomas C. Rodgers, Osaka Univ. (Japan); Satoshi Kawata, Osaka Univ. (Japan) and RIKEN (Japan) . . . [8245-11]

2:50 pm: **Density and orientation control of carbon nanotube synthesis**, Yunhao Cao, Tu Hong, Yaqiong Xu, Vanderbilt Univ. (USA) [8245-12]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 122 (Exhibit Level) Mon. 3:40 to 6:00 pm

Laser Nanoscale Materials Processing and Manufacturing

Joint Session with Conference 8243

Session Chair: **Richard F. Haglund, Jr.**, Vanderbilt Univ. (USA)

3:40 pm: **Surface plasmon-assisted nanolithography with nanometric accuracy** (*Invited Paper*), Kosei Ueno, Hokkaido Univ. (Japan) [8243-15]

4:10 pm: **XPS study of InP/InGaAs/InGaAsP microstructure irradiated by KrF and ArF lasers in different environments**, Neng Liu, Khalid Moumanis, Sonia Blais, Jan J. Dubowski, Univ. de Sherbrooke (Canada) [8245-13]

4:30 pm: **Designed near fields for parallel surface nanostructures**, Frank Hubenthal, Sören Maag, Abdul-Aleem Jamali, Bernd Witzigmann, Frank Träger, Univ. Kassel (Germany) [8245-14]

4:50 pm: **Laser ablation and nano-material fabrication in supercritical fluids** (*Invited Paper*), Ken-ichi Saitow, Hiroshima Univ. (Japan) [8243-16]

5:20 pm: **Dynamics of TiO₂ nanoparticle formation and deposition for nanostructured thin films**, Jason Readle, Alex A. Poretzky, Christopher Rouleau, Oak Ridge National Lab. (USA); Rudresh Ghosh, Rene Lopez, The Univ. of North Carolina at Chapel Hill (USA); Gyula Eres, Murari Regmi, Oak Ridge National Lab. (USA); Gerd Duscher, The Univ. of Tennessee (USA); Mina Yoon, David B. Geohegan, Oak Ridge National Lab. (USA) [8245-15]

5:40 pm: **Template-assisted metal nanoneedle/nanoprotrusion array fabrication at a sub-diffraction-limited scale**, Yuto Tanaka, Keio Univ. (Japan) and Harvard Univ. (USA); Jonathan D. B. Bradley, Eric Mazur, Harvard Univ. (USA); Minoru Obara, Keio Univ. (Japan) [8243-17]

Tuesday 24 January

SESSION 5

Room: 112 (Exhibit Level) Tues. 8:20 to 9:55 am

Nanoparticle Characterization and Biological Applications

Session Chair: Frank Hubenthal, Univ. Kassel (Germany)

8:20 am: **Exploring exciton-plasmon coupling in laser- and electron-beam fabricated nanostructures** (*Invited Paper*), Richard F. Haglund, Jr., Benjamin J. Lawrie, Vanderbilt Univ. (USA); Richard Mu, Fisk Univ. (USA); Kyeong-Won Kim, David P. Norton, Univ. of Florida (USA). [8245-16]

8:55 am: **Characterization of silicon fibrous nanoparticles aggregate structure synthesized using femtosecond laser pulses**, Sivakumar Manickam, Amrita Univ. (India); Krishnan Venkatakrishnan, Tan Bo, Ryerson Univ. (Canada). [8245-18]

9:15 am: **Plasmonic control of far-field interference for regular ripple formation on various material substrates irradiated by femtosecond laser**, Go Obara, Naoki Maeda, Tomoya Miyaniishi, Mitsuhiro Terakawa, Minoru Obara, Keio Univ. (Japan) [8245-19]

9:35 am: **Influence of the growing parameters on the size distribution of PbTe nanoparticles produced by laser ablation under inert gas atmosphere**, Eugenio Rodriguez, Ctr. de Investigación en Ciencia Aplicada y Tecnología Avanzada (Mexico); Diogo B. Almeida, Univ. Estadual de Campinas (Brazil); Said Agouam, Univ. de València (Spain); Ricardo Sis Moreira, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil); Ernesto Jimenez Villar, Univ. de València (Spain); Luiz C. Barbosa, Univ. Estadual de Campinas (Brazil) [8245-20]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

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Femtosecond ablation of aluminum for synthesis of nanoparticles and nanostructures and their optical characterization, Gopala Krishna Podagatlapalli, Hamad Syed, Surya P. Tewari, Soma Venugopal Rao, Univ. of Hyderabad (India) [8245-21]

Direct observation of surface plasmon far field for regular surface ripple formation by femtosecond laser irradiation of silicon wafer, Naoki Maeda, Go Obara, Tomoya Miyaniishi, Keio Univ. (Japan); Nikolay N. Nedyalkov, Institute of Electronics (Bulgaria); Minoru Obara, Keio Univ. (Japan) [8245-22]

Influence of ZnO buffer layer on ZnO nanowire growth by nanoparticle-assisted pulsed laser deposition, Daisuke Nakamura, Kota Okazaki, Iyempermal A. Palani, Kazuki Kubo, Koji Tsuta, Mitsuhiro Higashihata, Tatsuo Okada, Kyushu Univ. (Japan) [8245-23]

Femtosecond laser doped and nanostructured TiO₂ for photocatalysis, Katherine C. Phillips, Elizabeth C. Landis, Cynthia M. Friend, Eric Mazur, Harvard Univ. (USA) [8245-24]

Novel beam splitter for high-order harmonics with WO₃/TiO₂ bilayer grown on c-plane sapphire substrate by sequential surface chemical reactions, Yasutaka Sanjo, Masaki Murata, Hiroshi Kumagai, Osaka City Univ. (Japan); Yasuo Nabekawa, Katsumi Midorikawa, RIKEN (Japan); Masaya Chigane, Osaka Municipal Technical Research Institute (Japan). [8245-25]

Courses of Related Interest

SC689 Precision Laser Micromachining (Schaeffer) Wednesday, 1:30 to 5:30 pm
 SC743 Micromachining with Femtosecond Lasers (Nolte, Schaeffer) Monday, 1:30 to 5:30 pm
 SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
 SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.



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Free-Space Laser Communication Technologies XXIV

Conference Chairs: **Hamid Hemmati**, Jet Propulsion Lab. (USA); **Don M. Boroson**, MIT Lincoln Lab. (USA)

Program Committee: **Vincent W. Chan**, Massachusetts Institute of Technology (USA); **Renny A. Fields**, The Aerospace Corp. (USA); **G. Charmaine Gilbreath**, U.S. Naval Research Lab. (USA); **Michael A. Krainak**, NASA Goddard Space Flight Ctr. (USA); **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 E. Willner**, The Univ. of Southern California (USA); **Shiro Yamakawa**, Japan Aerospace Exploration Agency (Japan)

Tuesday 24 January

SESSION 1

Room: 111 (Exhibit Level) Tues. 1:30 to 3:30 pm

Invited Talks I

Session Chair: **Hamid Hemmati**, Jet Propulsion Lab. (USA)

- 1:30 pm: **Underwater blue-green laser communications in support of undersea dominance** (*Invited Paper*), Greg Mooradian, QinetiQ North America (USA) [8246-01]
- 2:00 pm: **Satellite-based quantum communications** (*Invited Paper*), Richard J. Hughes, Jane E. Nordholt, Los Alamos National Lab. (USA) [8246-02]
- 2:30 pm: **Achievable capacity using photon-counting array-based receivers with on-off-keyed and frequency-shift-keyed modulation formats** (*Invited Paper*), Bryan S. Robinson, Don M. Boroson, MIT Lincoln Lab. (USA) [8246-03]
- 3:00 pm: **On approaching the ultimate limits of communication using a photon-counting detector** (*Invited Paper*), Baris I. Erkmen, Bruce E. Moision, Kevin M. Birnbaum, Samuel J. Dolinar, Jr., Jet Propulsion Lab. (USA) . [8246-04]
- Coffee Break 3:30 to 4:00 pm

SESSION 2

Room: 111 (Exhibit Level) Tues. 4:00 to 5:30 pm

Invited Talks II

Session Chair: **Don M. Boroson**, MIT Lincoln Lab. (USA)

- 4:00 pm: **Low-frequency vibration isolation system for deep space optical communications payload** (*Invited Paper*), Gerardo G. Ortiz, Virginio Sannibale, Jet Propulsion Lab. (USA) [8246-05]
- 4:30 pm: **Current development status of small optical transponder (SOTA) for satellite-ground laser communications** (*Invited Paper*), Yoshihisa Takayama, Morio Toyoshima, Yoshisada Koyama, Hideki Takenaka, Maki Akioka, National Institute of Information and Communications Technology (Japan); Koichi Shiratama, Ichiro Mase, Osamu Kawamoto, NEC TOSHIBA Space Systems, Ltd. (Japan) [8246-06]
- 5:00 pm: **Directly-modulated, high-power semiconductor lasers** (*Invited Paper*), Gary M. Smith, Erik K. Duerr, Andrew M. Siegel, Joseph P. Donnelly, Leo J. Missaggia, Michael K. Connors, Pablo I. Hopman, Andrew K. Stimac, David C. Mathewson, George W. Turner, Paul W. Juodawlkis, MIT Lincoln Lab. (USA) [8246-07]

TECHNICAL EVENT

InterContinental Hotel, Fremont . . Tues. 7:30 to 9:00 pm

Laser Communications

Session Chairs: **Hamid Hemmati**, Jet Propulsion Lab. (USA) and **Don Boroson**, MIT Lincoln Lab. (USA)

This technical event on Laser Communications will hold its informal annual meeting in conjunction with the Free-Space Laser Communication Technologies XXIII conference. All professionals involved in theory and applications of free-space 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 25 January

LASE PLENARY SESSION

Room: 134 (Exhibit Level) . . .Wed. 10:20 am to 12:30 pm

Session Chairs: **Friedhelm Dorsch**, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

- 10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)
- 10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)
- 10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
- 10:35 am: **Impact of Green Technology in Germany**,
Matthias Machnig, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)
- 10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)
- 11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)
- 11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH & Co. KG (Germany)

See page 20 for details.

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 3

Room: 111 (Exhibit Level) Wed. 2:00 to 3:00 pm

Detection, Modulation, and Coding

Session Chair: **Robert Lange**, Tesat-Spacecom GmbH & Co. KG (Germany)

- 2:00 pm: **Limits on achievable dimensional and photon efficiencies with intensity modulation and photon-counting due to non-ideal photon-counter behavior**, Bruce E. Moision, Jet Propulsion Lab. (USA) [8246-08]
- 2:20 pm: **Development and evaluation of a digital signal processing for single polarization QPSK modulation format**, Kazuomi Endo, Yoichi Hashimoto, Kiyoshi Fukuchi, NEC Corp. (Japan) [8246-09]
- 2:40 pm: **Design of encoders and decoders for code/pulse-position-swapping (C/PPS) based on sonar codes**, Antonio J. Mendez, Mendez R&D Associates (USA) [8246-10]
- Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 111 (Exhibit Level) Wed. 3:30 to 5:30 pm

Demonstrations

Session Chair: Hamid Hemmati, Jet Propulsion Lab. (USA)

- 3:30 pm: **Overview and status of the Lunar Laser Communications Demonstration**, Don M. Boroson, Bryan S. Robinson, Dennis A. Burianek, Daniel V. Murphy, MIT Lincoln Lab. (USA) [8246-11]
- 3:50 pm: **Laser communication terminals for the European data relay system**, Robert Lange, Frank F. Heine, Mark Gregory, Hartmut Kaempfer, Tesat-Spacecom GmbH & Co. KG (Germany); Michael Lutzer, Rolf Meyer, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8246-12]
- 4:10 pm: **Free-space quantum cryptography over 144 km towards space applications**, Rupert Ursin, Univ. Wien (Austria) [8246-13]
- 4:30 pm: **10 Gb/s lasercom transceiver for LEO spacecraft**, Joseph M. Kovalik, Hamid Hemmati, Abhijit Biswas, Jet Propulsion Lab. (USA) . . . [8246-14]
- 4:50 pm: **40-Gbit/s optical free space transmission experiment using QPSK modulation format**, Yoichi Hashimoto, NEC Corp. (Japan) [8246-15]
- 5:10 pm: **Long range beam propagation for quantum communications**, Ivan Capraro, Adaptica S.r.l. (Italy); Andrea Tomaello, Alberto Dall'Arche, Francesca Gerlin, Giuseppe Vallone, Paolo Villoresi, Univ. degli Studi di Padova (Italy) [8246-17]

Thursday 26 January

SESSION 5

Room: 111 (Exhibit Level) Thurs. 8:30 to 10:10 am

Lasers

Session Chair: Don M. Boroson, MIT Lincoln Lab. (USA)

- 8:30 am: **All-semiconductor-based narrow linewidth high-power laser system for laser communication applications in space at 1060 nm**, Stefan Spiessberger, Ferdinand-Braun-Institut (Germany); Max Schiemangk, Humboldt-Univ. zu Berlin (Germany); Alexander Sahn, Frank Bugge, Jörg Fricke, Hans Wenzel, Andreas Wicht, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) [8246-18]
- 8:50 am: **-1.5 micron MOPA deep space downlink transmitter**, Donald L. Sipes, Jr., Jason Tafoya, Optical Engines, Inc. (USA) [8246-19]
- 9:10 am: **Short-wavelength (1010-1030-nm) Yb-fiber-MOPA based multi-aperture high-power uplink laser beacons for space communication**, Doruk Engin, Frank Kimpel, Shantanu Gupta, Fibertek, Inc. (USA) [8246-20]
- 9:30 am: **Preliminary results of space grade laser transmitters for optical communications**, Malcolm W. Wright, Jet Propulsion Lab. (USA) [8246-21]
- 9:50 am: **Design of a 40 Watt 1.5 micron uplink transmitter for Lunar Laser Communications**, David O. Caplan, John J. Carney, MIT Lincoln Lab. (USA); Robert E. Lafon, W. M. Keck Observatory (USA); Mark L. Stevens, MIT Lincoln Lab. (USA) [8246-22]
- Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 111 (Exhibit Level) Thurs. 10:40 to 11:40 am

Atmospheric Propagation

Session Chair: Abhijit Biswas, Jet Propulsion Lab. (USA)

- 10:40 am: **Anisoplanatism over horizontal paths: comparison of theoretical and experimental results**, Jeremy P. Bos, Aleksandr V. Sergeev, Michael C. Roggemann, Michigan Technological Univ. (USA) [8246-23]
- 11:00 am: **Mitigation of time-spatial influence in free-space optical networks utilizing route diversity**, Jiri Libich, Stanislav Zvanovec, Czech Technical Univ. in Prague (Czech Republic) [8246-24]
- 11:20 am: **Cloud attenuation models and availability of optical ground-space links**, Nicolas Perlot, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Josep Maria Perdiques Armengol, ESA-ESTEC (Netherlands) [8246-25]
- Lunch/Exhibition Break 11:40 am to 1:10 pm

SESSION 7

Room: 111 (Exhibit Level) Thurs. 1:10 to 2:50 pm

Detectors/Optics/Ranging

Session Chair: Joseph M. Kovalik, Jet Propulsion Lab. (USA)

- 1:10 pm: **Initial performance of the LLCD superconducting nanowire array receiver**, Eric A. Dauler, Danna Rosenberg, Richard J. Molnar, Jung U. Yoon, Matthew E. Grein, MIT Lincoln Lab. (USA) [8246-26]
- 1:30 pm: **Superconducting nanowire arrays for multi-meter free space optical communications receivers**, William H. Farr, Jeffrey Stern, Jet Propulsion Lab. (USA) [8246-27]
- 1:50 pm: **Optimum beam setting for near-field free-space optical communication system with bidirectional beacon tracking**, Yoshinori Arimoto, National Institute of Information and Communications Technology (Japan) [8246-28]
- 2:10 pm: **Conical refraction multiplexing for free space optical communications**, Yurii V. Loiko, Kenzi Aradj, Alex Turpin, Todor K. Kalkandjiev, Jordi Mompert, Univ. Autònoma de Barcelona (Spain) [8246-29]
- 2:30 pm: **The Lunar Laser Communications Demonstration time-of-flight system**, Bryan S. Robinson, Don M. Boroson, Mark L. Stevens, Joseph A. Greco, Matthew M. Willis, Barry R. Romkey, Jan E. Kansky, Jeffrey Matthews, Steven Constantine, Hemonth G. Rao, MIT Lincoln Lab. (USA) [8246-30]
- Coffee Break 2:50 to 3:20 pm

SESSION 8

Room: 111 (Exhibit Level) Thurs. 3:20 to 4:40 pm

Analysis and Testing

Session Chair: Yoshihisa Takayama, National Institute of Information and Communications Technology (Japan)

- 3:20 pm: **Throughput maximization of optical LEO-ground links**, Nicolas Perlot, Tomaso de Cola, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8246-31]
- 3:40 pm: **Evaluation of deep-space laser communication under different mission scenarios**, Abhijit Biswas, Sabino Piazzolla, Bruce E. Moision, P. Douglas Lisman, Jet Propulsion Lab. (USA) [8246-32]
- 4:00 pm: **Simulation of a deep space optical transceiver**, Joel F. Shields, Martin Regehr, Abhijit Biswas, Jet Propulsion Lab. (USA) [8246-33]
- 4:20 pm: **Radiation hardening techniques for rare-earth-based optical fibers and amplifiers**, Sylvain Girard, Commissariat à l'Énergie Atomique (France); Marilena Vivona, Univ. Jean Monnet Saint-Etienne (France); Luciano Mescia, Politecnico di Bari (Italy); Arnaud Laurent, ixFiber SAS (France); Youcef Ouerdane, Univ. Jean Monnet Saint-Etienne (France); Claude Marcandella, Commissariat à l'Énergie Atomique (France); Francesco Prudeniano, Politecnico di Bari (Italy); Aziz Boukenter, Univ. Jean Monnet Saint-Etienne (France); Thierry Robin, Benoit Cadier, ixFiber SAS (France); Marco Cannas, Univ. degli studi di Palermo (Italy) [8246-34]

Courses of Related Interest

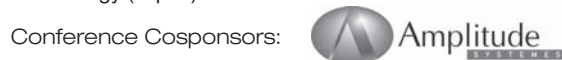
- SC188 Laser Beam Propagation for Applications in Laser Communications, Laser Radar, and Active Imaging (Phillips, Andrews) Wednesday, 8:30 am to 5:30 pm
- SC931 Applied Nonlinear Frequency Conversion (Paschotta) Monday, 8:30 am to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) Tuesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XII

Conference Chairs: **Alexander Heisterkamp**, Friedrich-Schiller-Univ. Jena (Germany); **Michel Meunier**, Ecole Polytechnique de Montréal (Canada); **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

Program Committee: **Craig B. Arnold**, Princeton Univ. (USA); **James E. Carey III**, SiOnyx Inc. (USA); **Xun Gu**, Max-Planck-Institut für Quantenoptik (Germany); **Denise M. Krol**, Univ. of California, Davis (USA); **Eric Mazur**, Harvard Univ. (USA); **Michael M. Mielke**, Raydiance, Inc. (USA); **Eric Mottay**, Amplitude Systemes (France); **Christopher B. Schaffer**, Cornell Univ. (USA); **Alexander Szameit**, Technion-Israel Institute of Technology (Israel); **Alfred Vogel**, Univ. zu Lübeck (Germany); **Wataru Watanabe**, National Institute of Advanced Industrial Science and Technology (Japan)



Sunday 22 January

SESSION 1

Room: 111 (Exhibit Level) Sun. 8:30 to 10:10 am

Cell Manipulation and Optoporation Using Nano- and Microparticles

Session Chair: **Alexander Heisterkamp**, Friedrich-Schiller-Univ. Jena (Germany)

8:30 am: **Biodegradable microsphere mediated cell perforation using femtosecond laser pulse**, Mitsuhiro Terakawa, Tatsuki Mitsuhashi, Keio Univ. (Japan) [8247-01]

8:50 am: **Basic mechanisms of out of resonance plasmonic enhanced laser (ORPEL) nanocavitation in water**, Michel Meunier, Étienne Boulais, Rémi Lachaine, Ecole Polytechnique de Montréal (Canada) [8247-02]

9:10 am: **Novel large-scale plasmon-based cell transfection**, Oliver Hauser, Valeria Nuzzo, Harvard Univ. (USA); Rémi Lachaine, Ecole Polytechnique de Montréal (Canada); Paul Peng, Harvard Univ. (USA); Eric D. Diebold, Univ. of California, Los Angeles (USA); Michel Meunier, Ecole Polytechnique de Montréal (Canada); Eric Mazur, Harvard Univ. (USA) [8247-03]

9:30 am: **Cancer cell manipulation using femtosecond pulses and gold nanoparticles**, Dvir Yelin, Limor Minai, Daniella Yeheskely-Hayon, Lior Golan, Gili Bisker, Technion-Israel Institute of Technology (Israel) [8247-04]

9:50 am: **Nano particles insertion into individual mammalian cells using optical tweezers**, Muhammad Waleed, Jung-Dae Kim, Yong-Gu Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [8247-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 111 (Exhibit Level) Sun. 10:40 am to 12:10 pm

Laser Fabrication of Scaffolds and Artificial Biostructures

Session Chair: **Michel Meunier**, Ecole Polytechnique de Montréal (Canada)

10:40 am: **Towards designer extracellular matrices (Invited Paper)**, Georg von Freymann, Univ. of Kaiserslautern (Germany); Franziska Klein, Benjamin Richter, Thomas Striebel, Clemens M. Franz, Martin Wegener, Martin Bastmeyer, Karlsruher Institut für Technologie (Germany) [8247-06]

11:10 am: **Femtosecond laser two-photon polymerization of three-dimensional scaffolds for tissue engineering and regenerative medicine applications**, Veronica Aprile, Shane M. Eaton, Matteo Laganà, Giulio Cerullo, Manuela T. Raimondi, Roberto Osellame, Politecnico di Milano (Italy) [8247-07]

11:30 am: **Femtosecond laser micropatterned polypyrrole artificial muscle actuators with enhanced electrochemical strain response**, Kenneth K. C. Lee, Univ. of Toronto (Canada) and Ryerson Univ. (Canada); Lucy Li, John D. W. Madden, The Univ. of British Columbia (Canada); Peter R. Herman, Univ. of Toronto (Canada); Victor X. D. Yang, Ryerson Univ. (Canada) [8247-08]

11:50 am: **Laser microfabrication of polymer implants for stem cell growth and cardiovascular surgery**, Mangirdas Malinauskas, Sima Reškėyte, Paulius Danilevicius, Evaldas Balciunas, Vytautas Purlys, Roaldas Gadonas, Vilnius Univ. (Lithuania) [8247-09]

Lunch/BiOS Exhibition Break 12:10 to 2:00 pm

SESSION 3

Room: 111 (Exhibit Level) Sun. 2:00 to 3:10 pm

Nonlinear Laser Surgery and Imaging

Session Chair: **Georg von Freymann**, Nanoscribe GmbH (Germany)

2:00 pm: **Prospects for automated dissection and surgery with amplified ultrashort pulses of laser light (Invited Paper)**, David Kleinfeld, Univ. of California, San Diego (USA) [8247-10]

2:30 pm: **Microchip laser technology for precise and fast creation of Lasik flaps**, Norbert Linz, Sebastian Freidank, Sebastian Eckert, Univ. zu Lübeck (Germany); Kerstin Schlott, Medizinisches Laserzentrum Lübeck GmbH (Germany); Sebastian Faust, Stefan Schwed, SCHWIND eye-tech-solutions GmbH & Co. KG (Germany); Alfred Vogel, Univ. zu Lübeck (Germany) [8247-11]

2:50 pm: **Neuronal rat cell imaging using supercontinuum source**, Stefano Taccheo, Swansea Univ. (United Kingdom); Silvia Soria, Istituto di Fisica Applicata Nello Carrara (Italy); Cosimo D'Andrea, Politecnico di Milano (Italy); Kay Schuster, Institut für Photonische Technologien e.V. (Germany); Franco Quercioli, Istituto Nazionale di Ottica (Italy) [8247-12]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 111 (Exhibit Level) Sun. 3:40 to 4:40 pm

Ultrashort Laser Systems for Biomedical

Session Chair: **David Kleinfeld**, Univ. of California, San Diego (USA)

3:40 pm: **Octave spanning Ti:sapphire laser for cost effective multimodal CARS/OCT**, Angelika Unterhuber, Boris Považay, Medizinische Univ. Wien (Austria); Tuan Le, FEMTOLASERS Produktions GmbH (Austria); Tschackad Kamali, Bernd Hofer, Medizinische Univ. Wien (Austria); Andreas Stingl, FEMTOLASERS Produktions GmbH (Austria); Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8247-13]

4:00 pm: **Alignment and maintenance free all-fiber laser sources for CARS microscopy based on frequency conversion by four-wave mixing**, Martin Baumgartl, Mario Chemnitz, Friedrich-Schiller-Univ. Jena (Germany); Tobias Meyer, Jürgen Popp, Institut für Photonische Technologien e.V. (Germany); Thomas Gottschall, Cesar Jauregui, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8247-14]

4:20 pm: **Low noise laser system generating 27-fs pulse duration, 30-kW peak power, and tunability from 850 to 1250 nm for ultrafast spectroscopy and multiphoton microscopy**, Bojan Resan, Felix Brunner, Andreas Rohrbacher, Hubert Ammann, Kurt J. Weingarten, Time-Bandwidth Products AG (Switzerland) [8247-15]

Monday 23 January

SESSION 5

Room: 111 (Exhibit Level) Mon. 8:40 to 10:00 am

Ultrafast Laser Systems and Measurements

Session Chair: Michael M. Mielke, Raydiance, Inc. (USA)

8:40 am: **High Q laser femtoREGEN UC 8W for industrial micro-processing applications**, Victor V. Matylytsky, Juerg Aus-der-Au, Heinz Huber, High Q Laser Innovation GmbH (Austria) [8247-16]

9:00 am: **Sub-picosecond laser amplifier with >1-mJ pulse energy and 33-W average power**, Martin Delaigue, Sandrine Ricaud, Clemens Hönninger, Eric Mottay, Amplitude Systemes (France) [8247-17]

9:20 am: **Measuring two ultrashort pulses simultaneously using a single device and on a single shot**, Tsz Chun Wong, Justin Ratner, Peter M. Vaughan, Vikrant Chauhan, Rick Trebino, Georgia Institute of Technology (USA) [8247-18]

9:40 am: **Pulse repetition interval-based excess fraction method for an arbitrary and absolute distance measurement using a femtosecond optical frequency comb**, Dong Wei, Kiyoshi Takamasu, Hirokazu Matsumoto, The Univ. of Tokyo (Japan) [8247-19]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 111 (Exhibit Level) Mon. 10:30 am to 12:20 pm

Processing of Transparent Materials I

Session Chair: Denise M. Krol, Univ. of California, Davis (USA)

10:30 am: **Femtosecond laser waveguide writing for integrated quantum optics (Invited Paper)**, Andrea Crespi, Politecnico di Milano (Italy); Linda Sansoni, Giuseppe Vallone, Fabio Sciarrino, Univ. degli Studi di Roma La Sapienza (Italy); Roberta Ramponi, Politecnico di Milano (Italy); Paolo Mataloni, Univ. degli Studi di Roma La Sapienza (Italy); Roberto Osellame, Politecnico di Milano (Italy) [8247-20]

11:00 am: **Femtosecond laser writing of polarization devices for optical circuits in glass**, Luis A. N. P. Fernandes, Univ. of Toronto (Canada) and INESC Porto (Portugal); Jason R. Grenier, Peter R. Herman, J. Stewart Aitchison, Univ. of Toronto (Canada); Paulo V. S. Marques, INESC Porto (Portugal) [8247-21]

11:20 am: **Enhanced formation of nanogratings inside fused silica due to the generation of self-trapped excitons induced by femtosecond laser pulses**, Sören Richter, Fei Jia, Matthias Heinrich, Sven Döring, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8247-22]

11:40 am: **Bragg grating stopbands from nanogratings generated during femtosecond laser writing of optical waveguides**, Jianzhao Li, Moez Haque, Stephen Ho, Peter R. Herman, Univ. of Toronto (Canada) [8247-23]

12:00 pm: **Femtosecond laser processing of hybrid micro- and nano-structures in silicate glasses**, Pavel Mardilovich, Neil Troy, Luke B. Fletcher, Univ. of California, Davis (USA); Lihmei Yang, Huan Huang, PolarOnyx, Inc. (USA); Subhash H. Risbud, Denise M. Krol, Univ. of California, Davis (USA) [8247-24]

Lunch Break 12:20 to 1:40 pm

SESSION 7

Room: 111 (Exhibit Level) Mon. 1:40 to 3:30 pm

Processing of Transparent Materials II

Session Chair: Craig B. Arnold, Princeton Univ. (USA)

1:40 pm: **Formation dynamics of femtosecond laser-induced phase objects in transparent materials (Invited Paper)**, Alexandre Mermillod-Blondin, Arkadi Rosenfeld, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Razvan Stoian, Eric Audouard, Lab. Hubert Curien (France) [8247-25]

2:10 pm: **Quantitative measurements of the densification observed in fused silica specimens exposed to low-energy femtosecond laser pulses**, Audrey Champion, Yves Bellouard, Technische Univ. Eindhoven (Netherlands) [8247-26]

2:30 pm: **Long term reliability prediction of fluorescent silver nanoclusters embedded in glass for perennial optical recording**, Arnaud Royon, Gautier Papon, Kevin Bourhis, Yannick Petit, Thierry Cardinal, Yannick Deshayes, Lionel S. Canioni, Univ. Bordeaux 1 (France) [8247-27]

2:50 pm: **On the role of the scanning line density on the etching of fused silica specimens exposed to femtosecond lasers pulses**, Yves Bellouard, Technische Univ. Eindhoven (Netherlands); Ali A. Said, Mark A. Dugan, Philippe Bado, Translume, Inc. (USA) [8247-28]

3:10 pm: **Structural modification in Er-Yb doped zinc phosphate glasses with megahertz repetition rate femtosecond pulses**, Neil Troy, Luke B. Fletcher, Univ. of California, Davis (USA); Signo T. Reis, Richard K. Brow, Missouri Univ. of Science and Technology (USA); Huan Huang, Lihmei Yang, Jian Liu, PolarOnyx, Inc. (USA); Denise M. Krol, Univ. of California, Davis (USA) [8247-29]

Coffee Break 3:30 to 4:00 pm

SESSION 8

Room: 111 (Exhibit Level) Mon. 4:00 to 5:50 pm

Processing of Transparent Materials III

Session Chair: Alexandre Mermillod-Blondin, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany)

4:00 pm: **Present status and trend of femtosecond laser processing in display industry of Korea (Invited Paper)**, Sung-Hak Cho, Korea Institute of Machinery & Materials (Korea, Republic of) [8247-30]

4:30 pm: **Femtosecond direct writing of lab-on-a-fiber optofluidic sensors**, Moez Haque, Jason R. Grenier, Stephen Ho, Univ. of Toronto (Canada); Luis A. N. P. Fernandes, Univ. do Porto (Portugal) and Univ. of Toronto (Canada); Peter R. Herman, Univ. of Toronto (Canada) [8247-31]

4:50 pm: **Rapid prototyping of biocompatible sensor chips by picoseconds laser structuring of a platinum/ tantalum pentoxide thin film layer system**, Gerhard Heise, Daniel Trappendreher, Hochschule München für Angewandte Wissenschaften (Germany); Florian Ilchmann, Robin S. Weiss, Bernhard Wolf, Technische Univ. München (Germany); Heinz P. Huber, Hochschule München für Angewandte Wissenschaften (Germany) [8247-32]

5:10 pm: **Femtosecond laser fabrication of optical sensing devices in the cladding of optical fibers**, Jason R. Grenier, Univ. of Toronto (Canada); Luis A. N. P. Fernandes, Univ. do Porto (Portugal) and Univ. of Toronto (Canada); J. Stewart Aitchison, Univ. of Toronto (Canada); Paulo V. S. Marques, Univ. do Porto (Portugal); Peter R. Herman, Univ. of Toronto (Canada) [8247-33]

5:30 pm: **Mechanism of selective removal of transparent layers on semiconductors using ultrashort laser pulses**, Tino Rublack, Stefan Hartnauer, Markus Muchow, Michael Mergner, Gerhard Seifert, Martin-Luther-Univ. Halle-Wittenberg (Germany) [8247-34]

Tuesday 24 January

SESSION 9

Room: 122 (Exhibit Level) Tues. 8:20 to 10:10 am

Ultrafast Laser 3D-Fabrication

Joint Session with Conference 8243

Session Chairs: Yoshiki Nakata, Osaka Univ. (Japan);
Beat Neuenschwander, Berner Fachhochschule Technik und
Informatik (Switzerland)

8:20 am: **Applications of picosecond laser and pulse-burst in precision manufacturing (Invited Paper)**, Ralf Knappe, LUMERA LASER GmbH (Germany) [8243-18]

8:50 am: **High sensitive concentration analysis of biochemical liquids using a microfluidic chip fabricated by femtosecond laser**, Yasutaka Hanada, Koji Sugioka, Katsumi Midorikawa, RIKEN (Japan) [8243-19]

9:10 am: **Ultrahigh precision surface structuring by synchronizing a galvo scanner with an ultrashort pulsed laser system in MOPA arrangement**, Beat Jaeggi, Beat Neuenschwander, Urs Hunziker, Thomas Meier, Markus Zimmermann, Karl-Heinz Selbmann, Ivan Gut, Berner Fachhochschule Technik und Informatik (Switzerland); Guido Hennig, Daetwyler Graphics AG (Switzerland) [8243-20]

9:30 am: **Three-dimensional silver nanostructure fabrication through multiphoton photoreduction**, Kevin Vora, Seung-Yeon Kang, Shobha Shukla, Eric Mazur, Harvard Univ. (USA) [8247-35]

9:50 am: **Material specific effects and limitations during ps-laser generation of micro structures**, Jens Hildenhagen, Klaus Dickmann, Uli Engelhardt, Marco Smarra, Fachhochschule Münster (Germany) [8247-36]

Coffee Break 10:10 to 10:40 am

Conference 8247 · Room: 122 (Exhibit Level)

SESSION 10

Room: 122 (Exhibit Level) Tues. 10:40 am to 12:10 pm

Ultrafast Laser-induced Modification of Glasses or Transparent Materials

Joint Session with Conference 8243

Session Chair: Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)

10:40 am: **Laser processing with ultrashort vortex pulses** (*Invited Paper*), Cyril Hnatovsky, Vladlen G. Shvedov, Wieslaw Z. Krolkowski, Andrei V. Rode, The Australian National Univ. (Australia) [8243-22]

11:10 am: **Machining of glass and quartz using nanosecond and picosecond laser pulses**, David Ashkenazi, Tristan Kaszemeikat, Norbert Mueller, Andreas Lemke, Laser- und Medizin-Technologie GmbH, Berlin (Germany); Hans Joachim Eichler, Technische Univ. Berlin (Germany) . [8243-23]

11:30 am: **Water assisted microhole drilling in fused silica using burst-train femtosecond laser pulses**, Takayuki Tamaki, Nara National College of Technology (Japan); Saeid Rezaei, Jianzhao Li, Peter R. Herman, Univ. of Toronto (Canada) [8247-37]

11:50 am: **Fabrication of photo-induced microstructure embedded inside ZnO crystal**, Yuichiro Ishikawa, Yasuhiko Shimotsuma, Akio Kaneta, Masaaki Sakakura, Masayuki Nishi, Kiyotaka Miura, Kazuyuki Hirao, Yoichi Kawakami, Kyoto Univ. (Japan) [8243-24]

Lunch/Exhibition Break 12:10 to 1:20 pm

SESSION 11

Room: 122 (Exhibit Level) Tues. 1:20 to 3:00 pm

Ultrafast Laser Surface Processing

Joint Session with Conference 8243

Session Chairs: Beat Neuenschwander, Berner Fachhochschule Technik und Informatik (Switzerland); **Yoshiki Nakata**, Osaka Univ. (Japan)

1:20 pm: **Comparison of picosecond and femtosecond laser ablation for surface engraving of metals and semiconductor**, John Lopez, Rémi Torres, Anne Lidolf, Charly Loumena, ALPhANOV (France); Martin Delaigüe, Clemens Hönninger, Eric Mottay, Sylvain Ricaud, Amplitude Systemes (France) . [8243-25]

1:40 pm: **Correlating texturing, milling, and scribing of ceramics and metals using ns and fs pulsed fiber lasers**, Sami T. Hendow, Multiwave Photonics (USA); Arzu M. Ozkan, Lumyn Technologies LLC (USA); Eric P. Mottay, Amplitude Systemes (France) [8243-26]

2:00 pm: **Sub-wavelength multi-period ripple phenomena on stainless steel irradiated with high repetition rate femtosecond laser pulses**, Ladan E. Abolghasemi, Univ. of Toronto (Canada); Abbas Hosseini, FiLaser Inc. (Canada); Peter R. Herman, Univ. of Toronto (Canada) [8247-38]

2:20 pm: **Structural changes of copper induced by high repetition rate femtosecond laser pulses**, Stéphane Valette, David Bruneel, Ecole Centrale de Lyon (France); Eric Audouard, Univ. Jean Monnet Saint-Etienne (France); Ronan Le Harzic, Fraunhofer-Institut für Biomedizinische Technik (Germany); Stéphane Benayoun, Ecole Centrale de Lyon (France) [8247-39]

2:40 pm: **Femtosecond-laser-induced nanowires with very high aspect ratios at the surface fused silica**, Arnaud Royon, Gautier Papon, Mathieu Dumergue, Jean-Christophe Delagnes, Kevin Bourhis, Yannick Petit, Thierry Cardinal, Yannick Deshayes, Lionel S. Canioni, Univ. Bordeaux 1 (France) [8247-40]

Coffee Break 3:00 to 3:30 pm

SESSION 12

Room: 122 (Exhibit Level) Tues. 3:30 to 5:40 pm

Fundamentals and Diagnostics in Ultrafast Laser Processing

Joint Session with Conference 8243

Session Chair: Michel Meunier, Ecole Polytechnique de Montréal (Canada)

3:30 pm: **Probing ultrafast laser-matter interactions with fs x-rays** (*Invited Paper*), Klaus Sokolowski-Tinten, Univ. Duisburg-Essen (Germany) . . . [8243-27]

4:00 pm: **In and out of resonance plasmonics enhanced ultrafast laser nanoablation of surfaces**, Alexandre Robitaille, Étienne Boulais, Michel Meunier, Ecole Polytechnique de Montréal (Canada) [8247-41]

4:20 pm: **Raman spectroscopy as a diagnostic means of sapphire dicing using ultrashort pulsed lasers**, Jiyeon Choi, Dongsig Shin, Yongkwon Cho, Jeong Suh, Korea Institute of Machinery & Materials (Korea, Republic of) [8243-28]

4:40 pm: **Influence of pulse duration on the hole formation during short and ultrashort pulse laser deep drilling**, Sven Doering, Soeren Richter, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tuennermann, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) [8247-42]

5:00 pm: **Direct investigation of the ablation rate evolution during laser drilling of high aspect ratio micro-holes**, Francesco P. Mezzapesa, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy); Teresa Sibillano, Lorenzo L. Columbo, CNR-IFN UOS Bari (Italy); Francesca Di Niso, Univ. degli Studi di Bari (Italy); Antonio Ancona, CNR-IFN UOS Bari (Italy); Maurizio Dabbicco, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy); Francesco De Lucia, Univ. degli Studi di Bari (Italy); Pietro M. Lugarà, Gaetano Scamarcio, Univ. degli Studi di Bari (Italy) and CNR-IFN UOS Bari (Italy) [8243-29]

5:20 pm: **Real-time automatic depth control of laser processing at kilohertz rates**, Paul J. Webster, Kevin D. Mortimer, Joe X. Z. Yu, James M. Fraser, Queen's Univ. (Canada) [8243-30]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Supercontinuum emission from water using fs pulses in the external tight focusing limit, Sreeja S. Pillai, Soma Venugopal Rao, Univ. of Hyderabad (India); Padmanabhan Radhakrishnan, Cochin Univ. of Science & Technology (India); Surya P. Tewari, Prem Kiran Paturi, Univ. of Hyderabad (India) . [8247-45]

Increase the wettability of fused silica glass surface by femtosecond laser induced micro/nano-structuring, Md. S. Ahsan, KAIST (Korea, Republic of) and Khulna Univ. (Bangladesh); Yeong Gyu Kim, KAIST (Korea, Republic of); Hitoshi Sekita, Tetsumi Sumiyoshi, Cyber Laser Inc. (Japan); Man Seop Lee, KAIST (Korea, Republic of) [8247-46]

Compact laser pulser for TOF SPAD rangefinder application, Lauri W. Hallman, Univ. of Oulu (Finland); Boris S. Ryvkin, Ioffe Physico-Technical Institute (Russian Federation); Tomi Leinonen, Kimmo Haring, Tampere Univ. of Technology (Finland); Juha T. Kostamovaara, Univ. of Oulu (Finland) . [8247-47]

Combined time-resolved GASMAS spectroscopy for the nondestructive optical characterization of wood: application to the study of archeological Swedish ships, Ilaria Bargigia, Politecnico di Milano (Italy); Patrik Lundin, Lund Univ. (Sweden); Andrea Farina, Austin Nevin, Cosimo D'Andrea, Politecnico di Milano (Italy); Marco Orlandi, Univ. degli Studi di Milano-Bicocca (Italy); Marcus Karlsson, Stefan Andersson-Engels, Gabriel Somesfalean, Lund Univ. (Sweden); Antonio Pifferi, Politecnico di Milano (Italy); Sune Svanberg, Lund Univ. (Sweden); Rinaldo Cubeddu, Politecnico di Milano (Italy) [8247-48]

Directly diode-pumped femtosecond laser based on an Yb:KYW crystal, Guang-Hoon Kim, Juhee Yang, Uk-Song Kang, Andrey Kulik, Elena G. Sall, Sergey Chizhov, Korea Electrotechnology Research Institute (Korea, Republic of) [8247-49]

Development of an automatics joint-area-measurement system after ultrafast laser microwelding, Yuta Nonogaki, Kohei Okusu, Takayuki Tamaki, Nara National College of Technology (Japan) [8247-50]

Wednesday 25 January

STUDENT COMPETITION

Room: 111 (Exhibit Level) Wed. 8:00 to 9:00 am

Session Chairs: **Alexander Heisterkamp**, Laser Zentrum Hannover e.V. (Germany); **Michel Meunier**, Ecole Polytechnique de Montréal (Canada); **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

Papers submitted to this conference by graduate and undergraduate students are eligible (both poster and oral papers considered). 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 students will present a brief **5-minute summary** of their original talk or poster presented at the conference.

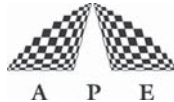
Following the student competition, the judges will meet and decide on the winner. The winner and runner-up will be announced at 9:30 am and awarded a cash prize.

Break for Judging · 9:00 to 9:30 am

Award Ceremony Wed. 9:30 to 9:50 am

Session Chairs: **Alexander Heisterkamp**, Laser Zentrum Hannover e.V. (Germany); **Michel Meunier**, Ecole Polytechnique de Montréal (Canada); **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

Award Sponsors



Coffee Break 9:50 to 10:20 am

LASE PLENARY SESSION

Room: 134 (Exhibit Level) . . . Wed. 10:20 am to 12:30 pm

Session Chairs: **Friedhelm Dorsch**, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)

- 10:20 am: **Welcome and Opening Remarks**
Friedhelm Dorsch, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA)
- 10:25 am: **Presentation of the SPIE Technology Achievement Award to James J. Coleman**
Katarina Svanberg, Lund Univ. Hospital (Sweden)
- 10:30 am: **Announcement of the Green Photonics Award**
Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
- 10:35 am: **Impact of Green Technology in Germany**,
Matthias Machnig, Minister of Economy, Labour and Technology, German Federal State Thüringen (Germany)
- 10:45 am: **Plasmonics for Beam Shaping and Wavefront Engineering**
Federico Capasso, Harvard Univ. (USA)
- 11:20 am: **The National Ignition Facility and Progress Towards Inertial Fusion Ignition**
Edward I. Moses, Lawrence Livermore National Lab. (USA)
- 11:55 am: **Successful Technology Approach for Lasers in Manufacturing**
Peter Leibinger, TRUMPF GmbH & Co. KG (Germany)

See page 20 for details.

Courses of Related Interest

- SC746 Introduction to Ultrafast Technology (Trebino) Tuesday, 1:30 to 5:30 pm
- SC1053 Ultrafast Laser Pulse Shaping and Adaptive Pulse Compression (Dantus) Tuesday, 1:30 to 5:30 pm
- SC744 Ultrafast Fiber Lasers (Fermann) Sunday, 1:30 to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

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MOEMS- MEMS

SPIE Photonics West

Conferences and Courses: 21–26 January 2012

Photonics West Exhibition: 24–26 January 2012

BIOS EXPO: 21–22 January 2012

The Moscone Center | San Francisco, California, USA

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Fraunhofer Institute for
Photonic Microsystems
(Germany)

Symposium Cochair



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Revoltech Microsystems (USA)

MOEMS-MEMS Steering Committee Chair



Rajeshuni Ramesham

Jet Propulsion Lab. (USA)

Micro/Nanofabrication

- 8248 **Micromachining and Microfabrication Process Technology XVII** (Maher/Resnick)212
- 8249 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics V** (Schoenfeld/Rumpf/von Freymann) 213
- 8243 **Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XVII** (Hennig/Xu/Gu/Nakata)196
- 8244 **Laser-based Micro- and Nanopackaging and Assembly VI** (Bachmann/Pfleging/Washio)200

Devices/Applications/ Reliability

- 8250 **Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices XI** (García-Blanco/Ramesham)216
- 8251 **Microfluidics, BioMEMS, and Medical Microsystems X** (Becker)218
- 8252 **MOEMS and Miniaturized Systems XI** (Schenk/Piyawattanametha/Noell)220
- 8253 **MEMS Adaptive Optics VI** (Olivier/Bifano/Kubby)222
- 8254 **Emerging Digital Micromirror Device Based Systems and Applications IV** (Douglass/Oden)224

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- Winston V. Schoenfeld**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)
- Georg von Freymann**, Technische Univ. Kaiserslautern (Germany)

MOEMS-MEMS Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
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Micro/Nanofabrication

8248 **Micromachining and Microfabrication Process Technology XVII** *(Maher, Resnick)* p. 212

8249 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics V** *(Schoenfeld, Rumpf, von Freymann)* p. 213

8243 **Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XVII** *(Hennig, Xu, Gu, Nakata)* p. 196

8244 **Laser-based Micro- and Nanopackaging and Assembly VI** *(Bachmann, Pfleging, Washio)* p. 200

Devices/Applications/Reliability

8250 **Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices XI** *(García-Blanco, Ramesham)* p. 216

8251 **Microfluidics, BioMEMS, and Medical Microsystems X** *(Becker)* p. 218

8252 **MOEMS and Miniaturized Systems XI** *(Schenk, Piyawattanametha, Noell)* p. 220

8253 **MEMS Adaptive Optics VI** *(Olivier, Bifano, Kubby)* p. 222

8254 **Emerging Digital Micromirror Device Based Systems and Applications IV** *(Douglass, Oden)* p. 224

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Micromachining and Microfabrication Process Technology XVII

Conference Chairs: **Mary Ann Maher**, SoftMEMS (USA); **Paul J. Resnick**, Sandia National Labs. (USA)

Program Committee: **Mu Chiao**, The Univ. of British Columbia (Canada); **Sanjay Krishna**, The Univ. of New Mexico (USA); **Tamal Mukherjee**, Carnegie Mellon Univ. (USA); **Metin Ozen**, Ozen Engineering, Inc. (USA); **Yu-Chuan Su**, National Tsing Hua Univ. (Taiwan); **T. C. Yih**, Oakland Univ. (USA)

Tuesday 24 January

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Resolution enhancement of EHD printing using hole-type electrode, Seungmi Lee, Jaewon Chung, Korea Univ. (Korea, Republic of) [8248-18]

Laser-based microstructuring of material surfaces using low-cost microlens arrays, Daniel Nieto, CIDETEC (Spain) and National Univ. of Ireland Galway (Ireland) and Univ. de Santiago de Compostela (Spain); Gemma Vara, Jose Antonio Diez, CIDETEC (Spain); Gerard M. O'Connor, National Univ. of Ireland Galway (Ireland); Justo Arines, Carlos Gomez-Reino, M. Teresa Flores-Arias, Univ. de Santiago de Compostela (Spain) [8248-19]

Thermopower of various phases and states of Si at high pressure, Vladimir V. Shchennikov, Institute of Metal Physics (Russian Federation); Vsevolod Shchennikov, Jr., Institute of Engineering Sciences (Russian Federation); Sergey Streltsov, Igor Korobeynikov, Institute of Metal Physics (Russian Federation); Sergey Ovsyannikov, Univ. Bayreuth (Germany). [8248-20]

Thursday 26 January

SESSION 1

Room: 274 (Mezzanine). Thurs. 8:40 to 10:00 am

Devices and Applications

Session Chair: **Mary Ann Maher**, SoftMEMS (USA)

8:40 am: **Optically transparent, flexible pressure sensor array micromachined utilizing plasma assisted bonding**, John Yan, Univ. of California, Davis (USA) [8248-01]

9:00 am: **Rotary MEMS comb-drive actuator with large deflection for photonic applications**, Quamrul Huda, Fahim Amin, Univ. of Alberta (Canada); Yuebin Ning, Graham McKinnon, Norcada Inc. (Canada); Alexandre Lytkine, John Tulip, Wolfgang Jaeger, Univ. of Alberta (Canada) [8248-02]

9:20 am: **A photovoltaic retinal prosthesis for restoring sight to the blind: fabrication and optoelectronic performance**, Lele Wang, Stanford Univ. (USA); Keith Mathieson, Stanford Univ. (USA) and Univ of California, Santa Cruz (USA); Theodore Kamins, James Loudin, Ludwig Galambos, James Harris, Daniel Palanker, Stanford Univ. (USA) [8248-03]

9:40 am: **Micromachined edge illuminated optically transparent automotive light guide panels**, Rahima Afrose Ronny, George K. Knopf, The Univ. of Western Ontario (Canada); Evgueni V. Bordatchev, Mohammed Tauhiduzzaman, Suwas Nikumb, National Research Council Canada (Canada). [8248-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 274 (Mezzanine). Thurs. 10:30 to 11:50 am

Microstructure Engineering

Session Chair: **Paul J. Resnick**, Sandia National Labs. (USA)

10:30 am: **Fabrication of micro structures with continuous surface profiles and very large sag heights by laser lithography**, Jens Dunkel, Frank Wippermann, Andreas Bräuer, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany). [8248-06]

10:50 am: **Design of experiment for the optimisation of deep reactive ion etching of silicon inserts for micro-fabrication**, Kirsty Wallis, Jeffrey R. Alcock, Christopher Shaw, Cranfield Univ. (United Kingdom) [8248-07]

11:10 am: **Impact of initial micro-geometry on the final roughness of laser micro-polished surfaces**, Michael Chow, The Univ. of Western Ontario (Canada); Evgueni V. Bordatchev, National Research Council Canada (Canada); George K. Knopf, The Univ. of Western Ontario (Canada) [8248-08]

11:30 am: **Sidewall roughness reduction techniques for MOEMS following DRIE**, Dmitry A. Kozak, Univ. of California, Santa Cruz (USA); Silviu Velicu, EPIR Technologies, Inc. (USA); Joel Kubby, Univ. of California, Santa Cruz (USA). [8248-09]

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

SESSION 3

Room: 274 (Mezzanine). Thurs. 1:30 to 3:10 pm

Laser Processing

Session Chair: **Paul J. Resnick**, Sandia National Labs. (USA)

1:30 pm: **Fabrication of microchannels in fused silica with femtosecond laser irradiation and hybrid chemical etching process**, Sara Lo Turco, Istituto Italiano di Tecnologia (Italy) and Politecnico di Milano (Italy); Roberto Osellame, Politecnico di Milano (Italy); Roberta Ramponi, Istituto di Fotonica e Nanotecnologie (Italy); Guglielmo Lanzani, Politecnico di Milano (Italy); Krishna C. Vishnubhatla, Istituto Italiano di Tecnologia (Italy) [8248-10]

1:50 pm: **High aspect ratio microfeatures with laser texturing in mixed ablative-melting regime**, Pablo Romero, Nerea Otero, Asociación de Investigación Metalúrgica del Noroeste (Spain) [8248-11]

2:10 pm: **Molten pool temperature measurement in YAG laser ablation using pyrometer**, Hamid Farrokhi, Nanyang Technological Univ. (Singapore); Junzhan Hou, Northwestern Polytechnical Univ. (China); Wei Zhou, Nanyang Technological Univ. (Singapore); Hong Yu Zheng, Zhongli Li, A*STAR Singapore Institute of Manufacturing Technology (Singapore) [8248-12]

2:30 pm: **Direct laser writing of 3D micro/nanostructures on opaque surfaces**, Mangirdas Malinauskas, Sima Rek?tyte, Albertas ?ukauskas, Roaldas Gadonas, Vilnius Univ. (Lithuania); Saulius Juodkazis, Swinburne Univ. of Technology (Australia). [8248-13]

2:50 pm: **Fabrication qualities of micro-gratings encoding depend on laser parameters by two-beam femtosecond lasers interference**, Xianhua Wang, Feng Chen, Hwei Liu, Hao Bian, Qing Yang, Jinhai Si, Xun Hou, Xi'an Jiaotong Univ. (China) [8248-14]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 274 (Mezzanine). Thurs. 3:40 to 4:40 pm

MEMS Fabrication

Session Chair: **Mary Ann Maher**, SoftMEMS (USA)

3:40 pm: **Bosch-like method for creating high aspect ratio poly(methyl methacrylate)(PMMA) structures**, Marius Haiducu, Ash M. Parameswaran, Simon Fraser Univ. (Canada). [8248-15]

4:00 pm: **Stress engineering for free-standing SU-8 thin film devices**, Kyle W. Oliver, Sarah J. Lukes, Mohammad J. Moghimi, David L. Dickensheets, Montana State Univ. (USA) [8248-16]

4:20 pm: **Modeling of hot imprint process of periodical microstructure in to polycarbonate**, Rimvydas Gaidys, Birute Narijauskaitė, Arvydas Palevicius, Giedrius Janusas, Kaunas Univ. of Technology (Lithuania) [8248-17]

Advanced Fabrication Technologies for Micro/Nano Optics and Photonics V

Conference Chairs: **Winston V. Schoenfeld**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Raymond C. Rumpf**, The Univ. of Texas at El Paso (USA); **Georg von Freymann**, Technische Univ. Kaiserslautern (Germany)

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Tuesday 24 January

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Photoresistor made by two single junctions between multiwalled carbon nanotubes, Raffaele Di Giacomo, Heinz C. Neitzert, Univ. degli Studi di Salerno (Italy); Christian Boit, Helmut Wegner, Technische Univ. Berlin (Germany) [8249-30]

Use of ALD thin film Bragg mirror stacks in tuneable visible light MEMS Fabry-Perot interferometers, Anna Rissanen, VTT Technical Research Ctr. of Finland (Finland); Riikka L. Puurunen, VTT Technical Research Ctr. of Finland (USA) [8249-44]

Optical characterization of subwavelength-scale solid immersion lenses, Myun-Sik Kim, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Mohammad Tahdiul Haq, Wataru Nakagawa, Montana State Univ. (USA); Toralf Scharf, Hans Peter Herzig, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8249-45]

Performance evaluation of direct laser lithographic system for rotationally symmetric diffractive optical elements, Dong-Ik Kim, Korea Basic Science Institute (Korea, Republic of); Hyug-Gyo Rhee, Korea Research Institute of Standards and Science (Korea, Republic of); Gun-Hee Kim, Korea Basic Science Institute (Korea, Republic of) [8249-46]

Energy-dependent temperature dynamics in femtosecond laser microprocessing clarified by Raman temperature measurement, Tomoki Yoshino, Masato Matsumoto, Yasuyuki Ozeki, Kazuyoshi Itoh, Osaka Univ. (Japan) [8249-47]

Effect of reactive monomer on PS-b-P2VP film with UV irradiation, Ho Joong Kim, Dong Myung Shin, Hongik Univ. (Korea, Republic of) [8249-48]

Spectral tuning of IR-resonant nanoantennas by nanogap engineering, Thomas Härtling, Fraunhofer-Institut für Zerstörungsfreie Prüfverfahren (Germany); Daniel Weber, Ruprecht-Karls-Univ. Heidelberg (Germany); Julia Katzmann, Fraunhofer-Institut für Zerstörungsfreie Prüfverfahren (Germany); Frank F. Neubrech, Annemarie Pucci, Ruprecht-Karls-Univ. Heidelberg (Germany) [8249-49]

Effects of electric fields on the photonic crystal formation from block copolymers, Taekun Lee, Jin-wook Ju, Won S. Ryoo, Hongik Univ. (Korea, Republic of) [8249-50]

Laser-written photonic crystal optofluidics for electrochromatography on a chip, Moez Haque, Stephen Ho, Peter R. Herman, Univ. of Toronto (Canada) [8249-51]

Plasmon enhanced optical photodiodes based on MEH-PPV polymer and fullerene blend on ITO, Fred Semendy, U.S. Army Research Lab. (USA) [8249-52]

InAs QD light emitting diodes on in-situ nano-patterned substrates using molecular beam epitaxy, Dongsheng Fan, Jiang Wu, Univ. of Arkansas (USA); Zhiming M. Wang, Univ. of Arkansas (USA) and Univ. of Electronic Science and Technology of China (China); Shui-Qing Yu, Gregory J. Salamo, Univ. of Arkansas (USA) [8249-53]

Using a dwell-time increase to compensate for SLM pixelation-limited diffraction efficiency in DMHL, Daniel R. McAdams, Daniel G. Cole, Univ. of Pittsburgh (USA) [8249-54]

Controlling the nanofabrication of metal structures in direct laser writing using various chemistries, SeungYeon Kang, Kevin Vora, Shobha Shukla, Eric Mazur, Harvard Univ. (USA) [8249-55]

Photoresist roughness characterization in additive lithography processes for the fabrication of phase-only optical vortices (*Oral Standby*), Zahra Hosseinimakarem, Zachary A. Roth, Menelaos K. Poutous, Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA) [8249-56]

SESSION 1

Room: 200 (Mezzanine) Tues. 8:00 to 10:00 am

STED Lithography Focus Session

Session Chair: **Georg von Freymann**, Nanoscribe GmbH (Germany)

8:00 am: **Recent advances in RAPID lithography** (*Invited Paper*), John T. Fourkas, Michael P. Stocker, Univ. of Maryland, College Park (USA) . . [8249-01]

8:30 am: **Recent progress on diffraction-unlimited three-dimensional direct-laser-writing optical lithography** (*Invited Paper*), Martin Wegener, Joachim Fischer, Tolga Ergin, Karlsruher Institut für Technologie (Germany) [8249-02]

9:00 am: **Development of a two-color photo-initiation/inhibition lithography system**, Darren L. Forman, Nanometrics Inc. (USA); Robert R. McLeod, Univ. of Colorado at Boulder (USA); Gerrit L. Heuvelman, Heidelberg Instruments Mikrotechnik GmbH (Germany) [8249-03]

9:20 am: **Polymerization inhibition dynamics for high resolution lithography**, Benjamin Harke, Paolo Bianchini, Fernando Brandi, Alberto Diaspro, Istituto Italiano di Tecnologia (Italy) [8249-04]

9:40 am: **Time-resolved experiments on diffraction-unlimited 3D laser lithography**, Joachim Fischer, Thomas J. Wolf, Andreas-Neil Unterreiner, Martin Wegener, Karlsruher Institut für Technologie (Germany) [8249-05]

Coffee Break 10:00 to 10:30 am

Conference 8249 · Room: 200 (Mezzanine)

SESSION 2

Room: 200 (Mezzanine) Tues. 10:30 am to 12:30 pm

Laser-Based Fabrication I

Session Chair: John T. Fourkas, Univ. of Maryland, College Park (USA)

10:30 am: **Nanophotonic laser direct fabrication** (*Invited Paper*), Min Gu, Swinburne Univ. of Technology (Australia) [8249-06]

11:00 am: **Towards visible-wavelength titania-based three-dimensional photonic-band-gap materials via direct laser writing**, Andreas Frölich, Joachim Fischer, Thomas Zebrowski, Isabelle Staude, Kurt Busch, Martin Wegener, Karlsruher Institut für Technologie (Germany) [8249-07]

11:20 am: **Scanning laser holographic lithography: toward flexible ultra-large-size 3D photonic crystal microsystems**, Liang Yuan, Peter R. Herman, Univ. of Toronto (Canada) [8249-08]

11:40 am: **Synthesis of super-dense phase of aluminum under extreme pressure and temperature conditions created by femtosecond laser pulses in sapphire** (*Invited Paper*), Vyngantas Mizeikis, Shizuoka Univ. (Japan); Arturas Vailionis, Stanford Univ. (USA); Eugene G. Gamaly, The Australian National Univ. (Australia); Wenge Yang, Carnegie Institution (USA); Andrei V. Rode, The Australian National Univ. (Australia); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) [8249-09]

12:10 pm: **Effect of configuration of the microchannels fabricated by femtosecond laser micromachining on topological defects in confined liquid crystals**, Krishna C. Vishnubhatla, Politecnico di Milano (Italy); Francesca Serra, Univ. degli Studi di Milano (Italy); Roberto Osellame, Giulio Cerullo, Politecnico di Milano (Italy); Roberto Cerbino, Marco Buscaglia, Tommaso Bellini, Univ. degli Studi di Milano (Italy) [8249-10]

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

SESSION 3

Room: 200 (Mezzanine) Tues. 1:30 to 3:30 pm

Micro and Nano Optics

Session Chair: Thomas J. Suleski, The Univ. of North Carolina at Charlotte (USA)

1:30 pm: **High precision fabrication of polarization insensitive resonant subwavelength gratings**, Robert R. Boye, David W. Peters, Joel R. Wendt, Jeffrey O. Stevens, Rick A. Kellogg, Sally Samora, Sandia National Labs. (USA) [8249-11]

1:50 pm: **Monolithic fabrication and performance control of multilayered, polarization sensitive, guided-mode resonance filters**, Menelaos K. Poutous, Indumathi Raghu Srimathi, Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA) [8249-12]

2:10 pm: **Ultra-fast diffractive optical micro-trap arrays for neutral atom quantum computing**, Shanalyn A. Kemme, Gregory Brady, Robert S. Ellis, Joel R. Wendt, David W. Peters, Grant Biedermann, Tony R. Carter, Sally Samora, Sandia National Labs. (USA); Joshua Isaacs, Vladyslav Ivanov, Mark E. Saffman, Univ. of Wisconsin-Madison (USA) [8249-13]

2:30 pm: **Fabrication of uniform index material guided-mode resonance filters**, Aaron J. Pung, Menelaos K. Poutous, Zachary A. Roth, Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA); Raymond C. Rumpf, The Univ. of Texas at El Paso (USA) [8249-14]

2:50 pm: **HSQ resist for replication stamp in polymers**, Muhammad Rizwan Saleem, Petri A. Stenberg, Univ. of Eastern Finland (Finland); Muhammad Bilal Khan, Zaffar Muhammad Khan, National Univ. of Sciences and Technology (Pakistan); Seppo K. Honkanen, Aalto Univ. School of Electrical Engineering (Finland); Jari Turunen, Pasi Vahimaa, Univ. of Eastern Finland (Finland) [8249-15]

3:10 pm: **Spatially and spectrally varying guided mode resonant filter by modifying the waveguide layer**, Zachary A. Roth, Menelaos K. Poutous, Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA) [8249-16]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 200 (Mezzanine) Tues. 4:00 to 6:10 pm

3D Lithography

Session Chair: Menelaos K. Poutous, The Univ. of North Carolina at Charlotte (USA)

4:00 pm: **3D photonic band gap crystals: islands of tranquility in a fluctuating vacuum** (*Invited Paper*), Willem L. Vos, Univ. Twente (Netherlands) [8249-17]

4:30 pm: **Adaptive amplitude filters for smaller feature sizes in direct laser writing**, Erik H. Waller, Michael Renner, Georg von Freymann, Technische Univ. Kaiserslautern (Germany) [8249-18]

4:50 pm: **Calorimetric study of fs-laser polymerizable sol-gel resists**, Saulius Juodkazis, Swinburne Univ. of Technology (Australia); Junko Morikawa, Toshiyuki Suzuki, Tokyo Institute of Technology (Japan); Ricardas Buividas, Gediminas Gervinskas, Swinburne Univ. of Technology (Australia); Domas Paipulas, Mangirdas Malinauskas, Vilnius Univ. (Lithuania); Vyngantas Mizeikis, Shizuoka Univ. (Japan); Toshimasa Hashimoto, Tokyo Institute of Technology (Japan) [8249-19]

5:10 pm: **3D inclined structures fabricated by prism assisted inclined UV lithography**, Guomin Jiang, Sarfaraz Baig, Michael R. Wang, Univ. of Miami (USA) [8249-20]

5:30 pm: **Active and adaptive optical methods for rapid fabrication of 3D photonic structures**, Martin Booth, Univ. of Oxford (United Kingdom) . [8249-21]

5:50 pm: **Material processing with 12 femtosecond picosecond laser pulses**, Karsten König, Martin Licht, Martin H. Straub, Huijing Zang, Aisada Uchugonova, Univ. des Saarlandes (Germany) [8249-22]

Wednesday 25 January

SESSION 5

Room: 200 (Mezzanine) Wed. 8:00 to 9:50 am

Advanced Lithography I

Session Chair: Raymond C. Rumpf, The Univ. of Texas at El Paso (USA)

8:00 am: **Rolling mask nanolithography: the pathway to large area and low cost nanofabrication** (*Invited Paper*), Boris Kobrin, Edward S. Barnard, Mark L. Brongersma, Rolith, Inc. (USA); Moon-Kyu Kwak, L. Jay Guo, Univ. of Michigan (USA) [8249-23]

8:30 am: **Fabrication of 8-channel array single-mode waveguides via vacuum assisted microfluidics**, Sarfaraz Baig, Guomin Jiang, Univ. of Miami (USA); Qunhui Sun, New Span Opto-Technology Inc. (USA); Michael R. Wang, Univ. of Miami (USA) [8249-24]

8:50 am: **Sub-micrometer pattern generation by diffractive mask-aligner lithography**, Uwe D. Zeitner, Lorenz Stuerzebecher, Torsten Harzendorf, Frank Fuchs, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8249-25]

9:10 am: **Wafer scale fabrication of submicron chessboard gratings using phase masks in proximity lithography**, Lorenz Stuerzebecher, Friedrich-Schiller-Univ. Jena (Germany); Torsten Harzendorf, Frank Fuchs, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Uwe D. Zeitner, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8249-26]

9:30 am: **Nano-scale multiple-axis photoelectron source using focused helium ion beam fabricated C-aperture nano-tip**, Yao-Te Cheng, Yuzuru Takashima, Juan R. Maldonado, Stanford Univ. (USA); Chuong T. Huynh, Larry Scipioni, Carl Zeiss SMT Inc. (USA); Roger Fabian W. Pease, Lambertus Hesselink, Stanford Univ. (USA) [8249-27]

Coffee Break 9:50 to 10:20 am

SESSION 6

Room: 200 (Mezzanine) Wed. 10:20 am to 12:20 pm

Photonic Device Fabrication

Session Chair: Winston V. Schoenfeld, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:20 am: **Tuning of random rough surface statistics for optoelectronics**, Vincent Brissonneau, Thales Optronique S.A. (France) and Institut Matériaux Microélectronique Nanosciences de Provence (France); Ludovic Escoubas, Institut Matériaux Microélectronique Nanosciences de Provence (France) and Aix Marseille Univ. (France); François Flory, Institut Matériaux Microélectronique Nanosciences de Provence (France) and Ecole Centrale Marseille (France); Gérard Berginc, Thales Optronique S.A. (France) [8249-28]

10:40 am: **High precision geometrical characterization and alignment of miniaturized optics**, Josef Heinisch, Patrik Langehanenberg, TRIOPTICS GmbH (Germany) [8249-29]

11:00 am: **Gallium nitride-based logpile photonic crystals for visible lighting**, Ganapathi S. Subramania, Qiming Li, Yun-Ju Lee, Jeffrey J. Figiel, George T. Wang, Arthur J. Fischer, Sandia National Labs. (USA) [8249-57]

11:20 am: **Programmed resist sidewall profiles using sub-resolution binary gray-scale masks for Si-photonics applications**, Ofir Gan, Micron Israel (Israel); Paul C. Allen, Toppan Photomasks, Inc. (USA); Assia Barkai, Micron Israel (Israel); Peter D. Buck, Toppan Photomasks, Inc. (USA); Brid Connolly, Toppan Photomasks, Inc. (Germany); Harel Frish, Micron Israel (Israel); Massimiliano Pindo, Toppan Photomasks, Inc. (France) [8249-31]

11:40 am: **Fabrication of diffraction imaging elements for continued terahertz waves**, Jianfeng Liu, Jinhui Gong, Kan Liu, Xinyu Zhang, Changsheng Xie, Huazhong Univ. of Science and Technology (China) [8249-32]

12:00 pm: **Economic silicon nanowire fabrication using nano-crack lithography**, Meng-Che Tsai, Po-Hsiang Chang, Yun-Chorng Chang, National Cheng Kung Univ. (Taiwan) [8249-33]
Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 7

Room: 200 (Mezzanine) Wed. 1:50 to 3:40 pm

Laser-Based Fabrication II

Session Chair: Shanalyn A. Kemme, Sandia National Labs. (USA)

1:50 pm: **Three-dimensional Dip-in Laser Lithography (DiLL) (Invited Paper)**, Michael Thiel, Julian Ott, Holger Fischer, Nanoscribe GmbH (Germany); Georg von Freymann, Nanoscribe GmbH (Germany) and Technische Univ. Kaiserslautern (Germany) [8249-34]

2:20 pm: **Hybrid optics for three-dimensional microstructuring of polymers via direct laser writing**, Frank Burmeister, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Uwe D. Zeitner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [8249-35]

2:40 pm: **Electro-optic effect in femtosecond laser written MZIs via microchannel electrodes**, Jason C. Ng, Peter R. Herman, Li Qian, Univ. of Toronto (Canada) [8249-36]

3:00 pm: **Generating high DOF light by using tapered hollow tube in a lithography system**, Chun-Yen Chen, Yu-Hsun Lee, Chih-Jen Chien, Yuh-Yan Yu, National Taiwan Univ. (Taiwan); Chih-Kung Lee, National Taiwan Univ. (Taiwan) and Institute for Information Industry (Taiwan) [8249-37]

3:20 pm: **Photonic crystal waveguide fabricated by a combination lithography of laser holography and focused ion beam deposition**, Sungmo Ahn, Hanbit Kim, Sihan Kim, Heonsu Jeon, Seoul National Univ. (Korea, Republic of); Hyojin Kim, Korea Photonics Technology Institute (Korea, Republic of) [8249-38]

Coffee Break 3:40 to 4:10 pm

SESSION 8

Room: 200 (Mezzanine) Wed. 4:10 to 6:00 pm

Advanced Lithography II

Session Chair: Pradeep Srinivasan, Intel Corp. (USA)

4:10 pm: **Dynamic membrane projection lithography (Invited Paper)**, D. Bruce Burckel, Sandia National Labs. (USA) [8249-39]

4:40 pm: **Fabrication of large arrays of plasmonic nanostructures via double casting**, Joanne Lo, Sandia National Labs., California (USA); David A. Horsley, Univ. of California, Davis (USA); Jack L. Skinner, Sandia National Labs., California (USA) [8249-40]

5:00 pm: **Selective electroless Ag coating of three dimensional SU-8 microstructures for metamaterials applications**, Andrew A. Bettiol, Yuanjun Yan, National Univ. of Singapore (Singapore); Ee Jin Teo, Hendrix Tanoto, Jinghua Teng, A*STAR Institute of Materials Research and Engineering (Singapore) [8249-41]

5:20 pm: **Exposure controlled projection lithography for microlens fabrication**, Amit S. Jariwala, David W. Rosen, Georgia Institute of Technology (USA) [8249-42]

5:40 pm: **Optical micro cavities fabricated using direct proton beam writing**, Sudheer Vanga, Prashant Shuvan, National Univ. of Singapore (Singapore); Ee Jin Teo, A*STAR Institute of Materials Research and Engineering (Singapore); Andrew A. Bettiol, National Univ. of Singapore (Singapore) [8249-43]

Courses of Related Interest

- SC454 Fabrication Technologies for Micro- and Nano-Optics (Suleski) Monday, 8:30 am to 12:30 pm
- SC689 Precision Laser Micromachining (Schaeffer) Wednesday, 1:30 to 5:30 pm
- SC743 Micromachining with Femtosecond Lasers (Nolte, Schaeffer) Monday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Don't miss the free Photonics West Exhibition


24-26 January 2012
South Hall ABC and North Hall D
Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm
Thursday · 10:00 am to 4:00 pm

MOEMS-MEMS

Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices XI

Conference Chairs: **Sonia M. García-Blanco**, Univ. Twente (Netherlands); **Rajeshuni Ramesham**, Jet Propulsion Lab. (USA)

Program Committee: **Paul Bierden**, Boston Micromachines Corp. (USA); **Christopher K. Harrison**, Schlumberger-Doll Research Ctr. (USA); **Allyson Hartzell**, Lilliputian Systems Inc. (USA); **Albert K. Henning**, Nanolnk, Inc. (USA); **Maurice S. Karpman**, Draper Lab. (USA); **Kee-Keun Lee**, Ajou Univ. (Korea, Republic of); **Richard C. Kullberg**, Vacuum Energy, Inc. (USA); **Herbert R. Shea**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Tolga Tekin**, Technische Univ. Berlin (Germany); **Yanzhu Zhao**, Medtronic, Inc. (USA)

Cooperating Organization:  **Fraunhofer**
IZM

Monday 23 January

MOEMS-MEMS Plenary Session
Room: 132 (Exhibit Level) Mon. 9:00 am to 12:00 pm

Session Chairs: **Harald Schenk**,
Fraunhofer Institute for Photonic Microsystems (Germany),
David L. Dickensheets, Montana State Univ. (USA)

9:00 am: **Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award**, Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany), David L. Dickensheets, Montana State Univ. (USA)

9:15 am: **Large-Scale Integration of Nanosystems**, Michael Roukes, California Institute of Technology

Coffee Break 10:00 to 10:30 am

10:30 am: **Powering the Wireless World with MEMS**, Samuel B. Schaevitz, Lilliputian Systems, Inc. (USA)

11:15 am: **Developing Diagnostics for the Developing World**, Jonathan Cooper, Univ. of Glasgow (United Kingdom)

For details see p. 24

Lunch Break 12:00 to 1:30 pm

SESSION 1

Room: 250 (Mezzanine) Mon. 1:30 to 3:30 pm

Reliability and Packaging

Session Chair: **Rajeshuni Ramesham**, Jet Propulsion Lab. (USA)

1:30 pm: **Assembly and interconnect formation in MEMS/MOEMS application (Invited Paper)**, Hermann Oppermann, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany) [8250-01]

2:00 pm: **Effects of releasing process parameters and induced in-plane stress on MEMS yield (Invited Paper)**, Patricia M. Nieva, Univ. of Waterloo (Canada) [8250-02]

2:30 pm: **Optoelectronic properties and interfacial coating durability of CNT and ITO on PET substrates with nano- and hetero-structural aspects**, Joung-Man Park, Gyeongsang National Univ. (Korea, Republic of) and The Univ. of Utah (USA); Dong-Jun Kwon, Zuo-Jia Wang, Ga-Young Gu, Gyeongsang National Univ. (Korea, Republic of); Lawrence K. DeVries, The Univ. of Utah (USA) [8250-03]

2:50 pm: **Usage induced changes to surface topography and material properties in polysilicon MEMS electrothermal structures**, Sahil Oak, Tim E. Dallas, Texas Tech Univ. (USA) [8250-04]

3:10 pm: **High fill-factor polymer refractive microlens array fabricated by stamping replica technique**, Minwoo Nam, Sang Sik Yang, Kee-Keun Lee, Ajou Univ. (Korea, Republic of) [8250-05]

Coffee Break 3:30 to 4:00 pm

SESSION 2

Room: 250 (Mezzanine) Mon. 4:00 to 5:00 pm

MEMS Testing I

Session Chair: **Sonia M. García-Blanco**, Univ. Twente (Netherlands)

4:00 pm: **Axial phase measurements of light interacting with microstructures**, Myun-Sik Kim, Toralf Scharf, Hans Peter Herzog, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8250-06]

4:20 pm: **Non destructive static and dynamic MEMS characterization using supercontinuum scanning white light interferometry**, Ville Heikkinen, Kalle Hanhijärvi, Juha Aaltonen, Univ. of Helsinki (Finland); Kostas Grigoras, Aalto Univ. School of Science and Technology (Finland); Ivan Kassamakov, Univ. of Helsinki (Finland); Sami Franssila, Aalto Univ. School of Science and Technology (Finland); Edward Haeggström, Univ. of Helsinki (Finland) [8250-07]

4:40 pm: **Low coherence interferometry, spectroscopically resolved reflectance, and hyperspectral imaging methods for novel high resolution pressure sensors membrane thickness and MEMS metrology**, Wojciech Walecki, Fanny Szondy, Peter Walecki, Sunrise Optical LLC (USA) [8250-08]

Tuesday 24 January

SESSION 3

Room: 250 (Mezzanine) Tues. 9:00 to 10:00 am

MEMS Testing II

Session Chair: **Sonia M. García-Blanco**, Univ. Twente (Netherlands)

9:00 am: **Reliability of high I/O high density CCGA interconnect electronic packages under extreme temperatures**, Rajeshuni Ramesham, Jet Propulsion Lab. (USA) [8250-09]

9:20 am: **Characterization of a flouorocarbon SAM coated MEMS tribogauge**, Ashwin Vijayasai, Tim E. Dallas, Ganapathy Sivakumar, Charlie Anderson, Richard Gale, Jr., Gautham Ramachandran, Texas Tech Univ. (USA) . . [8250-10]

9:40 am: **Characterization of a nanocoating using a MEMS tribogauge**, Ashwin Vijayasai, Tim E. Dallas, Ganapathy Sivakumar, Charlie Anderson, Richard Gale, Jr., Gautham Ramachandran, Texas Tech Univ. (USA) . . [8250-11]

Coffee Break 10:00 to 10:45 am

SESSION 4

Room: 250 (Mezzanine) Tues. 10:45 am to 12:00 pm

Special Session: Hot Industrial Topics in MEMS

Session Chair: Rajeshuni Ramesham, Jet Propulsion Lab. (USA)

- 10:45 am: **Ultra-compact illumination module for multi-aperture imaging systems** (*Presentation Only*), René Berlich, Andreas Brückner, Robert Leitel, Andreas Bräuer, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8250-21]
- 11:00 am: **Development of a new deformable mirror towards AO commercialization** (*Presentation Only*), Xingtao Wu, Microscale, Inc. (USA) [8250-13]
- 11:15 am: **MEMS deformable mirrors for laser applications** (*Presentation Only*), Michael A. Helmbrecht, Min He, Iris AO, Inc. (USA) [8250-14]
- 11:30 am: **Custom bolometric detector arrays: from MWIR to THz** (*Presentation Only*), Hubert Jerominek, Christine Alain, Alain Bergeron, INO (Canada) [8250-15]
- 11:45 am: **The unsettled world of leak rate physics: 1 atm-large volume considerations do not apply to MEMS packages, a practitioner's perspective**, Arthur Jonath, Jonath Associates (USA); Richard C. Kullberg, Vacuum Energy, Inc. (USA); Robert K. Lowry, Electronic Materials Characterization (USA) [8250-20]
- Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 5

Room: 123 (Exhibit Level) Tues. 1:30 to 3:30 pm

MEMS for Space

Joint Session with Conference 8252

Session Chair: Sonia M. García-Blanco, Univ. Twente (Netherlands)

- 1:30 pm: **MEMS technology for miniaturized space systems: needs, status and perspectives** (*Invited Paper*), Eberhard Gill, Jian Guo, Technische Univ. Delft (Netherlands) [8250-16]
- 2:00 pm: **MOEMS devices designed and tested for astronomical instrumentation in space** (*Invited Paper*), Frederic Zamkotsian, Observatoire Astronomique de Marseille-Provence (France); Wilfried Noell, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8250-17]
- 2:30 pm: **Net flux sensors for the measurement of Mars surface radiation budget**, Linh Ngo Phong, Alazzam Anas, Canadian Space Agency (Canada); Michael Daly, York Univ. (Canada); Francois Chateaufneuf, INO (Canada) [8252-08]
- 2:50 pm: **Large MEMS-based programmable reflective slit mask for multi-object spectroscopy fabricated using multiple wafer-level bonding**, Michael D. Canonica, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Frederic Zamkotsian, Patrick Lanzoni, Observatoire Astronomique de Marseille-Provence (France); Wilfried Noell, Nico de Rooij, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8252-09]
- 3:10 pm: **Performance prediction and characterization of highly insulated microbolometers for space applications**, Zhiqiang Xu, Canadian Space Agency (Canada) and INO (Canada); Linh Ngo Phong, Canadian Space Agency (Canada); Timothy Pope, INO (Canada) [8250-18]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Enhanced terahertz transmission by surface plasmon resonance, Yongzheng Wen, Jiancheng Yang, Xiaomei Yu, Peking Univ. (China); Yuejin Zhao, Xiaohua Liu, Liquan Dong, Beijing Institute of Technology (China) [8250-19]

Courses of Related Interest

- SC689 Precision Laser Micromachining (Schaeffer) Wednesday, 1:30 to 5:30 pm
- SC743 Micromachining with Femtosecond Lasers (Nolte, Schaeffer) Monday, 1:30 to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Microfluidics, BioMEMS, and Medical Microsystems X

Conference Chair: **Holger Becker**, microfluidic ChipShop GmbH (Germany)

Conference Co-Chair: **Bonnie L. Gray**, Simon Fraser Univ. (Canada)

Program Committee: **Brian W. Anthony**, Massachusetts Institute of Technology (USA); **Bruce K. Gale**, The Univ. of Utah (USA); **Albert K. Henning**, Nanolnk, Inc. (USA); **Yu-Cheng Lin**, National Cheng Kung Univ. (Taiwan); **Yuehe Lin**, Pacific Northwest National Lab. (USA); **Ciara K. O'Sullivan**, Univ. Rovira i Virgili (Spain); **Ian Papautsky**, Univ. of Cincinnati (USA); **Thomas Stieglitz**, Albert-Ludwigs-Univ. Freiburg (Germany); **Albert van den Berg**, Univ. Twente (Netherlands); **Wanjun Wang**, Louisiana State Univ. (USA); **Bernhard H. Weigl**, PATH (USA)



Monday 23 January

MOEMS-MEMS Plenary Session
Room: 132 (Exhibit Level) Mon. 9:00 am to 12:00 pm

Session Chairs: Harald Schenk,
 Fraunhofer Institute for Photonic Microsystems (Germany),
David L. Dickensheets, Montana State Univ. (USA)

9:00 am: **Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award**, Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany), David L. Dickensheets, Montana State Univ. (USA)

9:15 am: **Large-Scale Integration of Nanosystems**, Michael Roukes, California Institute of Technology

Coffee Break 10:00 to 10:30 am

10:30 am: **Powering the Wireless World with MEMS**, Samuel B. Schaevitz, Lilliputian Systems, Inc. (USA)

11:15 am: **Developing Diagnostics for the Developing World**, Jonathan Cooper, Univ. of Glasgow (United Kingdom)

For details see p. 24

Lunch Break 12:00 to 1:00 pm

SESSION 1

Room: 276 (Mezzanine) Mon. 1:00 to 3:30 pm

Cell and Particle Based Systems

Session Chair: Holger Becker, microfluidic ChipShop GmbH (Germany)

1:00 pm: **Microfluidic cell culture systems with integrated sensors for drug screening** (*Invited Paper*), Karen C. Cheung, The Univ. of British Columbia (Canada) [8251-01]

1:30 pm: **Optofluidic microdevice for algae size measurements and species classification**, Allison Schaap, Yves Bellouard, Technische Univ. Eindhoven (Netherlands); Thomas Rohrlack, Norwegian Institute for Water Research (Norway) [8251-02]

1:50 pm: **Probing the tumor microenvironment: collection and induction**, James K. Williams, Michael R. Padgen, Univ. at Albany (USA); Frank Gertler, Massachusetts Institute of Technology (USA); Jeffrey Wyckoff, John Condeelis, Albert Einstein College of Medicine of Yeshiva Univ. (USA); James Castracane, College of Nanoscale Science & Engineering (USA) [8251-03]

2:10 pm: **Mammosphere culture of cancer stem cells in a microfluidic device**, Katayoon Saadin, Ian M. White, Univ. of Maryland, College Park (USA) [8251-04]

2:30 pm: **Fast self-assembly kinetics of alkanethiols on gold nano-particles via microfluidic localized surface plasmon resonance spectroscopy**, Sasan Asiaei, Patricia M. Nieva, Matt Vijayan, Univ. of Waterloo (Canada) [8251-05]

2:50 pm: **Magnetic particle-based sample-prep and valving in microfluidic devices**, Richard Klemm, Nadine Hlawatsch, Thomas Hansen-Hagge, Holger Becker, Claudia Gärtner, microfluidic ChipShop GmbH (Germany) [8251-06]

3:10 pm: **A microfluidic device for studies of microrod flow dynamics**, Yogeshwar N. Mishra, Cochin Univ. of Science & Technology (India); Oladiran A. John, Pontus Andersson, Jonas Einarsson, Bernhard Mehlig, Dag Hanstorp, Göteborg Univ. (Sweden) [8251-07]

Coffee Break 3:30 to 4:00 pm

SESSION 2

Room: 276 (Mezzanine) Mon. 4:00 to 5:30 pm

Medical and Diagnostic Applications

Session Chair: Karen C. Cheung,
The Univ. of British Columbia (Canada)

4:00 pm: **Miniaturized neural interfaces and implants** (*Invited Paper*), Thomas Stieglitz, Albert-Ludwigs-Univ. Freiburg (Germany) [8251-08]

4:30 pm: **Integrated multi-sensing optrode for neural stimulation and recording**, Wei-Chuan Shih, Szu-Te Lin, Univ. of Houston (USA) [8251-09]

4:50 pm: **Point-of-care, portable microfluidic blood analyzer system**, Teimour Maleki, Purdue Univ. (USA); Meggie Grafton, Univ. of Michigan (USA); Michael D. Zordan, iCyt Mission Technology (USA); Alan Jones, Paul Todd, Techshot, Inc. (USA); James F. Leary, Purdue Univ. (USA) [8251-10]

5:10 pm: **A lab-on-a-chip system for the development of complex assays using modular microfluidic components**, Cornelia Carstens, Nadine Hlawatsch, Holger Becker, microfluidic ChipShop GmbH (Germany); Thomas Brandstetter, Albert-Ludwigs-Univ. Freiburg (Germany); Rudi Elbracht, Laborärztrepraxis Elbracht u Carstens (Germany); Claudia Gärtner, microfluidic ChipShop GmbH (Germany) [8251-11]

PANEL DISCUSSION

Room: 276 (Mezzanine) Mon. 5:40 to 7:00 pm

Prospects and Future of Microfluidics

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

The commercialization of microfluidic devices and systems is rapidly progressing. However not all promising approaches have become an economic success and investor's payback often has not met initial expectations. The discussion will look upon experiences made in the product development and market introduction phase of microfluidics enabled devices and will present lessons learned from various perspectives, from device performance to commercial organization. It tries to identify trends and will present case studies from different applications.

Tuesday 24 January

SESSION 3

Room: 276 (Mezzanine) Tues. 8:20 to 10:00 am

Manufacturing Technologies

Session Chair: Ian Papautsky, Univ. of Cincinnati (USA)

8:20 am: **Two-component injection molding for microfluidic devices**, Holger Becker, Claudia Gärtner, microfluidic ChipShop GmbH (Germany) [8251-12]

8:40 am: **Femtosecond laser written 3D optofluidic microsystems for capillary electrophoresis and cytometry**, Stephen Ho, Moez Haque, James J. Dou, Lu Chen, Peter R. Herman, J. Stewart Aitchison, Univ. of Toronto (Canada) [8251-13]

9:00 am: **Automation of a work cell for polymer microdevice production: precise alignment and visual quality inspection**, Nadege Zarrouati, Mines ParisTech (France); Xian Du, Brian W. Anthony, Massachusetts Institute of Technology (USA) [8251-14]

9:20 am: **Polymer micromolds with near optical quality surface finishes**, Pun-Pang Shiu, National Research Council Canada (Canada); George K. Knopf, The Univ. of Western Ontario (Canada); Suwas Nikumb, National Research Council Canada (Canada) [8251-15]

9:40 am: **Manufacturing for lab-on-chip devices: variation analysis of flow rate delivered using a blister pack**, Sivesh Selvakumar, St. Jude Medical, Inc. (USA); Rodrigo A. Linares, Natel Energy, Inc. (USA); Aaron Oppenheimer, Daktari Diagnostics, Inc. (USA); Brian W. Anthony, Massachusetts Institute of Technology (USA) [8251-16]

Coffee Break 10:00 to 10:30 am

SESSION 4

Room: 276 (Mezzanine) Tues. 10:30 to 11:50 am

Sensors and Devices

Session Chair: Thomas Stieglitz, Albert-Ludwigs-Univ. Freiburg (Germany)

10:30 am: **A simple single-detector system for simultaneous monitoring of O₂ and CO₂ gas concentration**, Rahul Dixit, Binghamton Univ. (USA); Li Shen, Mike Ratterman, Ian Papautsky, Univ. of Cincinnati (USA); David J. Klotzkin, Binghamton Univ. (USA) [8251-17]

10:50 am: **Lab-on-a-chip sensor for measuring Zn by stripping voltammetry**, Xing Pei, Wenjing Kang, Wei Yue, Univ. of Cincinnati (USA); Adam Bange, Xavier Univ. (USA); William Heineman, Ian Papautsky, Univ. of Cincinnati (USA) [8251-18]

11:10 am: **Optical sensing for on-chip digital microfluidics**, Jacqueline A. Nichols, Emily L. Landry, Brandon Born, Michael Wiltshire, Christopher M. Collier, Jonathan F. Holzman, UBC Okanagan (Canada) [8251-19]

11:30 am: **Fluorescence and bright-field on-chip imaging system for continuous growth monitoring and tracking of biological samples**, Seung Ah Lee, Guoan Zheng, Changhui Yang, California Institute of Technology (USA) [8251-20]

Lunch/Exhibition Break 11:50 am to 1:40 pm

SESSION 5

Room: 276 (Mezzanine) Tues. 1:40 to 3:00 pm

Devices and Systems I

Session Chair: Bonnie L. Gray, Simon Fraser Univ. (Canada)

1:40 pm: **Highly accurate measurement of varying drug dosage for real-time analysis of chemo-mechanical response of cardiomyocytes**, Avneet Bajwa, Behraad Bahreyni, Ash M. Parameswaran, Simon Fraser Univ. (Canada) [8251-21]

2:00 pm: **Optofluidic backplane as a platform for modular system design**, Marko Brammer, Christof Megnin, Marius Siegfarth, Shukhrat Sobich, Karlsruhe Institut für Technologie (Germany) and Bürkert Technology Ctr. (Germany); Dominik G. Rabus, Univ. of California, Santa Cruz (USA); Timo Mappes, Karlsruhe Institut für Technologie (Germany) [8251-22]

2:20 pm: **Hybrid membrane-microfluidic components using a novel ceramic MEMS technology**, Brent J. Lutz, Oleg Polyakov, Synkera Technologies, Inc. (USA) [8251-24]

2:40 pm: **3D nanoporous optofluidic device for high sensitivity SERS detection**, Yazdi Soroush, Ian M. White, Univ. of Maryland, College Park (USA) [8251-25]

Coffee Break 3:00 to 3:30 pm

SESSION 6

Room: 276 (Mezzanine) Tues. 3:30 to 5:00 pm

Devices and Systems II

Session Chair: Holger Becker, microfluidic ChipShop GmbH (Germany)

3:30 pm: **Spiral inertial microfluidic devices for continuous blood cell separation (Invited Paper)**, Nivedita Nivedita, Univ. of Cincinnati (USA); Phillip Ligrani, Saint Louis Univ. (USA); Ian Papautsky, Univ. of Cincinnati (USA) [8251-26]

4:00 pm: **Multiplexed fluorescence detection for point-of-care**, Li Shen, Mike Ratterman, Tyler Stites, Univ. of Cincinnati (USA); David J. Klotzkin, Binghamton Univ. (USA); Ian Papautsky, Univ. of Cincinnati (USA) [8251-27]

4:20 pm: **An active micro-mixer based on low frequency switching transverse electro-osmotic flow using 3D-symmetric planar electrodes**, Ziliang Cai, Guocheng Shao, Louisiana State Univ. (USA); Hongjun Song, CFD Research Corp. (USA); Wanjun Wang, Louisiana State Univ. (USA) [8251-28]

4:40 pm: **Study of multiple streamflows of dissimilar polymeric solutions and its mixing in microfluidic converging/diverging geometries**, Hong Yap Gan, A*STAR Singapore Institute of Manufacturing Technology (Singapore); Yee Cheong Lam, Nanyang Technological Univ. (Saint Kitts and Nevis) [8251-29]

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Nonspherical optofluidic lenses, Sergio Calixto-Carrera, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Martha Rosete-Aguilar, Univ. Nacional Autónoma de México (Mexico); Margarita Calixto-Solano, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico) [8251-30]

Biochemical liquid analysis using a microfluidic chip fabricated by femtosecond laser, Yasutaka Hanada, Koji Sugioka, Katsumi Midorikawa, RIKEN (Japan) [8251-31]

Design and analysis of a micromachined gyroscope, John D. Jones, Nilgoon Zarei, Simon Fraser Univ. (Canada) [8251-33]

Design of a micro-interdigitated electrode for impedance measurement performance in a biochemical assay, Linda M. Donoghue, Brian W. Anthony, Massachusetts Institute of Technology (USA) [8251-34]

Fabrication and testing of hydrogel-based microvalves for lab-on-a-chip applications, Ang Li, Bonnie L. Gray, Jonathan Lee, Paul Li, Simon Fraser Univ. (Canada) [8251-35]

Robustness and repeatability of interdigitated electrodes on a substrate tested in an aqueous environment, Jacklyn A. Holmes, Brian W. Anthony, Massachusetts Institute of Technology (USA) [8251-36]

Design of subretinal implants with MEMS, Muzaffer Akyurek, Selçuk Univ. (Turkey) [8251-37]

Courses of Related Interest

SC532 Micro- and Nanofluidics - Technology and Applications (Gärtner) Wednesday, 8:30 am to 12:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

MOEMS and Miniaturized Systems XI

Conference Chairs: **Harald Schenk**, Fraunhofer Institute for Photonic Microsystems (Germany); **Wibool Piyawattanametha**, NECTEC (Thailand); **Wilfried Noell**, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Program Committee: **Susanne Arney**, Alcatel-Lucent Bell Labs. (USA); **Wyatt O. Davis**, Microvision, Inc. (USA); **David L. Dickensheets**, Montana State Univ. (USA); **Jean-Christophe Eloy**, Yole Développement (France); **Sonia M. García-Blanco**, Univ. Twente (Netherlands); **Jason C. Heikenfeld**, Univ. of Cincinnati (USA); **Yong-Hwa Park**, Samsung Advanced Institute of Technology (Korea, Republic of); **Jason B. Stewart**, MIT Lincoln Lab. (USA); **Wanjun Wang**, Louisiana State Univ. (USA)

BEST PAPER AWARDS

We are pleased to announce that a cash prize will be awarded to the best paper and best student paper in MOEMS and Miniaturized Systems XI. Qualifying papers will be evaluated by the awards committee. Manuscripts will be judged based on scientific merit, impact, and clarity.

Qualifying papers will be evaluated by the awards committee. The winners will be announced during the conference and awarded a cash prize. See p. 25 for details.

Awards Sponsor:



Tuesday 24 January

SESSION 1

Room: 123 (Exhibit Level) Tues. 8:20 am to 12:00 pm

Picoprojectors: Systems and Components

Joint Session with Conference 8254

Session Chairs: **Paul Rancuret**, Texas Instruments Inc. (USA); **Yong-Hwa Park**, Samsung Advanced Institute of Technology (Korea, Republic of)

8:20 am: **Trajectory precision of micromachined scanning mirrors for laser beam scanning pico-projector displays** (*Invited Paper*), Wyatt O. Davis, Michael Beard, Robert Jackson, Microvision, Inc. (USA) [8252-01]

8:45 am: **MEMS-based micro projection system with a 1.5cc optical engine** (*Invited Paper*), Lucio Kilcher, Nicolas Abele, Lemoptix SA (Switzerland) [8252-02]

9:10 am: **Laser projector solution based on two 1D resonant micro scanning mirrors assembled in a low vertical distortion scan head**, Jan Grahmann, Michael Wildenhain, Thomas Grasshoff, Hans-Georg Dallmann, Christian Gerwig, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Alexander Wolter, HiperScan GmbH (Germany); Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [8252-03]

9:30 am: **Network based multi-sensor optical 3D acquisition of complex structures** (*Invited Paper*), Gottfried J. Frankowski, Christian Benderoth, Rolf Hainich, GF Messtechnik GmbH (Germany) [8254-01]

Coffee Break 9:55 to 10:25 am

10:25 am: **Speckle reduction for laser-illuminated picoprojectors** (*Invited Paper*), Fergal P. Shevlin, Dyoptyka Ltd. (Ireland) [8252-04]

10:50 am: **Optotune focus tunable lens and laser speckle reduction based on electroactive polymers** (*Invited Paper*), Manuel Aschwanden, Optotune AG (Switzerland) [8252-05]

11:15 am: **Superluminescent light emitting diodes - the best out of two worlds** (*Invited Paper*), Christian Vélez, Uwe Achatz, Marco Rossetti, Marcus Duell, Jerome Napierala, Exalos AG (Switzerland) [8252-06]

11:40 am: **Bi-resonant scanning mirror with Piezo-resistive position sensor for WVGA laser projection systems**, Christian Drabe, David Kallweit, André Dreyhaupt, Jan Grahmann, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Wyatt O. Davis, MicroVision, Inc. (USA) [8252-07]

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

SESSION 2

Room: 123 (Exhibit Level) Tues. 1:30 to 3:30 pm

MEMS for Space

Joint Session with Conference 8250

Session Chair: **Sonia M. García-Blanco**, Univ. Twente (Netherlands)

1:30 pm: **MEMS technology for miniaturized space systems: needs, status and perspectives** (*Invited Paper*), Eberhard Gill, Jian Guo, Technische Univ. Delft (Netherlands) [8250-16]

2:00 pm: **MOEMS devices designed and tested for astronomical instrumentation in space** (*Invited Paper*), Frederic Zamkotsian, Observatoire Astronomique de Marseille-Provence (France); Wilfried Noell, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8250-17]

2:30 pm: **Net flux sensors for the measurement of Mars surface radiation budget**, Linh Ngo Phong, Alazzam Anas, Canadian Space Agency (Canada); Michael Daly, York Univ. (Canada); Francois Chateaneuf, INO (Canada) [8252-08]

2:50 pm: **Large MEMS-based programmable reflective slit mask for multi-object spectroscopy fabricated using multiple wafer-level bonding**, Michael D. Canonica, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Frederic Zamkotsian, Patrick Lanzoni, Observatoire Astronomique de Marseille-Provence (France); Wilfried Noell, Nico de Rooij, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8252-09]

3:10 pm: **Performance prediction and characterization of highly insulated microbolometers for space applications**, Zhiqiang Xu, Canadian Space Agency (Canada) and INO (Canada); Linh Ngo Phong, Canadian Space Agency (Canada); Timothy Pope, INO (Canada) [8250-18]

Coffee Break 3:30 to 4:00 pm

SESSION 3

Room: 123 (Exhibit Level) Tues. 4:00 to 5:20 pm

Microspectrometer and Optical Filters

Session Chair: **Frederic Zamkotsian**, Observatoire Astronomique de Marseille-Provence (France)

4:00 pm: **Translatory MEMS actuator and their system integration for miniaturized Fourier transform spectrometers**, Thilo Sandner, Thomas Grasshoff, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Andreas Kenda, Carinthian Tech Research AG (Austria) . . . [8252-10]

4:20 pm: **Advances in performance and miniaturization of a FT-IR spectrometer system based on a large stroke MOEMS piston mirror device**, Andreas Kenda, Carinthian Tech Research AG (Austria); Thilo Sandner, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Stephan Lüttjohann, Bruker Optik GmbH (Germany) [8252-11]

4:40 pm: **Spectral imaging characterization of MOEM tunable Fabry-Perot filter**, Neelam Gupta, U.S. Army Research Lab. (USA) [8252-12]

5:00 pm: **Modulator for a micro Mach-Zhender spectrometer**, Armando G. Rojas Hernández, Alejandro Garcia-Juarez, Univ. de Sonora (Mexico) . [8252-14]

Wednesday 25 January

SESSION 4

Room: 123 (Exhibit Level) Wed. 8:10 to 10:00 am

MOEM Components and Systems I

Session Chair: David L. Dickensheets, Montana State Univ. (USA)

- 8:10 am: **Shared shuttles for integrated silicon optoelectronics** (*Invited Paper*), Michael Hochberg, Univ. of Washington (USA) [8252-15]
- 8:40 am: **One dimensional light modulator**, Steffen Sinning, Ingo Wullinger, Ulrike Dauberstadt, Steffen Wolschke, Thomas Hughes, Mathias Krellmann, Michael Wagner, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [8252-16]
- 9:00 am: **Detection of resonant cantilevers using the evanescent fields of silicon nanophotonic waveguides**, Vincent T. K. Sauer, National Institute for Nanotechnology (Canada); Zhu Diao, National Institute for Nanotechnology (Canada) and Univ. of Alberta (Canada); Mark R. Freeman, Wayne K. Hiebert, National Institute for Nanotechnology (Canada) [8252-17]
- 9:20 am: **Low voltage vertical flaps arrays as optical modulating elements for reflective display and switchable gratings**, Fabio Jutzi, Wilfried Noell, Nico de Rooij, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . [8252-18]
- 9:40 am: **Dynamically deformable reflective membrane for laser beam shaping and smoothing**, Jonathan Masson, Roland Bitterli, 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 de Rooij, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8252-19]
- Coffee Break 10:00 to 10:30 am

SESSION 5

Room: 123 (Exhibit Level) Wed. 10:30 to 11:30 am

MOEM Components and Systems II

Session Chair: Wibool Piyawattanametha, National Electronics and Computer Technology Ctr. (Thailand)

- 10:30 am: **Compact read head with MEMS focus control and spherical aberration correction for multi-layer optical disks**, Sarah J. Lukes, David L. Dickensheets, Montana State Univ. (USA) [8252-20]
- 10:50 am: **Deformable mirror with controlled damping for fast focus tracking and scanning**, Mohammad J. Moghimi, Krishna N. Chattergoon, Montana State Univ. (USA); Christopher R. Wilson, Bridger Photonics, Inc. (USA); David L. Dickensheets, Montana State Univ. (USA) [8252-21]
- 11:10 am: **Miniature non-mechanical zoom camera using deformable MOEMS mirrors**, Brant M. Kaylor, Christopher R. Wilson, Nathan J. Greenfield, Peter A. Roos, Eric M. Seger, Bridger Photonics, Inc. (USA); Mohammad J. Moghimi, David L. Dickensheets, Montana State Univ. (USA) [8252-22]
- Lunch/Exhibition Break 11:30 am to 1:00 pm

SESSION 6

Room: 123 (Exhibit Level) Wed. 1:00 to 2:20 pm

Micro Lenses and Micro Lens Arrays

Session Chair: Jan Grahmann, Fraunhofer-Institut für Photonische Mikrosysteme (Germany)

- 1:00 pm: **Microelectrofluidic iris for variable aperture**, Jong-hyeon Chang, Kyu-Dong Jung, Eunsung Lee, Minseong Choi, Seung-Wan Lee, Samsung Advanced Institute of Technology (Korea, Republic of) [8252-23]
- 1:20 pm: **Thin varifocal liquid lenses actuated below 10V for mobile phone cameras**, Arnaud Pouydebasque, Sébastien Bolis, Fabrice Jacquet, Claudine Bridoux, Laëtitia Zavattoni, Sofiane Soulimane, Stéphane Moreau, Damien Saint-Patrice, Christophe Bouvier, Christophe Kopp, Stéphane Fanget, CEA-LETI (France) [8252-24]
- 1:40 pm: **Novel resistive electrodes structure for liquid crystal modal lens shifting**, Nicolas Fraval, Frédéric Berier, Evosens (France); Olivier Castany, TELECOM Bretagne (France) [8252-25]
- 2:00 pm: **Modeling and simulation of the surface profile forming process for optimum control of the lithographically fabricated microlenses and lens arrays**, Zhengyu Miao, Wanjun Wang, Louisiana State Univ. (USA) . . . [8252-26]

SESSION 7

Room: 123 (Exhibit Level) Wed. 2:25 to 4:35 pm

Microscanner

Session Chair: Wyatt O. Davis, MicroVision, Inc. (USA)

- 2:25 pm: **Optical position feedback for electrostatically driven MOEMS-scanners**, Andreas Tortschanoff, Albert Frank, Carinthian Tech Research AG (Austria); Michael Wildenhain, Thilo Sandner, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Andreas Kenda, Carinthian Tech Research AG (Austria) [8252-27]
- 2:45 pm: **Closed-loop control for quasi-static MOEMS mirrors**, Andreas Tortschanoff, Dominik Holzmann, Martin Lenzhofner, Carinthian Tech Research AG (Austria) [8252-28]
- 3:05 pm: **Vertical comb drive microscanners for beam steering, linear scanning and laser projection applications**, Denis Jung, Thilo Sandner, David Kallweit, Thomas Grasshoff, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [8252-29]
- Coffee Break 3:25 to 3:55 pm
- 3:55 pm: **A high-speed, bimodal, CMOS-MEMS resonant scanner driven by temperature-gradient actuators**, Sergio Camacho-Leon, Tecnológico de Monterrey (Mexico); Peter J. Gilgunn, Carnegie Mellon Univ. (USA); Sergio O. Martinez-Chapa, Tecnológico de Monterrey (Mexico); Gary K. Fedder, Carnegie Mellon Univ. (USA) [8252-30]
- 4:15 pm: **Self-sustained oscillation of MEMS-based micromirrors**, Deepkishore Mukhopadhyay, Dario Antonio, Il Woong Jung, Daniel Lopez, Argonne National Lab. (USA) [8252-31]

SESSION 8

Room: 123 (Exhibit Level) Wed. 4:40 to 6:10 pm

Imaging

Session Chair: Wilfried Noell, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

- 4:40 pm: **Micro optical system based 3D imaging for full HD depth image capturing** (*Invited Paper*), Yong-Hwa Park, Yong-Chul Cho, Jang-Woo You, Chang-Young Park, Heesun Yoon, Sang-Hun Lee, Jong-Oh Kwon, Seung-Wan Lee, Samsung Advanced Institute of Technology (Korea, Republic of) . [8252-32]
- 5:10 pm: **Fabrication and characterization of wavelength selective microbolometers using a planar self-aligned process for low deformation membranes**, Jong Yeon Park, Dean P. Neikirk, The Univ. of Texas at Austin (USA) [8252-33]
- 5:30 pm: **Microscopy using water droplets**, Faqur A. Chowdhury, Kenneth J. Chau, UBC Okanagan (Canada) [8252-34]
- 5:50 pm: **Microbolometers, a market perspective**, Eric Mounier, Yole Développement (France) [8252-35]

MOEMS-MEMS

Conference 8253 · Room: 250 (Mezzanine)

Tuesday and Thursday 24 and 26 January 2012 • Proceedings of SPIE Vol. 8253

MEMS Adaptive Optics VI

Conference Chairs: **Scot S. Olivier**, Lawrence Livermore National Lab. (USA); **Thomas G. Bifano**, Boston Univ. (USA); **Joel Kubby**, Univ. of California, Santa Cruz (USA)

Program Committee: **William D. Cowan**, Sandia National Labs. (USA); **Christopher Dainty**, National Univ. of Ireland, Galway (Ireland); **Donald T. Gavel**, Univ. of California Observatories (USA); **Andreas Gehner**, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **Wen-Han Jiang**, Institute of Optics and Electronics (China); **Peter A. Kner**, The Univ. of Georgia (USA); **Alexis V. Kudryashov**, Moscow State Open Univ. (Russian Federation); **Sergio R. Restaino**, U.S. Naval Research Lab. (USA); **Ulrich Wittrock**, Fachhochschule Münster (Germany)

Tuesday 24 January

POSTERS-TUESDAY

Room: 103 (Exhibit Level) Tues. 6:00 to 8:00 pm

Conference attendees are invited to attend the LASE & 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 at <http://spie.org/x27476.xml>.

Aberration correction for improving the performance of a DMHL system, Daniel R. McAdams, Daniel G. Cole, Univ. of Pittsburgh (USA) [8253-23]

Biomimetic accommodating lens with implementation in MEMS (*Oral Standby*), Alexander Hogan, Brian Baker, The Univ. of Utah (USA); Charles Fisher, Utah Nanofab (USA); Stephen Naylor, The Univ. of Utah (USA); Doug Fettig, Aptina Imaging Corp. (USA); Ian R. Harvey, The Univ. of Utah (USA) [8253-24]

Thursday 26 January

SESSION 1

Room: 250 (Mezzanine). Thurs. 8:00 to 9:15 am

Astronomy

Session Chair: **Scot S. Olivier**, Lawrence Livermore National Lab. (USA)

8:00 am: **MEMS adaptive optics in the Gemini Planet Imager** (*Invited Paper*), Bruce A. Macintosh, Lawrence Livermore National Lab. (USA) [8253-01]

8:25 am: **Space-based planet detection concept using two MEMS DM's and a shaped pupil** (*Invited Paper*), N. Jeremy Kasdin, Tyler Groff, Alexis Carlotti, Princeton Univ. (USA) [8253-02]

8:50 am: **MEMS practice, from the lab to the telescope** (*Invited Paper*), Katie M. Morzinski, Donald T. Gavel, Daren Dillon, Andrew P. Norton, Marc Reinig, Univ. of California, Santa Cruz (USA); Steven Cornelissen, Boston Micromachines Corp. (USA) [8253-03]

SESSION 2

Room: 250 (Mezzanine). Thurs. 9:15 to 10:30 am

Deformable Mirrors I

Session Chair: **Thomas G. Bifano**, Boston Univ. (USA)

9:15 am: **Push-pull deformable mirror: characterization and close loop operations** (*Invited Paper*), Tommaso Occhipinti, Alberto Acciari, Adaptica S.r.l. (Italy); Stefano Bonora, Univ. degli Studi di Padova (Italy) and Adaptica S.r.l. (Italy); Ivan Capraro, Adaptica S.r.l. (Italy); Fabio Frassetto, Consiglio Nazionale delle Ricerche (Italy); Cosmo Trestino, Gianluigi Meneghini, Villi Scalzotto, Adaptica S.r.l. (Italy) [8253-04]

9:40 am: **Advances in MEMS deformable mirror development for astronomical adaptive optics** (*Invited Paper*), Steven Cornelissen, Boston Micromachines Corp. (USA); Thomas G. Bifano, Boston Univ. (USA) . . . [8253-05]

10:05 am: **Development of high-order segmented MEMS deformable mirrors** (*Invited Paper*), Michael A. Helmbrecht, Min He, Iris AO, Inc. (USA) [8253-06]

Coffee Break 10:30 to 11:00 am

SESSION 3

Room: 250 (Mezzanine). Thurs. 11:00 to 11:55 am

Deformable Mirrors II

Session Chair: **Thomas G. Bifano**, Boston Univ. (USA)

11:00 am: **Large stroke actuators and mirror devices for ocular adaptive optics** (*Invited Paper*), Xingtao Wu, Haijiang Ou, Li Yao, Microscale, Inc. (USA); Hong Li, Chaoyang Pang, Sichuan Normal Univ. (China) [8253-07]

11:25 am: **Characterization of a miniaturized unimorph deformable mirror for high power CW-solid state lasers**, Sven Verpoort, Peter Rausch, Ulrich Wittrock, Fachhochschule Münster (Germany) [8253-08]

11:40 am: **Novel hierarchically-dimensioned deformable mirrors with integrated ASIC driver electronics**, Xingtao Wu, Haijiang Ou, Li Yao, Microscale, Inc. (USA) [8253-09]

Lunch/Exhibition Break 11:55 am to 1:00 pm

SESSION 4

Room: 250 (Mezzanine). Thurs. 1:00 to 1:45 pm

Deformable Mirrors III

Session Chair: **Joel Kubby**, Univ. of California, Santa Cruz (USA)

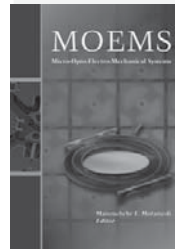
1:00 pm: **Finite element modeling for a thin-shelled composite mirror for use with a MEMS active optical system**, Christopher C. Wilcox, U.S. Naval Research Lab. (USA); Michael S. Baker, David V. Wick, Sandia National Labs. (USA); Robert Romeo, Robert Martin, Composite Mirror Applications, Inc. (USA); Brian Clark, Nicole L. Breivik, Brad Boyce, Sandia National Labs. (USA) [8253-10]

1:15 pm: **Monolithic fabrication and packaging of gold MEMS deformable mirrors**, Bautista R. Fernandez, Joel Kubby, Univ. of California, Santa Cruz (USA) [8253-11]

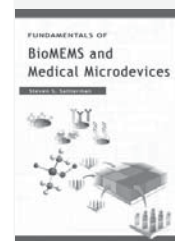
1:30 pm: **Thermo-mechanical properties of a deformable mirror with screen printed actuator**, Claudia Bruchmann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Michael Appelfelder, Erik Beckert, Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [8253-12]

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Fundamentals of BioMEMS and Medical Microdevices
by Steven S. Saliterman
Vol. PM153



MEMS and MOEMS Technology and Applications
Editor: Prosenjit Rai-Choudhury
Vol. PM85

SESSION 5

Room: 250 (Mezzanine) Thurs. 1:45 to 3:20 pm

Microscopy I

Session Chair: Joel Kubby, Univ. of California, Santa Cruz (USA)

1:45 pm: **Coherence-gated phase-shifting wavefront measurements** (*Invited Paper*), Tim van Werkhoven, Hans C. Gerritsen, Utrecht Univ. (Netherlands); Jacopo Antonello, Technische Univ. Delft (Netherlands); Rufus Fraanje, Technische Univ. Delft (Netherlands) and TNO Science and Industry (Netherlands); Michel Verhaegen, Technische Univ. Delft (Netherlands); Christoph Keller, Utrecht Univ. (Netherlands) [8253-13]

2:10 pm: **Assessing correction accuracy in image-based adaptive optics**, Delphine Débarre, Aurélie Facomprez, Emmanuel Beaufrepaire, Ecole Polytechnique (France) [8253-14]

2:25 pm: **Adaptive optics for biological microscopy using phase retrieval and phase diversity** (*Invited Paper*), Peter A. Kner, Benjamin Thomas, Andrew Herrington, The Univ. of Georgia (USA) [8253-15]

2:50 pm: **Critical considerations of pupil alignment to achieve open-loop control of MEMS deformable mirror in nonlinear laser scanning fluorescence microscopy**, Wei Sun, Wellman Ctr. for Photomedicine (USA) and Boston Univ. (USA) and Massachusetts General Hospital (USA); Yang Lu, Thomas G. Bifano, Boston Univ. (USA); Charles P. Lin, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts General Hospital (USA) [8253-16]

3:05 pm: **Adaptive optics for high-resolution microscopy and three-dimensional photonic fabrication**, Martin Booth, Univ. of Oxford (United Kingdom) [8253-17]

Coffee Break 3:20 to 3:50 pm

SESSION 6

Room: 250 (Mezzanine) Thurs. 3:50 to 5:45 pm

Microscopy II

Session Chair: Joel Kubby, Univ. of California, Santa Cruz (USA)

3:50 pm: **Adaptive optics for biological light microscopy** (*Invited Paper*), Christopher D. Saunter, Cyril J. T. Bourgenot, John M. Girkin, Gordon D. Love, Jonathan M. Taylor, Durham Univ. (United Kingdom) [8253-18]

4:15 pm: **Improving spatial resolution in photoacoustic imaging with adaptive optics** (*Invited Paper*), Hao F. Zhang, Northwestern Univ. (USA); Shuliang Jiao, The Univ. of Southern California (USA) [8253-19]

4:40 pm: **MEMS spatial light modulators for controlled optical transmission through nearly opaque materials**, Thomas G. Bifano, Yang Lu, Christopher Stockbridge, Aaron Berliner, Boston Univ. (USA); Richard G. Paxman, Paxman Consulting (USA); Santosh Tripathi, Kimani C. Toussaint, Jr., Univ. of Illinois at Urbana Champaign (USA) [8253-20]

4:55 pm: **Adaptive optics confocal microscopy using fluorescent protein guide-stars for brain tissue imaging** (*Invited Paper*), Xiaodong Tao, Oscar A. Azucena, Jr., Min Fu, Yi Zuo, Univ. of California, Santa Cruz (USA); Diana C. Chen, Lawrence Livermore National Lab. (USA); Joel Kubby, Univ. of California, Santa Cruz (USA) [8253-21]

5:20 pm: **Adaptive optics applied to super resolution localization microscopy: the practical results** (*Invited Paper*), Jerome Ballesta, Imagine Optic Inc. (USA); Jordi Andilla, Xavier Levecq, Imagine Optic SA (France) [8253-22]

Courses of Related Interest

MF109 8254 Emerging Digital Micromirror Device Based Systems and Applications IV

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Emerging Digital Micromirror Device Based Systems and Applications IV

Conference Chairs: **Michael R. Douglass**, Texas Instruments Inc. (USA); **Patrick I. Oden**, Texas Instruments Inc. (USA)

Program Committee: **Michael F. Becker**, The Univ. of Texas at Austin (USA); **Jonathan T. Fong**, Texas Instruments Inc. (USA); **Roland Höfling**, ViALUX GmbH (Germany); **Alfred Jacobsen**, Visitech AS (USA); **Paul Rancuret**, Texas Instruments Inc. (USA); **Joseph P. Rice**, National Institute of Standards and Technology (USA); **Karel J. Zuzak**, Digital Light Innovations (USA)

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Monday 23 January

MOEMS-MEMS Plenary Session

Room: 132 (Exhibit Level) Mon. 9:00 am to 12:00 pm

Session Chairs: **Harald Schenk**,
Fraunhofer Institute for Photonic Microsystems (Germany),
David L. Dickensheets, Montana State Univ. (USA)

9:00 am: **Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award**, Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany), David L. Dickensheets, Montana State Univ. (USA)

9:15 am: **Large-Scale Integration of Nanosystems**, Michael Roukes, California Institute of Technology

Coffee Break 10:00 to 10:30 am

10:30 am: **Powering the Wireless World with MEMS**, Samuel B. Schaevitz, Lilliputian Systems, Inc. (USA)

11:15 am: **Developing Diagnostics for the Developing World**, Jonathan Cooper, Univ. of Glasgow (United Kingdom)

For details see p. 24

SESSION 1

Room: 300 (Esplanade) Mon. 3:40 to 5:20 pm

Biomedical Imaging and Cell Manipulation using a Digital Micromirror Device I

Joint Session with Conference 8225

Session Chairs: **Calum E. MacAulay**, The BC Cancer Agency Research Ctr. (Canada); **Michael R. Douglass**, Texas Instruments Inc. (USA)

3:40 pm: **Multivariate optical computing using a digital micromirror device for Raman and fluorescence spectroscopy**, Zachary J. Smith, Sven Strombom, Sebastian Wachsmann-Hogiu, UC Davis Medical Ctr. (USA) [8225-55]

4:00 pm: **Realization of an endoscope equipped with microprojection system for optogenetics**, Ramin Pashaie, Univ. of Wisconsin-Milwaukee (USA) [8225-56]

4:20 pm: **Design and development of a wide-field structured illumination fluorescence imaging system for breast tumor margin assessment**, Henry L. Fu, Nimmi Ramamujam, J. Quincy Brown, Duke Univ. (USA) [8225-57]

4:40 pm: **Investigation of in situ fluorescence optical detection based on a programmable spatial light modulator**, Jong-ryul Choi, Kyujung Kim, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8225-58]

Tuesday 24 January

SESSION 2

Room: 123 (Exhibit Level) Tues. 8:20 am to 12:00 pm

Picoprojectors: Systems and Components

Joint Session with Conference 8252

Session Chairs: **Paul Rancuret**, Texas Instruments Inc. (USA); **Yong-Hwa Park**, Samsung Advanced Institute of Technology (Korea, Republic of)

8:20 am: **Trajectory precision of micromachined scanning mirrors for laser beam scanning pico-projector displays (Invited Paper)**, Wyatt O. Davis, Michael Beard, Robert Jackson, Microvision, Inc. (USA) [8252-01]

8:45 am: **MEMS-based micro projection system with a 1.5cc optical engine (Invited Paper)**, Lucio Kilcher, Nicolas Abele, Lemoptix SA (Switzerland) [8252-02]

9:10 am: **Laser projector solution based on two 1D resonant micro scanning mirrors assembled in a low vertical distortion scan head**, Jan Grahmann, Michael Wildenhain, Thomas Grasshoff, Hans-Georg Dallmann, Christian Gerwig, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Alexander Wolter, HiperScan GmbH (Germany); Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [8252-03]

9:30 am: **Network based multi-sensor optical 3D acquisition of complex structures (Invited Paper)**, Gottfried J. Frankowski, Christian Benderoth, Rolf Hainich, GF Messtechnik GmbH (Germany) [8254-01]

Coffee Break 9:55 to 10:25 am

10:25 am: **Speckle reduction for laser-illuminated picoprojectors (Invited Paper)**, Fergal P. Shevlin, Dyoptyka Ltd. (Ireland) [8252-04]

10:50 am: **Optotune focus tunable lens and laser speckle reduction based on electroactive polymers (Invited Paper)**, Manuel Aschwanden, Optotune AG (Switzerland) [8252-05]

11:15 am: **Superluminescent light emitting diodes - the best out of two worlds (Invited Paper)**, Christian Vélez, Uwe Achatz, Marco Rossetti, Marcus Duelk, Jerome Napierala, Exalos AG (Switzerland) [8252-06]

11:40 am: **Bi-resonant scanning mirror with Piezo-resistive position sensor for WVGA laser projection systems**, Christian Drabe, David Kallweit, André Dreyhaupt, Jan Grahmann, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Wyatt O. Davis, MicroVision, Inc. (USA) [8252-07]

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

SESSION 3

Room: 300 (Esplanade) Tues. 1:30 to 3:10 pm

**Biomedical Imaging and Cell Manipulation
using a Digital Micromirror Device II**

Joint Session with Conference 8225

Session Chairs: **Karel J. Zuzak**, Digital Light Innovations (USA);
James F. Leary, Purdue Univ. (USA)

- 1:30 pm: **Hyperspectral imaging in the operating room: what a surgeon wants** (*Invited Paper*), Sara L. Best, Univ. of Wisconsin School of Medicine and Public Health (USA) [8254-02]
- 2:00 pm: **Evaluation of a novel laparoscopic camera for characterization of renal ischemia in a porcine model using DLP® hyperspectral imaging** (*Invited Paper*), Ephrem O. Olweny, Sara L. Best, Neil Jackson, Eleanor F. Wehner, Samuel K. Park, Yung K. Tan, Abhas Thapa, Jeffrey A. Cadeddu, Karel J. Zuzak, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) [8254-03]
- 2:30 pm: **Instrument validation and applications of a clinic-friendly spatial frequency domain imaging (SFDI) device**, David J. Cuccia, Modulated Imaging, Inc. (USA) [8254-04]
- 2:50 pm: **Advances in optical tomography using spatial frequency domain imaging**, Soren D. Konecky, Tyler B. Rice, Alexander Lin, Amaan Mazhar, Rolf B. Saager, Beckman Laser Institute and Medical Clinic (USA); David J. Cuccia, Modulated Imaging, Inc. (USA); Anthony J. Durkin, Bernard Choi, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8254-05]
- Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 300 (Esplanade) Tues. 3:40 to 5:20 pm

**Biomedical Imaging and Cell Manipulation
using a Digital Micromirror Device III**

Joint Session with Conference 8225

Session Chairs: **Michael R. Douglass**, Texas Instruments Inc. (USA);
James F. Leary, Purdue Univ. (USA)

- 3:40 pm: **Digital micromirror device based confocal 4D-microscopy** (*Invited Paper*), Walter Neu, Markus Schellenberg, Fachhochschule Oldenburg/Ostfriesland/Wilhelmshaven (Germany) [8254-06]
- 4:10 pm: **A pico projector source for confocal fluorescence and ophthalmic imaging** (*Invited Paper*), Matthew Muller, Aeon Imaging, LLC (USA) . . . [8254-07]
- 4:40 pm: **Medical devices in dermatology using DLP® technology from Texas Instruments**, Friedrich Lüllau, Lüllau Engineering GmbH (Germany) [8254-08]
- 5:00 pm: **Implementation of an LED based clinical Spatial Frequency Domain Imaging (SFDI) system**, Amaan Mazhar, Seyed A. Sharif, Beckman Laser Institute and Medical Clinic (USA); Steve Saggese, David J. Cuccia, Modulated Imaging, Inc. (USA); Bernard Choi, Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (USA) [8254-09]

Wednesday 25 January

Welcome

Room: 250 (Mezzanine) Wed. 8:30 to 8:40 am

Michael R. Douglass and **Patrick I. Oden**, Texas Instruments Inc.

SESSION 5

Room: 250 (Mezzanine) Wed. 8:40 to 9:40 am

Holographic Implementation

Session Chairs: **Patrick I. Oden**, Texas Instruments Inc. (USA);
Alfred Jacobsen, Visitech AS (Germany)

- 8:40 am: **Realtime 3D holographic display**, Luigi Loreti, Opto-electronics s.r.l. (Italy) [8254-10]
- 9:00 am: **Suppression of the zero-order diffraction beam from computer-generated holograms using a DLP® spatial light modulator**, Sih-Ying Wu, Jinyang Liang, Michael F. Becker, The Univ. of Texas at Austin (USA) . [8254-11]
- 9:20 am: **Application of DMD device in lithography system for security holograms production**, Eugene V. Braginets, Svitlana Honcharuk, Volodymyr Girnyk, Kievolografia Ltd. (Ukraine) [8254-12]

SESSION 6

Room: 250 (Mezzanine) Wed. 9:40 to 10:00 am

Rapid Prototyping

Session Chairs: **Patrick I. Oden**, Texas Instruments Inc. (USA);
Alfred Jacobsen, Visitech AS (Germany)

- 9:40 am: **DLP based light engines for additive manufacturing of ceramic parts**, Jurgen Stampfl, Simon Gruber, Ruth Felzmann, Gerald Mitteramskogler, Robert Liska, Technische Univ. Wien (Austria) [8254-13]
- Coffee Break 10:00 to 10:30 am

SESSION 7

Room: 250 (Mezzanine) Wed. 10:30 to 11:50 am

3D Measurement Systems Using Structured Light

Session Chairs: **Paul Rancuret**, Texas Instruments Inc. (USA);
Joseph P. Rice, National Institute of Standards and Technology (USA)

- 10:30 am: **A high resolution body scanning system based on structured light**, Matthew W. Bellis, Seikowave (USA); Daniel L. Lau, Univ. of Kentucky (USA) [8254-27]
- 10:50 am: **Face recognition via a projective compressive sensing system**, Brant M. Kaylor, Charlie J. Keith, Peter A. Roos, Randy R. Reibel, Bridger Photonics, Inc. (USA) [8254-15]
- 11:10 am: **Hi-speed 3D measurement system using DMD-based projector for industrial applications**, Yasumoto Mori, Keisuke Saito, Kenji Homma, Yasuhiro Ohnishi, Daisuke Mitsumoto, Masaki Suwa, OMRON Corp. (Japan) [8254-16]
- 11:30 am: **Volumetric 3D display using a DLP projection engine**, Jason Geng, Xigen, LLC (USA) [8254-17]
- Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 8

Room: 250 (Mezzanine) Wed. 1:30 to 2:10 pm

Advanced Display

Session Chairs: **Roland Höfling**, ViALUX GmbH (Germany);
Michael F. Becker, The Univ. of Texas at Austin (USA)

- 1:30 pm: **Considerations for DMDs operating in the infrared**, Julia Rentz Dupuis, David J. Mansur, James R. Engel, OPTRA, Inc. (USA) [8254-18]
- 1:50 pm: **Full color, high contrast front projection on black emissive display**, Ted Sun, Sun Innovations Inc. (USA); Greg Pettitt, Nguyen T. Ho, Kurt Eckles, Texas Instruments Inc. (USA); Ben Clifton, Planar Systems, Inc. (USA); Botao Cheng, Sun Innovations Inc. (USA) [8254-19]

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Conference 8254 · Room: 250 (Mezzanine)

SESSION 9

Room: 250 (Mezzanine) Wed. 2:10 to 3:10 pm

Laser Beam Shaping

Session Chairs: **Michael F. Becker**, The Univ. of Texas at Austin (USA);
Roland Höfling, ViALUX GmbH (Germany)

2:10 pm: **Multimode fiber-based high-power laser distribution using DLP technology**, Adèle Morisset, Elodie Durbize, Bruno Chassagne, Christophe Pierre, Arnaud Zoubir, Sébastien Ermeuex, ALPhANOV (France). . . . [8254-20]

2:30 pm: **Band-limited laser image projection using a DMD-based beam shaper**, Jinyang Liang, Sih-Ying Wu, Rudolph N. Kohn, Michael F. Becker, Daniel J. Heinzen, The Univ. of Texas at Austin (USA) [8254-21]

2:50 pm: **Application of DMD: laser speckle control for rough surface photofabrication**, Vincent Brissonneau, Thales Optronique S.A. (France) and IM2NP (France); Ludovic Escoubas, Institut Matériaux Microélectronique Nanosciences de Provence (France) and Aix Marseille Univ. (France); François Flory, Institut Matériaux Microélectronique Nanosciences de Provence (France) and Ecole Centrale Marseille (France); Gérard Berginc, Thales Optronique S.A. (France) [8254-22]

Coffee Break 3:10 to 3:40 pm

SESSION 10

Room: 250 (Mezzanine) Wed. 3:40 to 5:00 pm

Dynamic Spectral Imaging and Attenuation


Session Chairs: **Jonathan T. Fong**, Texas Instruments Inc. (USA);
Karel J. Zuzak, Digital Light Innovations (USA)

3:40 pm: **Study of a near infrared digital micromirror device-based snapshot spectral imaging system**, Yuehao Wu, Iftekhar O. Mirza, Gonzalo R. Arce, Dennis W. Prather, Univ. of Delaware (USA) [8254-23]

4:00 pm: **Flat spectral response all-digital broadband variable fiber-optic attenuator**, Mumtaz A. Sheikh, Lahore Univ. of Management Sciences (Pakistan) [8254-24]

4:20 pm: **Demonstrator of a multi-object spectrograph based on the 2048x1080 DMD**, Frederic Zamkotsian, Observatoire Astronomique de Marseille-Provence (France); Paolo Spano, INAF - Osservatorio Astronomico di Brera (Italy); William Bon, Patrick Lanzoni, Observatoire Astronomique de Marseille-Provence (France) [8254-25]

4:40 pm: **Hyperspectral image projector applications**, Joseph P. Rice, National Institute of Standards and Technology (USA) [8254-26]



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- Yakov Sidorin**, Quarles Brady LLP (USA)
- Peter M. Smowton**, Cardiff Univ. (United Kingdom)
- Jin-Joo Song**, Univ. of California, San Diego (USA)
- Atul K. Srivastava**, OneTerabit (USA)
- Klaus P. Streubel**, OSRAM GmbH (Germany)
- Frank Szmulowicz**, Univ. of Dayton Research Institute (USA)
- Christopher Tabor**, Air Force Research Lab. (USA)
- Ferechteh H. Teherani**, Nanovation (France)
- Kong-Thon Tsen**, Arizona State Univ. (USA)
- Katsutoshi Tsakamoto**, Osaka Univ. (Japan)
- Li-Wei Tu**, National Sun Yat-Sen Univ. (Taiwan)
- Werner Weiershausen**, Deutsche Telekom AG (Germany)
- Alan E. Willner**, The Univ. of Southern California (USA)
- Bernd Witzigmann**, Univ. Kassel (Germany)
- Ming Hsien Wu**, Hamamatsu Corp. (USA)
- Weimin Zhou**, U.S. Army Research Lab. (USA)

OPTO Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Optoelectronic Materials and Devices					
Program Chair: James G. Grote , Air Force Research Lab. (USA)					
	8259 RF and Millimeter-Wave Photonics II (Nelson, Prather, Schuetz) p. 247	8255 Physics and Simulation of Optoelectronic Devices XX (Witzigmann, Osinski, Henneberger, Arakawa) p. 233			
		8256 Physics, Simulation, and Photonic Engineering of Photovoltaic Devices (Freundlich, Guillemoles) p. 237			8257 Optical Components and Materials IX (Jiang, Digonnet, Dries) p. 241
		8258 Organic Photonic Materials and Devices XIV (Tabor, Kajzar, Kaino, Koike) p. 244			
	8260 Ultrafast Phenomena and Nanophotonics XVI (Betz, Elezzabi, Song, Tsen) p. 248				
				8261 Terahertz Technology and Applications V (Sadwick, O'Sullivan) p. 252	
		8262 Gallium Nitride Materials and Devices VII (Chyi, Nanishi, Morkoç) p. 254			
	8263 Oxide-based Materials and Devices III (Teherani, Look, Rogers) p. 259				
Photonic Integration					
Program Chair: Yakov Sidorin , Quarles Brandy LLP (USA)					
	8259 RF and Millimeter-Wave Photonics II (Nelson, Prather, Schuetz) p. 247	8264 Integrated Optics: Devices, Materials, and Technologies XVI (Broquin, Nunzi Conti) p. 263			
				8265 Optoelectronic Integrated Circuits XIV (Eldada, Lee) p. 266	
	8266 Silicon Photonics VII (Kubby, Reed) p. 268				
		8267 Optoelectronic Interconnects XII (Glebov, Chen) p. 270			
Nanotechnologies in Photonics					
Program Chair: Ali Adibi , Georgia Institute of Technology (USA)					
			8249 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics V (Schoenfeld, Rumpf, von Freymann) p. 213		
	8268 Quantum Sensing and Nanophotonic Devices IX (Razeghi) p. 273				
		8269 Photonic and Phononic Properties of Engineered Nanostructures II (Adibi, Lin, Scherer) p. 279			
	8270 High Contrast Metastructures (Chang-Hasnain, Koyama, Willner, Zhou) p. 283				
			8271 Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling IX (Eyink, Szmulowicz, Huffaker) p. 285		

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
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Advanced Quantum and Optoelectronic Applications

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

8268 **Quantum Sensing and Nanophotonic Devices IX** (*Razeghi*) p. 273

8271 **Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling IX** (*Eyink, Szmulowicz, Huffaker*) p. 285

8272 **Advances in Photonics of Quantum Computing, Memory, and Communication V** (*Hasan, Hemmer, Lee, Santori*) p. 287

8273 **Advances in Slow and Fast Light V** (*Shahriar, Narducci*) p. 291

8274 **Complex Light and Optical Forces VI** (*Galvez, Andrews, Glückstad*) p. 294

8275 **Laser Refrigeration of Solids V** (*Epstein, Sheik-Bahae*) p. 296

Semiconductor Lasers and LEDs

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

8241 **High-Power Diode Laser Technology and Applications X** (*Zediker*) p. 192

8276 **Vertical-Cavity Surface-Emitting Lasers XVI** (*Lei, Choquette*) p. 297

8242 **Vertical External Cavity Surface Emitting Lasers (VECSELs) II** (*Tropper*) p. 194

8255 **Physics and Simulation of Optoelectronic Devices XX** (*Witzigmann, Osiniski, Henneberger, Arakawa*) p. 233

8262 **Gallium Nitride Materials and Devices VII** (*Chyi, Nanishi, Morkoç*) p. 254

8277 **Novel In-Plane Semiconductor Lasers XI** (*Belyanin, Smowton*) p. 299

8278 **Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVI** (*Streubel, Jeon, Tu*) p. 303

Displays and Holography

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

8279 **Emerging Liquid Crystal Technologies VII** (*Chien*) p. 306

8280 **Advances in Display Technologies II** (*Chien, Lee, Wu*) p. 309

8281 **Practical Holography XXVI: Materials and Applications** (*Bjelkhagen, Bove*) p. 311

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OPTO Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Optical Communications: Devices to Systems					
Program Chair: Benjamin Dingel , Nasfine Photonics, Inc. (USA)					
	8259 RF and Millimeter-Wave Photonics II (<i>Nelson, Prather, Schuetz</i>) p. 247		8246 Free-Space Laser Communication Technologies XXIV (<i>Hemmati, Boroson</i>) p. 204		
	8266 Silicon Photonics VII (<i>Kubby, Reed</i>) p. 268	8267 Optoelectronic Interconnects XII (<i>Glebov, Chen</i>) p. 270			
			8282 Broadband Access Communication Technologies VI (<i>Dingel, Jain, Tsukamoto</i>) p. 314		
			8283 Optical Metro Networks and Short-Haul Systems IV (<i>Weiershausen, Dingel, Dutta, Srivastava</i>) p. 316		
			8284 Next-Generation Optical Communication: Components, Sub-Systems, and Systems (<i>Li, Jäger</i>) p. 319		



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Physics and Simulation of Optoelectronic Devices XX

Conference Chairs: **Bernd Witzigmann**, Univ. Kassel (Germany); **Marek Osinski**, The Univ. of New Mexico (USA); **Fritz Henneberger**, Humboldt-Univ. zu Berlin (Germany); **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan)

Program Committee: **Hiroshi Amano**, Nagoya Univ. (Japan); **Toshihiko Baba**, Yokohama National Univ. (Japan); **Weng W. Chow**, Sandia National Labs. (USA); **Shun Lien Chuang**, Univ. of Illinois at Urbana-Champaign (USA); **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. (USA); **Alexandre Freundlich**, Univ. of Houston (USA); **Stephan W. Koch**, Philipps-Univ. Marburg (Germany); **Vassilios I. Kovanis**, Air Force Research Lab. (USA); **Nikolay N. Ledentsov**, VI Systems GmbH (Germany); **Cun-Zheng Ning**, Arizona State Univ. (USA); **Joachim Piprek**, NUSOD Institute LLC (USA); **Ikuo Suemune**, Hokkaido Univ. (Japan)

Monday 23 January

SESSION 1

Room: 301 (Esplanade) Mon. 8:00 to 10:20 am

Spontaneous Two-Photon Emission from Semiconductors

Session Chairs: **Ikuo Suemune**, Hokkaido Univ. (Japan); **Bernd Witzigmann**, Univ. Kassel (Germany)

8:00 am: **Spontaneous two-photon emission from semiconductors and its prospect**, Ikuo Suemune, Hokkaido Univ. (Japan) [8255-01]

8:20 am: **Applications of quantum photonics for communications and metrology** (*Invited Paper*), Alex Hayat, Ardavan Darabi, Lee A. Rozema, Dylan Mahler, Yasaman Soudagar, Xingxing Xing, Amir Feizpour, Aephraim M. Steinberg, Univ. of Toronto (Canada) [8255-02]

8:50 am: **Spontaneous two photon emission from a single quantum dot coupled to photonic crystal nanocavity** (*Invited Paper*), Yasutomoto Ota, Satoshi Iwamoto, Naoto Kumagai, Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [8255-03]

9:20 am: **Generation of a two-photon state from a quantum dot in a microcavity** (*Invited Paper*), Elena del Valle, Technische Univ. München (Germany) [8255-04]

9:50 am: **Two-photon emission process with Cooper-pair injection into semiconductors** (*Invited Paper*), Hirotaka Sasakura, Ikuo Suemune, Hidekazu Kumano, Claus Hermannstaedter, Hokkaido Univ. (Japan) [8255-05]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 301 (Esplanade) Mon. 10:50 am to 12:20 pm

Laser Dynamics: Optical Injection

Session Chair: **Horacio Lamela Rivera**, Univ. Carlos III de Madrid (Spain)

10:50 am: **Frequency chirp stabilization in semiconductor distributed feedback lasers with external control** (*Invited Paper*), Frederic Grillot, Telecom ParisTech (France) and Univ. Européenne de Bretagne, INSA (France); Jean-Guy Provost, III-V Lab. (France); Khalil Kechaou, Bruno J. Theirez, Didier Erasme, Telecom ParisTech (France) [8255-06]

11:20 am: **Rate equation analysis of dynamic response in strongly injection-locked cascaded semiconductor microring lasers**, Gennady A. Smolyakov, Marek Osinski, The Univ. of New Mexico (USA) [8255-07]

11:40 am: **Optical spectral analysis of the nonlinear dynamics in long-wavelength single-mode VCSELs subject to orthogonal optical injection**, Angel Valle, Ana Quirce, Pablo Perez, Luis Pesquera, Univ. de Cantabria (Spain) [8255-08]

12:00 pm: **Dynamics of polarization switching in a 1550-nm VCSEL subject to single and double polarized optical injection**, Antonio Hurtado, Ian D. Henning, Michael J. Adams, Univ. of Essex (United Kingdom) . . [8255-09]

Lunch Break 12:20 to 1:40 pm

SESSION 3

Room: 301 (Esplanade) Mon. 1:40 to 3:00 pm

Quantum Dot Devices

Session Chair: **Elena del Valle**, Technische Univ. München (Germany)

1:40 pm: **Free carrier effects in 1.3- μ m quantum dot lasers leading to a negative differential gain**, Hifsa Shahid, David T. D. Childs, Benjamin J. Stevens, Richard A. Hogg, The Univ. of Sheffield (United Kingdom) . . . [8255-10]

2:00 pm: **Temperature effects on the characterization of new quantum dot dual mode lasers for terahertz generation**, Bruno Gonzalez Izquierdo, Horacio Lamela Rivera, Univ. Carlos III de Madrid (Spain); Vitalii Sichkovskiy, Johann Peter Reithmaier, Univ. Kassel (Germany) [8255-11]

2:20 pm: **Numerical simulation of nonlinear mode interactions in ridge-waveguide semiconductor lasers**, HemaShilpa Kalagara, Petr G. Eliseev, Marek Osinski, The Univ. of New Mexico (USA) [8255-12]

2:40 pm: **Hybrid quantum well/dot structures for broad spectral bandwidth devices**, Siming C. Chen, Kejia J. Zhou, Ziyang Zhang, David T. D. Childs, Andrew J. Ramsay, Richard A. Hogg, The Univ. of Sheffield (United Kingdom) [8255-13]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 301 (Esplanade) Mon. 3:30 to 5:20 pm

Light Emitting Diodes

Session Chair: **Nikolay N. Ledentsov**, VI Systems GmbH (Germany)

3:30 pm: **Bandstructure influences on InGaN light-emitting diode efficiency** (*Invited Paper*), Weng W. Chow, Sandia National Labs. (USA) [8255-14]

4:00 pm: **Computational study of white InGaN/GaN nanowire LEDs with continuously varied indium composition**, Marcus Deppner, Friedhard Roemer, Bernd Witzigmann, Univ. Kassel (Germany) [8255-15]

4:20 pm: **Enhancing the luminescence and efficiency of InGaN/GaN core-shell nanowire LEDs by numerical modelling**, Friedhard Roemer, Marcus Deppner, Bernd Witzigmann, Univ. of Kassel (Germany) [8255-16]

4:40 pm: **The effect of exciton dimensionality on resonance energy transfer: advances for organic color converters in hybrid inorganic/organic LEDs**, Jan Junis Rindermann, Univ. of Southampton (United Kingdom); Galia R. Pozina, Bo Monemar, Lars Hultman, Linköping Univ. (Sweden); Hiroshi Amano, Nagoya Univ. (Japan); Pavlos G. Lagoudakis, Univ. of Southampton (United Kingdom) [8255-17]

5:00 pm: **Optimizing software simulation of particulate down-converting phosphor blends for warm white high CRI LED illumination**, Jonathan H. Melman, Intematix Corp. (USA); William J. Cassarly, Synopsys, Inc. (USA); Haitao Yang, Gang Wang, Intematix Corp. (USA); Thomas L. R. Davenport, Synopsys, Inc. (USA) [8255-18]

Tuesday 24 January

OPTO Plenary Session
Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am
Session Chairs: Klaus P. Streubel, OSRAM GmbH (Germany); David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)
 8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)
 8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
 8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)
 8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)
 9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)
 See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 5

Room: 301 (Esplanade) Tues. 10:30 am to 12:10 pm

Electromagnetics I

Session Chair: Stavroula Foteinopoulou, The Univ. of Exeter (United Kingdom)

- 10:30 am: **Numerical method for precise simulation of optical modes in VCSELs**, Sven Burger, Maria Rozova, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Jan Pomplun, Frank Schmidt, JCMwave GmbH (Germany) [8255-19]
 10:50 am: **A meshless based solution to vectorial mode fields in optical microstructured waveguides**, Daniel Burke, Tom J. Smy, Carleton Univ. (Canada) [8255-20]
 11:10 am: **On the performance of numerical modeling for diffractive grating using couple mode theory**, Dong-Xue Wang, OSRAM SYLVANIA Inc. (USA) [8255-21]
 11:30 am: **Choice of the perfectly matched layer boundary condition for iterative solvers of the frequency-domain Maxwell's equations**, Wonseok Shin, Shanhui Fan, Stanford Univ. (USA) [8255-22]
 11:50 am: **The light path tree algorithm for non-sequential field tracing**, Michael Kuhn, LightTrans GmbH (Germany); Frank Wyrowski, Friedrich-Schiller- Univ. Jena (Germany); Christian Hellmann, LightTrans GmbH (Germany) [8255-23]
 Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 6

Room: 301 (Esplanade) Tues. 1:30 to 2:50 pm

Plasmonics

Session Chair: Bernd Witzigmann, Univ. Kassel (Germany)

- 1:30 pm: **Fundamentals of excitation and resonance of a near-field transducer in the presence of a conductive magnetic recording medium**, Jessica R. Piper, Paul Hansen, Lambertus Hesselink, Stanford Univ. (USA) [8255-24]
 1:50 pm: **Investigations of deterministic IR surface plasmon properties in doped zinc oxides**, Justin W. Cleary, Michael Snure, Joshua Hendrickson, Air Force Research Lab. (USA); Robert E. Peale, Univ. of Central Florida (USA); Walter R. Buchwald, Solid State Scientific Corp. (USA) [8255-25]
 2:10 pm: **Dispersion analysis of subwavelength square apertures at optical frequencies**, Eli Lansey, The City College of New York (USA); Jonah N. Gollub, Phoebus Optoelectronics, LLC (USA); David T. Crouse, The City College of New York (USA) [8255-26]
 2:30 pm: **Tunable surface plasmon band-gap in an index-perturbed double-electrode waveguide structure**, Yanyan Zhou, A*STAR Singapore Institute of Manufacturing Technology (Singapore) [8255-27]
 Coffee Break 2:50 to 3:20 pm

SESSION 7

Room: 301 (Esplanade) Tues. 3:20 to 5:10 pm

Electromagnetics II

Session Chair: Friedhard Römer, Univ. Kassel (Germany)

- 3:20 pm: **Metamaterials based on polaritonic composites for THz and mid-IR (Invited Paper)**, Stavroula Foteinopoulou, The Univ. of Exeter (United Kingdom) [8255-28]
 3:50 pm: **Design of Bragg gratings having negative group time delay for continuum generation**, Grigore Adrian Iordachescu, Joel Jacquet, Supélec (France) [8255-29]
 4:10 pm: **Optimization of nanophotonic devices with adjoint FDTD**, Paul Hansen, Yuxin Zheng, Lambertus Hesselink, Stanford Univ. (USA) [8255-31]
 4:30 pm: **Efficient 3D FDTD analysis of arbitrary birefringent and dichroic media with obliquely incident sources**, Matthew N. Miskiewicz, Patrick T. Bowen, Michael J. Escuti, North Carolina State Univ. (USA) [8255-32]
 4:50 pm: **Scattered light by refracting and reflecting surfaces**, Romuald Pawluczzyk, Arash Rohani, P&P Optica Inc. (Canada) [8255-33]

Wednesday 25 January

SESSION 8

Room: 301 (Esplanade) Wed. 8:00 to 10:10 am

Semiconductor Lasers

Session Chair: Joachim Piprek, NUSOD Institute LLC (USA)

- 8:00 am: **Advances in quantum dot lasers for silicon photonics application (Invited Paper)**, Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [8255-34]
 8:30 am: **Realization of a photonic crystal surface emitting laser through GaAs based overgrowth**, David Williams, Kristian M. Groom, David T. D. Childs, Benjamin J. Stevens, Salam Khamas, Tim Roberts, Richard Taylor, Richard Hogg, The Univ. of Sheffield (United Kingdom); Naoki Ikeda, Yoshimasa Sugimoto, National Institute for Materials Science (Japan) [8255-35]
 8:50 am: **Thermo-optical simulation of high-power diode lasers**, Jan Pomplun, JCMwave GmbH (Germany); Sven Burger, Zuse Institute Berlin (Germany); Lin Zschiedrich, JCMwave GmbH (Germany); Maria Rozova, Frank Schmidt, Zuse Institute Berlin (Germany); Hans Wenzel, Paul Crump, Hossein Ekhteraei, Christoph M. Schultz, Götz Erbert, Ferdinand-Braun-Institut (Germany) [8255-36]
 9:10 am: **Bending losses and modal properties of serpentine and bent waveguides**, Fei-Hung Chu, HemaShilpa Kalagara, Emmanuel Mercado Sotelo, Gennady A. Smolyakov, The Univ. of New Mexico (USA); Aaron V. Gin, Sandia National Labs. (USA); Marek Osinski, The Univ. of New Mexico (USA) . [8255-37]
 9:30 am: **Thermally tunable DFB dual mode laser diode by an external platinum thin-film heater for THz generation**, Horacio Lamela Rivera, Ehsan Dadrasnia, Univ. Carlos III de Madrid (Spain); Kamen Kozuharov, Johann Peter Reithmaier, Univ. Kassel (Germany) [8255-38]
 9:50 am: **Comparison of linewidth enhancement factor for compressively strained AlGaInAs and InGaAsP quantum well lasers**, Durga P. Sapkota, Koichi Wakita, Madhu S. Kayastha, Chubu Univ. (Japan) [8255-39]
 Coffee Break 10:10 to 10:40 am

SESSION 9

Room: 301 (Esplanade) Wed. 10:40 am to 12:20 pm

Photovoltaics Simulation

Session Chair: **Weng W. Chow**, Sandia National Labs. (USA)10:40 am: **The solar cell physics required to approach the Shockley-Queisser efficiency limit** (*Invited Paper*), Eli Yablonovitch, Univ. of California, Berkeley (USA). [8255-40]11:20 am: **Semiconductor nanowire solar cells: high efficiency concepts**, Bernd Witzigmann, Shuqing Yu, Univ. Kassel (Germany); Jan Kupec, ETH Zurich (Switzerland) [8255-41]11:40 am: **Carrier dynamics and defects in MOVPE-grown bulk InGaAs layers with metamorphic InGaAs and InGaPsb buffer layers for solar cells**, Yongkun Sin, Stephen LaLumondiere, Brendan Foran, William T. Lotshaw, Steven C. Moss, The Aerospace Corp. (USA); Tae Wan Kim, Jeremy Kirch, Steven Ruder, Luke J. Mawst, Thomas F. Kuech, Univ. of Wisconsin-Madison (USA) [8255-42]12:00 pm: **Study of silicon solar cell double-triangular nano-gratings**, Ashton Ellaboudy, Michael James Marshall, Gregory J. Chavoor, Xiaomin Jin, California Polytechnic State Univ., San Luis Obispo (USA). [8255-43]

Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 10

Room: 301 (Esplanade) Wed. 1:50 to 3:30 pm

Passive Optics

Session Chair: **Frederic Grillet**, Telecom ParisTech (France) and Univ. Européenne de Bretagne (France)1:50 pm: **Using the finite difference method in the analysis of micro-size SOI MMI couplers with asymmetric tapers**, Ali A. Hussein, Sawzan A. Majid, Univ. of Ottawa (Canada); Trevor J. Hall, Univ. of Ottawa (Canada) and Canada Research Chair in Photonic Network Technology (Canada) and Univ. of London (United Kingdom). [8255-44]2:10 pm: **Multi-helix chiral fiber gratings**, Shengxi Li, Ming Zhao, Yuzhen Qin, Qianpeng Zhang, Zhenyu Yang, Wuhan National Lab. for Optoelectronics (China) [8255-45]2:30 pm: **Modeling of a 2x2 multimode interference switch for wider optical window operation**, Ghanshyam Singh, Abhishek Goyal, Vijay Janyani, R. P. Yadav, Malaviya National Institute of Technology (India) [8255-46]2:50 pm: **Estimation of coupling power parameters of 1x3 directional fused fiber coupler**, Dedi Irawan, Univ. Teknologi Malaysia (Malaysia); Toto Saktioto, Univ. of Riau (Indonesia); Jalil Ali, Univ. Teknologi Malaysia (Malaysia); Iwantonio Iwantonio, Univ. of Riau (Indonesia). [8255-47]3:10 pm: **Parametrization of optical constants of anisotropic materials**, Daniel Franta, David Necas, Ivan Ohlídal, Masaryk Univ. (Czech Republic) [8255-48]

Coffee Break 3:30 to 4:00 pm

SESSION 11

Room: 301 (Esplanade) Wed. 4:00 to 5:50 pm

Microcavities and VECSELS

Session Chair: **Alex Hayat**, Univ. of Toronto (Canada)4:00 pm: **From an exciton laser to a polariton laser in a ZnO microcavity** (*Invited Paper*), Thierry Guillet, Stéphane Faure, Meletios Mexis, Christelle Brimont, Thierry Bretagnon, Bernard Gil, Univ. Montpellier 2 (France) and Ctr. National de la Recherche Scientifique (France); Jesus Zuniga-Perez, Fabrice Sémont, Mathieu L. Leroux, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Sophie Bouchoule, Ctr. National de la Recherche Scientifique (France); François Médard, Martine Mihailovic, Pierre Disseix, Joel Leymarie, Univ. Blaise Pascal (France) [8255-49]4:30 pm: **VECSEL action and strong exciton-photon coupling in all-monolayer ZnO-based microcavities**, Fritz Henneberger, Simon Halm, Sascha Kalusniak, Sergey Sadofev, Humboldt-Univ. zu Berlin (Germany) [8255-50]4:50 pm: **Exciton-polaritons study in ZnO-based hybrid microcavities**, Yu-Pin Lan, Tien-Chang Lu, Ying-Yu Lai, Si-Wei Huang, Jun-Rong Chen, Yung-Chi Wu, Shiang-Chi Lin, Shing-Chung Wang, Wen-Feng Hsieh, National Chiao Tung Univ. (Taiwan); Hui Deng, Univ. of Michigan (USA) [8255-51]5:10 pm: **Universality in the quantum to classical transition of the one-atom laser**, Fabrice P. Laussy, Elena del Valle, Jonathan J. Finley, Technische Univ. München (Germany) [8255-52]5:30 pm: **Narrow band high transmission mode in nanocavity self-assembly structure**, Young Uk Jung, The City College of New York (USA); Jonah N. Gollub, Phoebus Optoelectronics, LLC (USA); David T. Crouse, The City College of New York (USA). [8255-53]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Application of anti-reflection structures on curved surfaces, Kazuya Yamamoto, Nalux Co., Ltd. (Japan) [8255-65]**A novel single-transistor APS and its comparison with 3T CMOS image sensor**, Xin-Yan Liu, Peng-Fei Wang, Xi Lin, Cheng-Wei Cao, Qing-Qing Sun, Wei D. Zhang, Fudan Univ. (China); Paul-Chang Lin, Yi-Jun Bian, Cheng Xing, Semiconductor Manufacturing International Corp. (China). [8255-66]**Two-dimensional cell parameters measurement of a twisted nematic liquid crystal device by using imaging ellipsometer**, Chien Chou, Chih-Jen Yu, Chang Gung Univ. (Taiwan); Yao-Teng Tseng, National Central Univ. (Taiwan); Kuei-Chu Hsu, Unice E-O services Inc. (Taiwan) [8255-67]**Non-equilibrium QW populations and internal efficiency of polar and nonpolar III-nitride light emitters**, Mikhail V. Kisin, Natalie DeMille, Hussein S. El-Ghoroury, Ostendo Technologies, Inc. (USA) [8255-68]**Linewidth influenced by phase modulation and frequency modulation in optical feedback diode laser**, Hongying Wang, Xi'an Univ. of Arts and Science (China); Kang Li, Jurgang Huang, Ray Chaney, Nigel J. Copner, Univ. of Glamorgan (United Kingdom) [8255-69]**Effect of reversed polarization on characteristics of N-face InGaN/GaN p-i-n solar cells**, Yen-Kuang Kuo, Jih-Yuan Chang, National Changhua Univ. of Education (Taiwan) [8255-70]**Enhancement in carrier-collection efficiency of Ga-face InGaN/GaN p-i-n solar cells by polarization-reduced InGaN interlayer**, Shu-Hsuan Chang, Jih-Yuan Chang, National Changhua Univ. of Education (Taiwan) [8255-71]**The effects of temperature and stress on the spectrum broadening in high power semiconductor laser arrays**, Pu Zhang, Xi'an Institute of Optics and Precision Mechanics (China); Jingwei Wang, Xi'an Focuslight Technologies Co., Ltd. (China); Lingling Xiong, Xi'an Institute of Optics and Precision Mechanics (China); Xiaoning Li, Xiaochen Ding, Xi'an Jiaotong Univ. (China); Zhenfu Wang, Xingsheng Liu, Xi'an Institute of Optics and Precision Mechanics (China) [8255-72]**Optical 90° hybrids based on silicon-on-insulator multimode interference couplers**, Tingting Hong, Wei Yang, Peking Univ. (China) [8255-73]**Biaxial strain effects on the electronic band structure of wurtzite In_xGa_{1-x}N alloys using first-principles calculations**, Bo-Ting Liou, Hsiuping Institute of Technology (Taiwan); Bang-Yenn Wu, De Lin Institute of Technology (Taiwan) [8255-74]**Fast random-number generation using a diode laser's frequency noise characteristic**, Hiroki Takamori, Kohei Doi, Shinya Maehara, Kohei Kawakami, Takashi Sato, Masashi Ohkawa, Yasuo Ohdaira, Shuichi Sakamoto, Niigata Univ. (Japan) [8255-75]**Oscillation wavelength shifts of vertical cavity surface emitting lasers exposed to magnetic fields**, Yuki Yamagishi, Takashi Sato, Masashi Okawa, Shinichi Tabira, Niigata Univ. (Japan) [8255-76]**Self-pulsation in two-section laser with an air gap**, Chien Chung Lin, Chih Wei Lin, Hao Chung Kuo, National Chiao Tung Univ. (Taiwan) [8255-77]**Reduction of back scattered light in sub-wavelength apertures through coupled cavity effects**, Amarachukwu Eneuo, David T. Crouse, The City College of New York (USA) [8255-78]**A new approach for implementation of associative memory using volume holographic materials**, Ramin Pashaie, Univ. of Wisconsin-Milwaukee (USA) [8255-79]

Nonlinear pulse reshaping in passive optical fibers towards quasi-parabolic waveforms, Sergii O. Iakushev, Kharkov National Univ. of Radio Electronics (Ukraine); Igor A. Sukhoivanov, Univ. de Guanajuato (Mexico); Oleksiy V. Shulika, Kharkov National Univ. of Radio Electronics (Ukraine); Jose A. Andrade-Lucio, Igor V. Guryev, Arturo G. Perez, Univ. de Guanajuato (Mexico). [8255-80]

Thermal and optical properties of both ridge and buried structures laser including waveguide layer, Joël Jacquet, Abdessamad Ou-Sair, Mickael Faugeron, Emeric Mercier, Jad Taki, Harmonie Sakala, Mathieu Jeanin, Thomas Molines, Supélec (France). [8255-81]

Analysis of 1D photonic crystal microcavity sensor using surface plasmon resonance effect, Hong-Seung Kim, Tae-Kyeong Lee, Geum-Yoon Oh, Byeong-Hyeon Lee, Chung-Ang Univ. (Korea, Republic of); Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [8255-82]

Oscillation frequency stabilization and narrowing of a laser diode by using an external cavity, Minoru Iwahori, Kohei Doi, Hideaki Arai, Takashi Sato, Masashi Ohkawa, Yoshihiko Matsumoto, Niigata Univ. (Japan). [8255-83]

Graphene: an exciting two-dimensional material for science and technology, Saroj S. Hole, Shankar D. Hole, Yogita Deshmukh, Modern College of Arts, Science and Commerce (India). [8255-84]

Polarization splitter based on a porous silicon waveguide, Yajun Liu, Xinjiang Univ. (China). [8255-86]

Geometric and material modeling environment for the finite-difference time-domain method, Yong-Gu Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [8255-87]

Thursday 26 January

SESSION 12

Room: 301 (Esplanade) Thurs. 8:00 to 10:10 am

Laser Dynamics: Modulation and Feedback

Session Chair: Marek Osirski, The Univ. of New Mexico (USA)

8:00 am: **Novel modulation approaches for directly and electro-optically modulated vertical-cavity surface-emitting lasers** (*Invited Paper*), Jonathan D. Ingham, Zihad Qureshi, Michael J. Crisp, Richard V. Penty, Ian H. White, Univ. of Cambridge (United Kingdom); Petter Westbergh, Johan Gustavsson, Asa Haglund, Anders Larsson, Chalmers Univ. of Technology (Sweden); James A. Lott, Nikolay N. Ledentsov, VI Systems GmbH (Germany). [8255-55]

8:30 am: **Novel picosecond optical sources based on gain switched diode lasers and nonlinear pulse reshaping** (*Invited Paper*), Horacio Lamela, Cristina de Dios, Univ. Carlos III de Madrid (Spain) [8255-56]

9:00 am: **Delay differential equation-based modeling of passively mode-locked quantum dot lasers using measured gain and loss spectra**, Ravi Raghunathan, Mark T. Crowley, The Univ. of New Mexico (USA); Frédéric Grillot, Univ. Européenne de Bretagne (France) and Institut TELECOM/Telecom Paristech (France); Vassilios I. Kovanis, Air Force Research Lab. (USA); Luke F. Lester, The Univ. of New Mexico (USA) [8255-57]

9:20 am: **THz wave generation using frequency stabilized laser diodes**, Yasuhito Minamisawa, Takashi Sato, Masashi Ohkawa, Kennji Nakano, Toshiya Nimomi, Niigata Univ. (Japan) [8255-58]

9:40 am: **Physics, design, and modeling of passive vertical cavity surface emitting lasers** (*Invited Paper*), Vitaly A. Shchukin, James A. Lott, Nikolay N. Ledentsov, VI Systems GmbH (Germany). [8255-54]

Coffee Break 10:10 to 10:40 am

SESSION 13

Room: 301 (Esplanade) Thurs. 10:40 am to 12:20 pm

Nonlinear Fibers and Laser Systems

Session Chair: Thierry Guillet, Univ. Montpellier 2 (France)

10:40 am: **Potentials and challenges for the optoelectronic oscillator** (*Invited Paper*), Weimin Zhou, Olukayode K. Okusaga, James Cahill, U.S. Army Research Lab. (USA); Andrew Docherty, Curtis R. Menyuk, Gary Cater, Univ. of Maryland, Baltimore County (USA); Moshe Horowitz, Technion-Israel Institute of Technology (Israel) [8255-59]

11:10 am: **System modeling of passive millimeter wave imager based on optical up-conversion** (*Invited Paper*), Shouyuan Shi, Univ. of Delaware (USA); Christopher A. Schuetz, Richard D. Martin, Thomas E. Dillon, Phase Sensitive Innovations, Inc. (USA); Peng Yao, Janusz Murakowski, Garrett J. Schneider, Dennis W. Prather, Univ. of Delaware (USA) [8255-60]

11:40 am: **Speckle noise reduction of a dual-frequency laser Doppler velocimeter based on an optically injected semiconductor laser**, Chih-Hao Cheng, Jia-Wei Lee, Tze-Wei Lin, Fan-Yi Lin, National Tsing Hua Univ. (Taiwan) [8255-61]

12:00 pm: **Simulation of the evolution of spectrum-managed optical pulse propagation in active fibers with programmable gain spectral profile**, Tianxin Yang, Zifei Wang, Delin Yang, Dongfang Jia, Mei Sang, Tianjin Univ. (China) [8255-62]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Physics, Simulation, and Photonic Engineering of Photovoltaic Devices

Conference Chairs: **Alexandre Freundlich**, Univ. of Houston (USA); **Jean-Francois F. Guillemoles**, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

Program Committee: **Harry A. Atwater**, California Institute of Technology (USA); **Sheila G. Bailey**, NASA Glenn Research Ctr. (USA); **Nicholas J. Ekins-Daukes**, Imperial College London (United Kingdom); **Christiana B. Honsberg**, Arizona State Univ. (USA); **Seth M. Hubbard**, Rochester Institute of Technology (USA); **Daniel Lincot**, Ecole Nationale Supérieure de Chimie de Paris (France); **Antonio Marti**, Univ. Politécnica de Madrid (Spain); **Marek Osinski**, The Univ. of New Mexico (USA); **Mike Scarpulla**, The Univ. of Utah (USA); **Masakazu Sugiyama**, The Univ. of Tokyo (Japan); **Robert J. Walters**, U.S. Naval Research Lab. (USA); **Peichen Yu**, National Chiao Tung Univ. (Taiwan)

Monday 23 January

SESSION 1

Room: 309 (Esplanade) Mon. 8:30 to 10:10 am

Advanced Light Management and Spectral Shaping

Session Chair: **Gavin J. Conibeer**,
The Univ. of New South Wales (Australia)

8:30 am: **Increasing upconversion by metal and dielectric nanostructures** (*Invited Paper*), Jan Christoph Goldschmidt, Stefan Fischer, Heiko Steinkemper, Barbara Herter, Benedikt Bläsi, Fraunhofer-Institut für Solare Energiesysteme (Germany); Florian Hallermann, Gero von Plessen, RWTH Aachen (Germany); Karl W. Krämer, Daniel Biner, Univ. Bern (Switzerland); Martin Hermle, Fraunhofer-Institut für Solare Energiesysteme (Germany) [8256-01]

9:00 am: **Simulations of solar cell enhancement using whispering-gallery modes of dielectric nanospheres** (*Invited Paper*), Jonathan Grandidier, Dennis M. Callahan, Jr., Michael G. Deceglie, Jeremy N. Munday, Harry A. Atwater, California Institute of Technology (USA) [8256-02]

9:30 am: **Inverse design for enhanced light management in photovoltaic cells**, Serena Faruque, Stanford Univ. (USA); Benjamin Armbruster, Northwestern Univ. (USA); Peter Peumans, IMEC (Belgium); Shanhui Fan, Mark L. Brongersma, Stanford Univ. (USA) [8256-03]

9:50 am: **Exact field solution to guided wave propagation in lossy thin films**, James R. Nagel, Steve Blair, Michael Scarpulla, The Univ. of Utah (USA) [8256-04]

Coffee Break 10:10 to 10:30 am

SESSION 2

Room: 309 (Esplanade) Mon. 10:30 am to 12:10 pm

Photonic and Plasmonics Designs for Photovoltaics

Session Chair: **Jean-Francois F. Guillemoles**, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

10:30 am: **Plasmonic photovoltaics: combination of electromagnetic and carrier-transport modeling reveals performance windows for nanoplasmonics (Keynote Presentation)**, Stefan A. Maier, Imperial College London (United Kingdom) [8256-05]

11:10 am: **Plasmonic enhancement of up-conversion in ultrathin $Y_2O_3:Er$ layers**, Christian Andriamiadamanana, Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Fabienne Pelle, Ecole Nationale Supérieure de Chimie de Paris (France); Stéphane S. Collin, Petru V. Ghenuche, Nathalie Bardou, Jean-Luc Pellouard, Ctr. National de la Recherche Scientifique (France); Alban Ferrier, Ecole Nationale Supérieure de Chimie de Paris (France); Laurent Lombez, Anne-Laure Joudrier, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) [8256-06]

11:30 am: **Improved efficiency for nanopillar array of c-Si photovoltaic by down-conversion and anti-reflection of quantum dots**, Chien-chung Lin, Hsin-Chu Chen, H. W. Han, Y. L. Tsai, C. H. Chang, Min-An Tsai, Hao-Chung Kuo, Peichen Yu, National Chiao Tung Univ. (Taiwan) [8256-07]

11:50 am: **Scattering analysis of the indium-tin-oxide (ITO) nanowiskers on ITO film substrate for a-Si solar cell**, Hsiao-Wei Liu, Chia-Hua Chang, Cheng-Chung Lin, Peichen Yu, National Chiao Tung Univ. (Taiwan) [8256-08]

Lunch Break 12:10 to 1:30 am

SESSION 3

Room: 309 (Esplanade) Mon. 1:30 to 3:10 pm

Quantum Well and Superlattice Solar Cells

Session Chair: **Seth M. Hubbard**,
Rochester Institute of Technology (USA)

1:30 pm: **Improving photo-generated carrier escape in quantum well solar cells** (*Invited Paper*), Andenet Alemu, Alexandre Freundlich, Univ. of Houston (USA) [8256-09]

2:00 pm: **Exploring the radiative limits of InGaAs quantum well solar cells** (*Invited Paper*), Roger E. Welsler, Magnolia Solar, Inc. (USA) [8256-10]

2:30 pm: **Exploring the potential of quantum wells for efficiency enhancement in photovoltaic cells**, Masakazu Sugiyama, The Univ. of Tokyo (Japan); Yunpeng Wang, Yu Wen, Kentaroh Watanabe, Yoshiaki Nakano, The Univ. of Tokyo (Japan) [8256-11]

2:50 pm: **Minority carrier contacts for high efficiency tandem solar cells**, Christiana B. Honsberg, Stephen M. Goodnick, Arizona State Univ. (USA) [8256-12]

Coffee Break 3:10 to 3:30 pm

SESSION 4

Room: 309 (Esplanade) Mon. 3:30 to 5:00 pm

Quantum Dot Based Solar Cells

Session Chair: **Masakazu Sugiyama**, The Univ. of Tokyo (Japan)

3:30 pm: **Efficiency improvement of InAs/GaAs quantum dot solar cells through VOC loss mitigation** (*Invited Paper*), Christopher G. Bailey, David V. Forbes, Ryne P. Raffaele, Seth M. Hubbard, Rochester Institute of Technology (USA) [8256-13]

4:00 pm: **Photovoltaic properties of silicon quantum dots in dielectric matrices**, Philipp Löper, Anke Witzky, Fraunhofer-Institut für Solare Energiesysteme (Germany); Andreas Hartel, Sebastian Gutsch, Daniel Hiller, Albert-Ludwigs-Univ. Freiburg (Germany); Jan Christoph Goldschmidt, Stefan Janz, Stefan W. Glunz, Fraunhofer-Institut für Solare Energiesysteme (Germany); Margit Zacharias, Albert-Ludwigs-Univ. Freiburg (Germany) [8256-14]

4:20 pm: **Achieve more than 5% PbS quantum dot solar cells**, Jianbo Gao, National Renewable Energy Lab. (USA); So-Hee Jeong, Korea Institute of Machinery and Materials (Korea, Republic of); Octavi E. Semonin, Joseph M. Luther, National Renewable Energy Lab. (USA); Randy J. Ellingson, The Univ. of Toledo (USA); Arthur J. Nozik, Matthew C. Beard, National Renewable Energy Lab. (USA) [8256-15]

4:40 pm: **Numerical simulation of QD-intermediate band solar cells: effect of dot size on performance**, Alexandre I. Fedoseyev, Timothy Bald, CFD Research Corp. (USA) [8256-16]

Tuesday 24 January

OPTO Plenary Session
Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am
Session Chairs: Klaus P. Streubel, OSRAM GmbH (Germany); David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 5

Room: 309 (Esplanade) Tues. 10:30 am to 12:10 pm

Novel Thin Film Materials and Devices

Session Chair: Alexandre Freundlich, Univ. of Houston (USA)

10:30 am: **Screening of next-generation thin film PV absorbers from thousands of candidates (Keynote Presentation)**, Alex Zunger, Univ. of Colorado, Boulder (USA); Liping Yu, National Renewable Energy Lab. (USA) [8256-17]

11:10 am: **Thin Cu(In,Ga)Se₂ photovoltaic microcells: high efficiency with reduced material usage**, Myriam Paire, Laurent Lombez, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) and Ctr. National de la Recherche Scientifique (France) and Ecole Nationale Supérieure de Chimie de Paris (France); Nicolas Péré-Laperne, Ctr. National de la Recherche Scientifique (France); Zacharie Jehl, Marie Jubault, Frédérique Donsanti, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) and Ctr. National de la Recherche Scientifique (France) and Ecole Nationale Supérieure de Chimie de Paris (France); Stéphane S. Collin, Alain Dollet, Jean-Luc Pelouard, Ctr. National de la Recherche Scientifique (France); Jean-François Guillemoles, Daniel Lincot, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) and Ctr. National de la Recherche Scientifique (France) and Ecole Nationale Supérieure de Chimie de Paris (France) [8256-18]

11:30 am: **Highly surface textured tin oxide thin films fabricated by nozzle spraying process in photovoltaic devices**, Liwei Chou, Yangyi Lin, Albert T. Wu, National Central Univ. (Taiwan) [8256-19]

11:50 am: **Optimal optical designs for GaAs single-junction solar cells**, Shi Liu, Ding Ding, Shane R. Johnson, Yong-Hang Zhang, Arizona State Univ. (USA) [8256-20]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 6

Room: 309 (Esplanade) Tues. 1:30 to 3:10 pm

Intermediate Band Solar Cells

Session Chair: Alex Zunger, Univ. of Colorado at Boulder (USA)

1:30 pm: **Impurities versus quantum dots for the intermediate band solar cell (Invited Paper)**, Elisa Antolín, Antonio Martí, Antonio Luque, Univ. Politécnica de Madrid (Spain) [8256-21]

2:00 pm: **Demonstration of a multiband solar cell (Invited Paper)**, Nair López Martínez, Lawrence Berkeley National Lab. (USA); Lothar A. Reichertz, Lawrence Berkeley National Lab. (USA) and RoseStreet Labs. Energy (USA); Kin Man Yu, Lawrence Berkeley National Lab. (USA); Kenneth Campman, Sumika Electronic Materials, Inc. (USA); Wlodek Walukiewicz, Lawrence Berkeley National Lab. (USA) and RoseStreet Labs. Energy (USA) [8256-22]

2:30 pm: **Device simulation of intermediate band solar cells**, Katsuhisa Yoshida, Yoshitaka Okada, The Univ. of Tokyo (Japan); Nobuyuki Sano, Univ. of Tsukuba (Japan) [8256-23]

2:50 pm: **The Thermodynamic Limits of Tandem Photovoltaic Devices with Intermediate Band**, Jongwon Lee, Christiana B. Honsberg, Arizona State Univ. (USA) [8256-28]

Coffee Break 3:10 to 3:30 pm

SESSION 7

Room: 309 (Esplanade) Tues. 3:30 to 4:40 pm

Advanced Tandem Solar Cells

Session Chair: David Wilt, Air Force Research Lab. (USA)

3:30 pm: **Spectrum-optimized Si-based III-V multijunction photovoltaics (Invited Paper)**, Steven A. Ringel, Tyler Grassman, Javier Grandal, Andrew Carlin, Christopher Ratcliff, Limei Yang, Michael Mills, The Ohio State Univ. (USA) [8256-25]

4:00 pm: **Simulation of novel InAlAsSb solar cells**, Matthew P. Lumb, U.S. Naval Research Lab. (USA) and George Washington Univ. (USA); Maria Gonzalez, Global Defense Technology & Systems, Inc. (USA); Igor Vurgafman, Jerry R. Meyer, Joshua Abell, Michael K. Yakes, U.S. Naval Research Lab. (USA); Raymond Hoheisel, U.S. Naval Research Lab. (USA) and George Washington Univ. (USA); Joseph G. Tischler, Philip P. Jenkins, U.S. Naval Research Lab. (USA); Paul N. Stavrinou, Markus F. Fuhrer, Nicholas J. Ekins-Daukes, Imperial College London (United Kingdom); Robert J. Walters, U.S. Naval Research Lab. (USA) [8256-26]

4:20 pm: **Two-dimensional modeling of CdZnTe/Si based dual and triple junction solar cells**, Yegao Xiao, Zhiqiang Li, Michel Lestrade, Zhanming S. Li, Crosslight Software Inc. (Canada) [8256-27]

Wednesday 25 January

SESSION 8

Room: 309 (Esplanade) Wed. 8:30 to 10:10 am

Carrier Relaxations and Hot Carrier Solar Cells

Session Chair: Christiana B. Honsberg, Arizona State Univ. (USA)

8:30 am: **Electron confinement and phonon effects in semiconductor quantum dots (Invited Paper)**, Robson Ferreira, Ecole Normale Supérieure (France) [8256-29]

9:00 am: **Modeling carrier relaxation in hot carrier solar cells (Invited Paper)**, Stephen M. Goodnick, Christiana B. Honsberg, Arizona State Univ. (USA) [8256-30]

9:30 am: **InGaAs/GaAsP quantum wells for hot carrier solar cells**, Louise C. Hirst, Markus Furher, Daniel J. Farrell, Imperial College London (United Kingdom); Arthur Le Bris, Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Murad J. Y. Tayebjee, Raphael Clady, Timothy W. Schmidt, The Univ. of Sydney (Australia); Masakazu Sugiyama, Yunpeng Wang, The Univ. of Tokyo (Japan); Nicholas J. Ekins-Daukes, Imperial College London (United Kingdom) [8256-31]

9:50 am: **Anitmonide based heterostructures for hot carrier solar cells**, Arthur Le Bris, Md. Mokerrobin Mannan, Laurent Lombez, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Philippe Christol, Guilhem Boissier, Jean-Philippe Perez, Univ. Montpellier 2 (France); Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) [8256-32]

Coffee Break 10:10 to 10:30 am

SESSION 9

Room: 309 (Esplanade) Wed. 10:30 am to 12:10 pm

Nanostructures and Emerging Photovoltaic Approaches*Session Chair: Stephen M. Goodnick, Arizona State Univ. (USA)*10:30 am: **Third generation photovoltaics: high efficiency at low cost to drive large scale PV implementation (Keynote Presentation)**, Gavin J. Conibeer, The Univ. of New South Wales (Australia) [8256-33]11:10 am: **Multiple exciton generation in PbSe nanorods**, Paul D. Cunningham, U.S. Naval Research Lab. (USA); Janice E. Boecker, Edward E. Foos, U.S. Naval Research Lab. (USA); Matthew P. Lumb, U.S. Naval Research Lab. (USA) and The George Washington Univ. (USA); Anthony R. Smith, Joseph G. Tischler, Joseph S. Melinger, U.S. Naval Research Lab. (USA) [8256-34]11:30 am: **Recycling carrier thermalization losses for improving efficiency of dilute nitride multi quantum well solar cells**, Gopi Krishna Vijaya, Andenet Alemu, Alexandre Freundlich, Univ. of Houston (USA) [8256-35]11:50 am: **The use of nanostructures for meeting the terawatt photovoltaic challenge**, Christiana B. Honsberg, Stephen M. Goodnick, Stuart G. Bowden, Arizona State Univ. (USA) [8256-36]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 10

Room: Wed. 1:30 to 3:10 pm

Advanced Device Characterization*Session Chair: Steven Ringel, The Ohio State Univ. (USA)*1:30 pm: **Spectroscopic ellipsometry: metrology for photovoltaics from the nano to the giga (Invited Paper)**, Sylvain Marsillac, Old Dominion Univ. (USA); Robert W. Collins, Jr., The Univ. of Toledo (USA) [8256-37]2:00 pm: **Quantitative luminescence imaging of solar cells using hyperspectral imager (Invited Paper)**, Amaury Delamarre, Laurent Lombez, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Brice Bourgoïn, Marc Verhaegen, Photon etc. Inc. (France); Jean-Françoise Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) [8256-38]2:30 pm: **Spectroscopic analysis of InAs quantum dot solar cells**, Stephen J. Polly, Christopher G. Bailey, Zachary S. Bittner, Yushuai Dai, Elias G. Fernandez, Seth M. Hubbard, Rochester Institute of Technology (USA) [8256-39]2:50 pm: **A novel method to eliminate the artifacts in external quantum efficiency measurements on multi-junction solar cell**, Jing-Jing Li, Shi Liu, Swee H. Lim, Charles R. Allen, Yong-Hang Zhang, Arizona State Univ. (USA) [8256-40]

Coffee Break 3:10 to 3:30 pm

SESSION 11

Room: 309 (Esplanade) Wed. 3:30 to 5:00 pm

Advanced Light Concentration and Light Trapping for Photovoltaics*Session Chair: Peichen Yu, National Chiao Tung Univ. (Taiwan)*3:30 pm: **Toward high efficiency ultra-thin CIGSe based solar cells using light management techniques (Invited Paper)**, Negar Naghavi, Zacharie Jehl, Frédérique Donsanti, Jean-François Guillemoles, Ecole Nationale Supérieure de Chimie de Paris (France); Isabelle Gérard, Arnaud Etcheberry, Muriel Bouttey, Univ. de Versailles Saint-Quentin-en Yvelines (France); Jean-Luc Pelouard, Stéphane S. Collin, Clement Colin, Ctr. National de la Recherche Scientifique (France); Nir Dahan, Jean-Jacques Greffet, Institut d'Optique Graduate School (France); Georg Voorwinden, Wuerth Elektronik Research GmbH (Germany); Micheal Powalla, Wuerth Elektronik Research GmbH (France); Daniel Lincot, Ecole Nationale Supérieure de Chimie de Paris (France) [8256-41]4:00 pm: **Trackfree planar solar concentrator system**, Volker Zagolla, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8256-42]4:20 pm: **A cascaded circular concentrator with confocal structure for increasing the energy density**, Nai-Lun Ku, Yi-Yung Chen, Jong-Woei A. Whang, National Taiwan Univ. of Science and Technology (Taiwan) . . . [8256-43]4:40 pm: **Minimizing solar cell reflection loss through surface texturing and implementation of 1D and 2D subwavelength dielectric gratings**, Wei Wang, Akhil Mehrotra, Andenet Alemu, Alex Freundlich, Univ. of Houston (USA) [8256-44]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Sub-ns luminescence lifetime measurements and imaging for characterization and quality control of thin film solar cells, Felix Koberling, Volker Buschmann, Peter Kapusta, Rainer Erdmann, Uwe Ortmann, PicoQuant GmbH (Germany) [8256-58]

Energy conversion materials for photovoltaic application, Madhab Pokhrel, Ajith K. Gangadharan, Dhiraj K. Sardar, The Univ. of Texas at San Antonio (USA) [8256-59]

Low surface recombination velocity on p-type B-Si by atmosphere pressure metal-organic chemical vapor deposition grown aluminum oxide, Sheng Chun Hung, National Central Univ. (Taiwan); C. F. Lin, Chung-Yuan Christian Univ. (Taiwan); S. M. Lan, Chung Yuan Christian Univ. (Taiwan); T. N. Yang, Institute of Nuclear Energy Atomic Energy Council (Taiwan); Gou-Chung Chi, National Chiao Tung Univ. (Taiwan) [8256-60]

Near-field optical beam induced current (NOBIC) characteristics of a GaAs solar cell with biomimetic antireflective structures, ChengYing Yang, MinAn Tsai, Peichen Yu, National Chiao Tung Univ. (Taiwan) [8256-61]

Efficiency prediction and interface effects of organic/crystalline silicon hybrid solar cells, Bo-Yu Huang, Ting-Gang Chen, Peichen Yu, National Chiao Tung Univ. (Taiwan) [8256-62]

Theoretical study of solar cells based on a semiconductor with spatially varying band-gap, Bogdan S. Sokolovsky, Ivan Franko National Univ. of L'viv (Ukraine) [8256-63]

Optimum concentration factor analysis using dynamic thermal model for a concentrated photovoltaic system, John T. Avrett, Air Force Institute of Technology (USA) [8256-64]

First principle investigation of optoelectronic properties of (S-Ta)-doped TiO₂: an approach for solar energy harvesting, Shermin Arab, Roger K. Lake, Univ. of California, Riverside (USA) [8256-65]

Analysis of radiation hardness and subcell I-V characteristics of GaInP/GaInAs/Ge solar cells using electroluminescence measurements, Raymond Hoheisel, U.S. Naval Research Lab. (USA) [8256-66]

Performance analysis of acid texturization for multi-crystalline silicon solar cells, Jyh-Jier J. Ho, Sheng-Shih Wang, National Taiwan Ocean Univ. (Taiwan); William J. Lee, Industrial Technology Research Institute (Taiwan); Jia-Show Ho, Kang L. Wang, Univ. of California, Los Angeles (USA) [8256-67]

Numerical analysis of triangular micro-optical array for enhancement of incident power of photovoltaic panels, Rajat Dey, Evgueni V. Bordatchev, Mohammed Tauhiduzzaman, Hugo W. Reshef, National Research Council Canada (Canada) [8256-69]

Thursday 26 January

SESSION 12

Room: 309 (Esplanade) Thurs. 8:30 to 10:10 am

Epitaxy and Characterization of III-V Photovoltaic Materials

Session Chair: Yong-Hang Zhang, Arizona State Univ. (USA)

8:30 am: **Interface quality enhancement of the epitaxial regrowth process for nipi photovoltaic devices**, Michael A. Slocum, Rochester Institute of Technology (USA); Jeremiah S. McNatt, NASA Glenn Research Ctr. (USA); Christopher G. Bailey, Seth M. Hubbard, Rochester Institute of Technology (USA) [8256-45]

8:50 am: **The role of Sb compositions on the properties of InAs/GaAsSb quantum dots**, Keun-Yong Ban, Arizona State Univ. (USA); Stephen P. Bremner, The Univ. of New South Wales (Australia); Darius Kuciauskas, National Renewable Energy Lab. (USA); Som N. Dahal, Christiana B. Honsberg, Arizona State Univ. (USA) [8256-68]

9:10 am: **Characteristics of bulk InGaAsN and InGaAsSbN material grown by metal organic vapor phase epitaxy (MOVPE) for solar cell application**, TaeWan Kim, Toby J. Garrod, Luke J. Mawst, Thomas F. Kuech, Univ. of Wisconsin-Madison (USA) [8256-47]

9:30 am: **Dilute nitride GaInNAs and GaInNAsSb for solar cell applications**, Siew Li Tan, Wai Mun Soong, The Univ. of Sheffield (United Kingdom); Matthew J. Steer, Univ. of Glasgow (United Kingdom); Shiyong Zhang, Jo Shien Ng, John P. David, The Univ. of Sheffield (United Kingdom) [8256-48]

9:50 am: **Intersubband and intrasubband transition in InGaN quantum dot for solar cell application**, Kuang-Chung Wang, Yuh-Renn Wu, National Taiwan Univ. (Taiwan) [8256-49]

Coffee Break 10:10 to 10:30 am

SESSION 13

Room: 309 (Esplanade) Thurs. 10:30 am to 12:10 pm

Space Photovoltaics

Session Chair: Robert J. Walters, U.S. Naval Research Lab. (USA)

10:30 am: **Advanced photovoltaic development at Air Force Research Laboratory (Keynote Presentation)**, David Wilt, Air Force Research Lab. (USA) [8256-50]

11:10 am: **Modeling of defect-tolerant thin multi-junction solar cells for space application**, Akhil Mehrotra, Andenet Alemu, Alexandre Freundlich, Univ. of Houston (USA) [8256-51]

11:30 am: **Radiation effects on quantum dot enhanced solar cells**, Christopher Kerestes, Seth M. Hubbard, Rochester Institute of Technology (USA) [8256-52]

11:50 am: **High efficiency laser power converters for space-based laser power transfer applications**, Jayanta Mukherjee, Stephen Sweeney, Univ. of Surrey (United Kingdom); Matthew Perren, EADS Astrium (France) [8256-53]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 14

Room: 309 (Esplanade) Thurs. 1:30 to 3:00 pm

Hybrid Photovoltaic Approaches

Session Chairs: Alexandre Freundlich, Univ. of Houston (USA); Jean-Francois Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

1:30 pm: **Photonic crystals for improving light absorption in organic solar cells (Invited Paper)**, Ludovic Escoubas, David Duché, Jean-Jacques Simon, Institut Matériaux Microélectronique Nanosciences de Provence (France); Cécile Gourgon, Céline Masclaux, CEA-LETI (France); Philippe Torchio, Judikael Le Rouzo, Francois Flory, Institut Matériaux Microélectronique Nanosciences de Provence (France) [8256-54]

2:00 pm: **Resonance energy transfer from PbS colloidal quantum dots to bulk silicon: the road to hybrid photovoltaics**, Peristera Andreakou, Mael Brossard, Univ. of Southampton (United Kingdom); Maria Bernechea, Gerasimos Konstantatos, ICFO - Institut de Ciències Fotòniques (Spain); Pavlos G. Lagoudakis, Univ. of Southampton (United Kingdom) [8256-55]

2:20 pm: **Hybrid graphene with TCO nanorods based dye-sensitized solar cell**, Sheng Chun Hung, Chung Wei Chen, Y. H. Chien, Y. P. Huang, Chen-Yu Shieh, National Central Univ. (Taiwan); Peichen Yu, Gou-Chung Chi, National Chiao Tung Univ. (Taiwan) [8256-56]

2:40 pm: **Full device analysis of novel metamaterial coated PN and MIS solar cells using numerical methods**, Isroel Mandel, The City College of New York (USA); Jonah Gollub, Chris H. Sarantos, Phoebus Optoelectronics, LLC (USA); Eli Lansey, David T. Crouse, The City College of New York (USA) [8256-57]

CLOSING REMARKS

Room: 309 (Esplanade) Thurs. 3:00 to 3:05 pm

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Optical Components and Materials IX

Conference Chairs: **Shibin Jiang**, AdValue Photonics, Inc. (USA); **Michel J. F. Digonnet**, Stanford Univ. (USA); **J. Christopher Dries**, United Silicon Carbide, Inc. (USA)

Program Committee: **Jean-Luc Adam**, Univ. de Rennes 1 (France); **Norman C. Anheier, Jr.**, Pacific Northwest National Lab. (USA); **Rolindes Balda**, Univ. del País Vasco (Spain); **Robert P. Dahlgren**, Silicon Valley Photonics, Ltd. (USA) and Univ. of California, Santa Cruz (USA); **Leonid B. Glebov**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Min Gu**, Swinburne Univ. of Technology (Australia); **Seppo K. Honkanen**, Aalto Univ. School of Science and Technology (Finland); **Lili Hu**, Shanghai Institute of Optics and Fine Mechanics (China); **Jacques Lucas**, Univ. de Rennes 1 (France); **Yasutake Ohishi**, Toyota Technological Institute (Japan); **Aydogan Ozcan**, Univ. of California, Los Angeles (USA); **Giancarlo C. Righini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Feng Song**, Nankai Univ. (China); **Setsumi Tanabe**, Kyoto Univ. (Japan); **John M. Zavada**, National Science Foundation (USA)

Wednesday 25 January

SESSION 1

Room: 232 (Mezzanine). Wed. 9:00 to 10:00 am

Material Spectroscopy I

Session Chair: **Shibin Jiang**, AdValue Photonics, Inc. (USA)

9:00 am: **Sensitization of erbium through silicon nanocrystals in silicon rich oxide**, Quamrul Huda, Bangladesh Univ. of Engineering and Technology (Bangladesh) [8257-02]

9:20 am: **Recent advancements in multiband IR sensor windows**, Shyam S. Bayya, Jas Sanghera, Woohong Kim, Guillermo R. Villalobos, Ishwar Aggarwal, U.S. Naval Research Lab. (USA) [8257-03]

9:40 am: **Pr³⁺-doped ZBLA glasses for visible laser emission**, Mélinda Olivier, Univ. de Rennes 1 (France); Jean-Louis Doualan, Patrice Camy, ENSICAEN (France); Herve Lhermite, Jean-Luc Adam, Virginie Nazabal, Univ. de Rennes 1 (France) [8257-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 232 (Mezzanine). Wed. 10:30 to 11:50 am

Material Spectroscopy II

Session Chair: **Michel J. F. Digonnet**, Stanford Univ. (USA)

10:30 am: **A new vision of photodarkening in Yb³⁺-doped fibers**, Romain Peretti, Univ. Claude Bernard Lyon 1 (France); Cédric Gonnet, Draka (France); Anne-Marie Jurduc, Univ. Claude Bernard Lyon 1 (France) [8257-05]

10:50 am: **Spectroscopic study of Nd³⁺ ions in 0.8CaSiO₃-0.2Ca₃(PO₄)₂ eutectic glass ceramics**, Daniel Sola, Centro de Física de Materiales (Spain); Rolindes Balda, Univ. del País Vasco (Spain); Jose Ignacio Peña, Univ. de Zaragoza (Spain); Joaquin M. Fernández, Univ. del País Vasco (Spain). [8257-37]

11:10 am: **Calculation of cross-relaxation parameter in highly Tm-doped glasses**, Masud Taher, Hrvoje Gebavi, Stefano Taccheo, Swansea Univ. (United Kingdom); Daniel Milanese, Politecnico di Torino (Italy); Rolindes Balda, Univ. del País Vasco (Spain) [8257-07]

11:30 am: **One- and two-photon pumped random laser action in rhodamine B doped di-ureasil hybrids**, Sara Garcia-Revilla, Univ. del País Vasco (Spain); Edison Pecoraro, Univ. de Aveiro (Portugal); Rolindes Balda, Univ. del País Vasco (Spain); Luis D. Carlos, Univ. de Aveiro (Portugal); Joaquin M. Fernandez, Univ. del País Vasco (Spain) [8257-08]

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

SESSION 3

Room: 232 (Mezzanine). Wed. 1:30 to 2:40 pm

Laser Materials

Session Chair: **Robert P. Dahlgren**, San José State Univ. (USA)

1:30 pm: **Advances in modeling of photonic structures for glass lasers** (*Invited Paper*), Francesco Prudenzano, Luciano Mescia, Pietro Bia, Annalisa Di Tommaso, Marco De Sario, Politecnico di Bari (Italy) [8257-09]

2:00 pm: **~2.1- μ m Tm³⁺-Ho³⁺ co-doped tungsten tellurite single mode fiber laser**, Kefeng Li, Guang Zhang, Lili Hu, Meng Wang, Danping Chen, Shanghai Institute of Optics and Fine Mechanics (China) [8257-10]

2:20 pm: **Er³⁺-doped micro-structured tellurite fiber: laser generation and optical gain**, Luiz C. Barbosa, Enver F. Chillice, Univ. Estadual de Campinas (Brazil) [8257-11]

SESSION 4

Room: 232 (Mezzanine). Wed. 2:40 to 3:30 pm

Microstructured Fibers

2:40 pm: **Recent advances in very highly nonlinear chalcogenide photonic crystal fibers and their applications** (*Invited Paper*), David Méchin, Laurent Brilland, Plate-forme d'Étude et de Recherche sur les Fibres Optiques Spéciales (France); Johann Troles, Sciences Chimiques de Rennes (France) and UEB (France); Thierry Chartier, Pascal Besnard, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) and UEB (France); Guillaume Canat, ONERA (France); Gilles Renversez, Institut Fresnel (France) . . . [8257-13]

3:10 pm: **Chalcogenide-tellurite composite microstructured optical fibre**, Tomas Kohoutek, Zhongchao Duan, Xin Yan, Takenobu Suzuki, Toyota Technological Institute (Japan); Morio Matsumoto, Takashi Misumi, The Furukawa Electric Co., Ltd. (Japan); Yasutake Ohishi, Toyota Technological Institute (Japan) [8257-15]

Conference 8257 · Room: 232 (Mezzanine)

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Quantum-correlated photon pair generation in tellurite microstructured optical fibers, Xin Yan, Meisong Liao, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8257-16]

Enhanced upconversion in rare-earth doped chalcogenide photonic crystals, Michael Pollard, Univ. of Southampton (United Kingdom); Kenton Knight, The Univ. of Adelaide (Australia); Greg Parker, Dan Hewak, Martin Charlton, Univ. of Southampton (United Kingdom) [8257-17]

The passively mode-locked and Q-switched operation in a fiber laser cavity with normal dispersion, Weiqing Gao, Meisong Liao, Xin Yan, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8257-19]

Optical power control filters: from laser dazzling to damage protection, Ariela Donval, Tali Fisher, Yuval Ofir, Ofir Lipman, Moshe Oron, KiloLambda Technologies, Ltd. (Israel) [8257-36]

A dispersion flattened tellurite composite holey fiber, Meisong Liao, Zhongchao Duan, Weiqing Gao, Xin Yan, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8257-38]

Optimization in Raman+EDFA hybrid amplifiers for WDM systems, Márcia da Mota Jardim Martini, Centro Federal de Educação Tecnológica de Minas Gerais (Brazil); Hypolito J. Kalinowski, Univ. Tecnológica Federal do Paraná (Brazil); Maria José Pontes, Moisés R. N. Ribeiro, Carlos Eduardo S. Castellani, Univ. Federal do Espírito Santo (Brazil) [8257-39]

Numerical simulation of Nd-fluoride and tellurite solar-pumped fiber lasers, Takenobu Suzuki, Hiroyuki Nasu, Toyota Technological Institute (Japan); Shintaro Mizuno, Hiroshi Ito, Kazuo Hasegawa, Toyota Central R&D Labs., Inc. (Japan); Yasutake Ohishi, Toyota Technological Institute (Japan) [8257-40]

Novel tellurite-phosphate composite microstructured optical fibers for nonlinear applications, Tuan H. Tong, Xin Yan, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8257-41]

Structure light with laser speckle for object contour reconstruction, Ting-Xuan Hua, Cheng-Huan Chen, National Tsing Hua Univ. (Taiwan); Augustine Tsai, Institute for Information Industry (Taiwan) [8257-42]

Nonlinear optical testing of electron beam sterilization results, Thomas Haertling, Manuela Reitzig, Fraunhofer-Institut für Zerstörungsfreie Prüfverfahren (Germany); Anton Mayer, Gigatag GmbH (Germany); Christiane Wetzel, Fraunhofer-Institut für Elektronenstrahl- und Plasmatechnik (Germany); Olaf Röder, Jürgen Schreiber, Fraunhofer-Institut für Zerstörungsfreie Prüfverfahren (Germany); Alexander Eychmüller, Technische Univ. Dresden (Germany); Jörg Opitz, Fraunhofer-Institut für Zerstörungsfreie Prüfverfahren (Germany) [8257-43]

Low losses volume Bragg gratings recorded in photo-thermo-refractive glass, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Larissa Glebova, OptiGrate Corp. (USA); Julien Lumeau, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim Smirnov, OptiGrate Corp. (USA) [8257-44]

All-fiber optical modulator, Vladimir I. Denisov, Natalya Koliada, Boris Nyushkov, Victor Pivtsov, Dmitry Primakov, Institute of Laser Physics (Russian Federation) [8257-45]

Optical humidity sensor using polypyrrole (PPy), Maria E. Armas Alvarado, Daniel Orquiza de Carvalho, Escola Politécnica da Univ. de São Paulo (Brazil); Gustavo P. Rehder, Jonas Gruber, Rosamaria W. C. Li, Univ. de São Paulo (Brazil); Marco I. Alayo Chávez, Escola Politécnica da Univ. de São Paulo (Brazil) [8257-46]

Refractive-index insensitive long-period fiber gratings point-by-point inscribed by CO₂ laser for fiber sensors and lasers, Qun Han, Tianjin Univ. (China) and Missouri Univ. of Science and Technology (USA); Xinwei Lan, Jie Huang, Hai Xiao, Missouri Univ. of Science and Technology (USA) [8257-47]

Multi-element superconducting nanowire photon detector for photon-number resolution, Labao Zhang, Lin Kang, Jian Chen, Peiheng Wu, Nanjing Univ. (China) [8257-49]

Time-of-flight 3D ranging through SPAD arrays with in-pixel time-to-digital conversion, Federica A. Villa, Bojan Markovic, Simone Bellisai, Politecnico di Milano (Italy); Simone Tisa, Micro Photon Devices S.r.l. (Italy); Franco Zappa, Politecnico di Milano (Italy) [8257-50]

Impact of threading dislocation density on metamorphic In_xGa_{1-x}As and In_zGa_{1-z}P p-i-n photodetectors on GaAs, Krishna Swaminathan, Tyler Grassman, Limei Yang, Michael Mills, Steven Ringel, The Ohio State Univ. (USA) [8257-51]

Bend loss insensitive all-solid optical fiber, Luiz C. Barbosa, Enver F. Chillce, Univ. Estadual de Campinas (Brazil) [8257-52]

Development of nanostructure based antireflection coatings for EO/IR sensor applications, Ashok K. Sood, Magnolia Optical Technologies, Inc. (USA); Roger E. Welsler, Magnolia Solar, Inc. (USA); Nibir K. Dhar, Defense Advanced Research Projects Agency (USA) [8257-53]

Optical switch using polymer functionalized clad etched fiber Bragg grating, Shivananju B. Nanjunda, Gurusiddhappa R. Prashanth, Sundarajan Asokan, Manoj M. Varma, Indian Institute of Science (India) [8257-54]

Middle infrared LEDs: key element for new generation chemical sensors, Nikolay Stoyanov, LED Microsensor NT, LLC (Russian Federation) [8257-55]

Thursday 26 January

SESSION 5

Room: 232 (Mezzanine) Thurs. 9:10 to 9:50 am

Fiber Lasers

Session Chair: Seppo K. Honkanen, Aalto Univ. School of Electrical Engineering (Finland)

9:10 am: **Broad-band laser emission and optical mode-locking of a Fabry-Perot laser formed between two linearly chirped fiber Bragg gratings**, Grigore Adrian Iordachescu, Xunqi Wu, Joel Jacquet, Supélec (France) [8257-20]

9:30 am: **Tunable and switchable multi-wavelength fiber laser based on semiconductor optical amplifier and twin-core photonic crystal fiber**, Bongkyun Kim, Youngjoo Chung, Gwangju Institute of Science and Technology (Korea, Republic of) [8257-21]

Coffee Break 9:50 to 10:30 am

SESSION 6

Room: 232 (Mezzanine) Thurs. 10:30 to 11:50 am

Bragg Gratings

Session Chair: Shibin Jiang, AdValue Photonics, Inc. (USA)

10:30 am: **Recent developments in the fabrication of infrared fiber Bragg gratings**, Lynda Busse, U.S. Naval Research Lab. (USA); Catalin Florea, Sotera Defense Solutions (USA); Brandon Shaw, Jas Sanghera, U.S. Naval Research Lab. (USA); Ishwar Aggarwal, Sotera Defense Solutions (USA) [8257-22]

10:50 am: **Temperature stability in silica based fiber Bragg gratings**, Christopher W. Smelser, Stephen J. Mihailov, Dan Grobnic, Communications Research Ctr. Canada (Canada) [8257-23]

11:10 am: **Single resonance monolithic Fabry-Perot filters formed by volume Bragg gratings and multilayer dielectric mirrors**, Julien Lumeau, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Cihan Koc, Institut Fresnel (France); Oleksiy Mokhun, Vadim Smirnov, OptiGrate Corp. (USA); Michel Lequime, Institut Fresnel (France); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8257-24]

11:30 am: **High order mode long-period fiber grating refractive index sensor based on intensity measurement**, Xinwei Lan, Missouri Univ. of Science and Technology (USA); Qun Han, Tianjin Univ. (China) and Missouri Univ. of Science and Technology (USA); Jie Huang, Xia Fang, Tao Wei, Zhan Gao, Hai Xiao, Missouri Univ. of Science and Technology (USA) [8257-25]

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

SESSION 7

Room: 232 (Mezzanine) Thurs. 1:30 to 3:10 pm

Optical Components I

Session Chair: **Aydogan Ozcan**, Univ. of California, Los Angeles (USA)1:30 pm: **Electro-adaptive multi-layer fluidic lens system of PDMS membranes**, Hyunhwan Choi, Soo-a Yeo, Yong Hyub Won, KAIST (Korea, Republic of) [8257-26]1:50 pm: **Flexible fibre-addressable surface-plasmon-polariton chip**, Faqrul A. Chowdhury, UBC Okanagan (Canada); Kenneth J. Chau, The Univ. of British Columbia (Canada) [8257-27]2:10 pm: **Optical attenuation across a metal grid**, Michael M. Tilleman, Elbit Systems of America (USA) [8257-28]2:30 pm: **Laser fabrication of micro-optical components of hybrid polymers**, Mangirdas Malinauskas, Albertas Žukauskas, Kristupas Tikuišis, Vytautas Purlys, Vilnius Univ. (Lithuania); Elmina Kabouraki, Stavros Pissadakis, Maria Farsari, Foundation for Research and Technology-Hellas (Greece); Roaldas Gadonas, Vilnius Univ. (Lithuania) [8257-29]2:50 pm: **Numerical simulation of laser pulse propagation in rare-earth-doped materials**, Karl W. Beeson, Evgueni Parilov, Mary Potasek, Simphotek Inc. (USA) [8257-30]

Coffee Break 3:10 to 3:40 pm

SESSION 8

Room: 232 (Mezzanine) Thurs. 3:40 to 5:20 pm

Optical Components II

Session Chair: **Michel J. F. Dignonet**, Stanford Univ. (USA)3:40 pm: **Compact silica-on-silicon planar lightwave circuits for high speed optical signal processing**, Claire L. Callender, Patrick Dumais, Chantal Blanchetiere, Sarkis Jacob, Christopher J. Ledderhof, Christopher W. Smelser, Communications Research Ctr. Canada (Canada); Ksenia Yadav, Jacques Albert, Carleton Univ. (Canada) [8257-31]4:00 pm: **Influence of coating stress of diamond-like carbon coating on surface flatness of large germanium windows**, Rao Yadagiri, Ronian Siew, Qioptiq Singapore Pte Ltd. (Singapore) [8257-32]4:20 pm: **Three-phase photoconductive elements for directional free-space optical sensing**, Xian Jin, Daniel Guerrero, Jonathan F. Holzman, UBC Okanagan (Canada) [8257-33]4:40 pm: **Demonstration of all-optical two bit digital comparator using self-locked Fabry-Perot laser diode**, Bikash Nakarmi, Mohammad Rakib-Uddin, Yong Hyub Won, KAIST (Korea, Republic of) [8257-34]5:00 pm: **The focusing property of the spiral Fibonacci zone plate**, HaiTao Dai, Tianjin Univ. (China); Yanjun Liu, A*STAR Institute of Materials Research and Engineering (Singapore); Xiaowei Sun, Tianjin Univ. (China) [8257-35]

Courses of Related Interest

- SC931 Applied Nonlinear Frequency Conversion (Paschotta) Monday, 8:30 am to 5:30 pm
- SC1060 Fundamentals of Nonlinear Optics (Powers) Sunday, 8:30 am to 12:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Don't miss the free Photonics West Exhibition

24-26 January 2012
South Hall ABC and North Hall D
Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm
Thursday · 10:00 am to 4:00 pm

Organic Photonic Materials and Devices XIV

Conference Chairs: **Christopher Tabor**, Air Force Research Lab. (USA); **François Kajzar**, Polytechnical Univ. of Bucharest (Romania); **Toshikuni Kaino**, Tohoku Univ. (Japan); **Yasuhiro Koike**, Keio Univ. (Japan)

Program Committee: **Chantal Andraud**, Ecole Normale Supérieure de Lyon (France); **Werner J. Blau**, Trinity College Dublin (Ireland); **Christoph Bubeck**, Max-Planck-Institut für Polymerforschung (Germany); **Fabrice Charra**, Commissariat à l'Énergie Atomique (France); **Darnell E. Diggs**, Air Force Research Lab. (USA); **Raluca Dinu**, GigOptix, Inc. (USA); **Alain F. Fort**, Institut de Physique et Chimie des Matériaux de Strasbourg (France); **James G. Grote**, Air Force Research Lab. (USA); **Frank Kenneth Hopkins**, Air Force Research Lab. (USA); **Alex K. Jen**, Univ. of Washington (USA); **Michael H. C. Jin**, The Univ. of Texas at Arlington (USA); **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 (USA); **Kwang-Sup Lee**, Hannam Univ. (Korea, Republic of); **Emisoon Mah**, Air Force Research Lab. (USA); **Seth R. Marder**, Georgia Institute of Technology (USA); **Antoni C. Mitus**, Wrocław Univ. of Technology (Poland); **Robert L. Nelson**, Air Force Research Lab. (USA); **Robert A. Norwood**, College of Optical Sciences, The Univ. of Arizona (USA); **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); **Devanand K. Shenoy**, Defense Advanced Research Projects Agency (USA); **Kenneth D. Singer**, Case Western Reserve Univ. (USA); **Don J. Smith**, U.S. Air Force (United Kingdom); **Attila A. Szep**, Air Force Research Lab. (USA); **Rebecca E. Taylor**, Lockheed Martin Space Systems Co. (USA); **Toshiyuki Watanabe**, Tokyo Univ. of Agriculture and Technology (Japan); **Shiyoshi Yokoyama**, Kyushu Univ. (Japan); **Roberto Zamboni**, Consiglio Nazionale delle Ricerche (Italy)

Monday 23 January

SESSION 1

Room: 234 (Mezzanine) Mon. 8:00 to 10:20 am

Photonic Materials

Session Chair: **François Kajzar**, Polytechnical Univ. of Bucharest (Romania)

8:00 am: **Photonics polymers for reconstructing Japan from the 11th March disaster (Keynote Presentation)**, Toshikuni Kaino, Tohoku Univ. (Japan); Yasuhiro Koike, Keio Univ. (Japan); Seizo Miyata, Tokyo Institute of Technology (Japan) [8258-01]

8:40 am: **Terahertz metamaterials for sensing nematic liquid crystals and carbon nanotubes (Invited Paper)**, Jeong-Weon Wu, Ewha Womans Univ. (Korea, Republic of) [8258-02]

9:10 am: **Control of birefringence of styrene copolymers for optical devices**, Takumi Kojo, Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan) [8258-03]

9:30 am: **Self-assembled functional thin films towards nanophotonics (Invited Paper)**, André-Jean Attias, David Bléger, Antoine Colas, Amandine Bocheux, Fabrice Mathevet, Univ. Pierre et Marie Curie (France); Fabrice Charra, Commissariat à l'Énergie Atomique (France) [8258-04]

10:00 am: **Tuning the refractive index of blended polymer films by RIR-MAPLE deposition**, Ryan D. McCormick, Duke Univ. (USA); Eric D. Cline, ZT Solar, Inc. (USA); Weidong Zhou, The Univ. of Texas at Arlington (USA); Adrienne D. Stiff-Roberts, Duke Univ. (USA) [8258-05]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 234 (Mezzanine) Mon. 10:50 am to 12:00 pm

Bio-photonics

Session Chair: **Toshikuni Kaino**, Tohoku Univ. (Japan)

10:50 am: **Biphotonic chromophores for photodynamic therapy: molecular engineering and biological data (Invited Paper)**, Chantal Andraud, Ecole Normale Supérieure de Lyon (France) [8258-06]

11:20 am: **Nanocrystalline cellulose for covert optical encryption**, Mark P. Andrews, Yiping Zhang, Vamsy P. Chodavarapu, Andrew K. Kirk, McGill Univ. (Canada) [8258-07]

11:40 am: **Describing two-photon absorptivity of (Zwitter)ionic fluorochromes and fluorescent proteins with a new vibronic coupling mechanism**, Mikhail Drobizhev, Montana State Univ. (USA); Nikolay S. Makarov, Georgia Institute of Technology (USA); Erich B. Beuerman, Montana State Univ. (USA); Shane E. Tillo, Oregon Health & Science Univ. (USA); Thomas E. Hughes, Aleksander K. Rebane, Montana State Univ. (USA) [8258-08]

Lunch Break 12:00 to 1:50 pm

SESSION 3

Room: 234 (Mezzanine) Mon. 1:50 to 3:00 pm

Solar Cell and OLED I

Session Chair: **Michael F. Durstock**, Air Force Research Lab. (USA)

1:50 pm: **Conductive polymers as a hole transport materials in a solid state solar cell (Invited Paper)**, Jeonghun Kim, Jong Kwan Koh, Byeonggwon Kim, Jungmok You, Jong Hak Kim, Eunyoung Kim, Yonsei Univ. (Korea, Republic of) [8258-10]

2:20 pm: **DNA for highly efficient phosphorescent organic light emitting diodes**, Elliot F. Gomez, Hans Spaeth, Han You, Univ. of Cincinnati (USA); James G. Grote, Air Force Research Lab. (USA); Andrew J. Steckl, Univ. of Cincinnati (USA) [8258-11]

2:40 pm: **Carrier mobility characterization of DNA-surfactant complexes**, Ting-Yu Lin, Yu-Chueh Hung, National Tsing Hua Univ. (Taiwan) [8258-13]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 234 (Mezzanine) Mon. 3:30 to 5:00 pm

Solar Cell and OLED II

Session Chair: **Eunyoung Kim**, Yonsei Univ. (Korea, Republic of)

3:30 pm: **Nanoscale templating and assembly in dye-sensitized and polymer solar cells (Invited Paper)**, Michael F. Durstock, Giorgio Bazzan, James R. Deneault, Tae-Sik Kang, Christopher Tabor, Barney E. Taylor, Christopher A. Bailey, Air Force Research Lab. (USA) [8258-14]

4:00 pm: **Phase sensitive optical coherence tomography for organic solar cell characterization**, Barry Cense, Hitoyuki Ito, Utsunomiya Univ. (Japan); Chulmin Joo, Yonsei Univ. (Korea, Republic of); Yiheng Lim, Tatsuya Nagamori, Kazuhiro Marumoto, Yoshiaki Yasuno, Univ. of Tsukuba (Japan); Toyohiko Yatagai, Utsunomiya Univ. (Japan) [8258-15]

4:20 pm: **Characterization of water-based thiophene polymers for organic photovoltaics**, Tze Chien Sum, Michael Kurniawan, Kong Fai Tai, Cheng Hon A. Huan, Nanyang Technological Univ. (Singapore) [8258-16]

4:40 pm: **White organic light-emitting diodes with ultra-thin mixed emitting layer**, Taewoo Jeon, Ecole Polytechnique (France); Bernard Geffroy, Ecole Polytechnique (France) and CEA (France); Yvan Bonnassieux, Denis Tondelier, Ecole Polytechnique (France); Eléna Ishow, Univ. de Nantes (France); Sébastien V. Chenais, Sébastien Forget, Univ. Paris 13 (France) and CNRS (France) [8258-17]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany);
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 5

Room: 234 (Mezzanine) Tues. 10:30 am to 12:10 pm

Organic Transistors and Lasers

Session Chair: **Christopher Tabor**, Air Force Research Lab. (USA)10:30 am: **Frontiers in organic semiconductor optoelectronics (Keynote Presentation)**, Ifor D. W. Samuel, Yue Wang, Georgios Tsiminis, Graham A. Turnbull, Univ. of St. Andrews (United Kingdom); Andrew McNeill, Ambicare Health Ltd. (United Kingdom); James Ferguson, Ninewells Hospital and Medical School (United Kingdom) [8258-18]11:10 am: **Emission from strongly coupled exciton-waveguide modes in thin film organic semiconductor**, Tal Ellenbogen, Kenneth Crozier, Harvard Univ. (USA) [8258-19]11:30 am: **Reconfigurable visible quantum dot microlasers integrated on a silicon chip**, Simin Mehrabani, The Univ. of Southern California (USA); Heather K. Hunt, Univ. of Missouri-Columbia (USA); Andrea M. Armani, The Univ. of Southern California (USA) [8258-20]11:50 am: **Towards the control of polarization of organic microlasers**, Iryna Gozhyk, Mélanie Lebental, Ecole Normale Supérieure de Cachan (France); Sébastien Forget, Sébastien V. Chenais, Univ. Paris 13 (France); Christian Ulysse, Ctr. National de la Recherche Scientifique (France); Arnaud Brosseau, Rachel Méallet-Renault, Gilles Clavier, Robert B. Pansu, Joseph Zyss, Ecole Normale Supérieure de Cachan (France) [8258-21]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 6

Room: 234 (Mezzanine) Tues. 1:30 to 3:30 pm

Miscellaneous

Session Chair: **Ifor D. Samuel**, Univ. of St. Andrews (United Kingdom)1:30 pm: **Photonic applications of photochromic molecules (Invited Paper)**, Jaroslaw Mysliwiec, Maciej Czajkowski, Stanislaw Bartkiewicz, Andrzej Miniewicz, Wroclaw Univ. of Technology (Poland); Krystian Zygodlo, Zbigniew Galewski, Univ. of Wroclaw (Poland); Ileana Rau, Francois Kajzar, Polytechnical Univ. of Bucharest (Romania); Bouchta Sahraoui, Univ. d'Angers (France) [8258-22]2:00 pm: **Metal and quantum dot containing patterns by two-photon lithography (Invited Paper)**, Prem Prabhakaran, Kyung Kook Jang, Sung Yeoun Park, Su-Min Jeon, Kwang-Sup Lee, Hannam Univ. (Korea, Republic of); Jong-Jin Park, Samsung Advanced Institute of Technology (Korea, Republic of); Yong Son, Dong-Yol Yang, KAIST (Korea, Republic of) [8258-23]2:30 pm: **Reversible multi-color electrofluorescence switching**, Seogjae Seo, Yuna Kim, Jungmok You, Yonsei Univ. (Korea, Republic of); Pierre Audebert, Ecole Normale Supérieure de Cachan (France); Eunyoung Kim, Yonsei Univ. (Korea, Republic of) [8258-24]2:50 pm: **Organic nanofibers from squarylium dyes: local morphology, optical, and electrical properties**, Frank Balzer, Manuela Schiek, Horst-Günter Rubahn, Univ. of Southern Denmark (Denmark) [8258-25]3:10 pm: **All-printed touchless human-machine interface based on only five functional materials**, Martin Zirkl, Anurak Sawatdee, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); Uta Helbig, Fraunhofer-Institut für Silicatiforschung (Germany); Markus Krause, Johannes Kepler Univ. Linz (Austria); Gregor Scheipl, Elke Kraker, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); Peter Andersson Ersman, David Nilsson, Duncan Platt, Peter Bodö, Acreo AB (Sweden); Siegfried G. Bauer, Johannes Kepler Univ. Linz (Austria); Gerhard Domann, Fraunhofer-Institut für Silicatiforschung (Germany); Barbara Stadlober, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria) [8258-26]

Coffee Break 3:30 to 4:00 pm

SESSION 7

Room: 234 (Mezzanine) Tues. 4:00 to 5:30 pm

Electro-Optics

Session Chair: **Shiyoshi Yokoyama**, Kyushu Univ. (Japan)4:00 pm: **High performance photorefractive polymer composite and organic glass based on diphenylhydrazone (Invited Paper)**, Nakjoong Kim, Hanyang Univ. (Korea, Republic of) [8258-27]4:30 pm: **Fabry-Perot resonant switch using electro-optic polymer**, Katherine L. Drain, UES, Inc. (USA); Wen Cheng, Univ. of Dayton (USA); Robert L. Nelson, Air Force Research Lab. (USA); Qiwen Zhan, Univ. of Dayton (USA) [8258-28]4:50 pm: **Organic single crystalline electro-optic films for hybrid integration with silicon photonic wires**, Mojca Jazbinsek, Blanca Ruiz, Peter Günter, Rainbow Photonics AG (Switzerland) [8258-29]5:10 pm: **Solution phase assisted reorientation of chromophores: a modern approach to electro optic materials processing**, Stephen Kozacik, David L. Eng, Michael Roman, Benjamin C. Olbricht, Dennis W. Prather, Univ. of Delaware (USA) [8258-30]

Wednesday 25 January

SESSION 8

Room: 234 (Mezzanine) Wed. 8:30 to 10:20 am

Nonlinear Optics

Session Chair: **Yasuhiro Koike**, Keio Univ. (Japan)8:30 am: **Advances in third-order nonlinear optical materials (Keynote Presentation) (Presentation Only)**, Seth R. Marder, Stephen Barlow, Jean-Luc Bredas, San-Hui Chi, Georgia Institute of Technology (USA); David J. Hagan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Joel M. Hales, Yesudas Kada, Hsin-Chieh Lin, Jonathan Matichak, Shino Ohira, Georgia Institute of Technology (USA); Lazaro Padilha, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Joseph W. Perry, Yanrong Shi, Georgia Institute of Technology (USA); Eric W. Van Stryland, Scott Webster, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8258-31]9:10 am: **Nonlinear absorption and nonlinear refraction: maximizing the merit factors (Invited Paper)**, Marek J. Samoc, Katarzyna Matczyszyn, Marcin Nyk, Joanna Olesiak-Banska, Dominika Wawrzynczyk, Piotr Hanczyc, Janusz Szeremeta, Malgorzata Wielgus, Marta Gordel, Radoslaw Kolkowski, Bartlomiej Straszak, Wroclaw Univ. of Technology (Poland); Marie P. Cifuentes, Mark G. Humphrey, The Australian National Univ. (Australia) [8258-32]9:40 am: **In vivo polarization-resolved second harmonic generation imaging of collagenous tissues**, Gaël Latour, Ivan Gusachenko, Laura Kowalczyk, Isabelle Lamarre, Marie-Claire Schanne-Klein, Ecole Polytechnique (France) [8258-33]10:00 am: **Proposal of cyano-group containing polymers as new host materials of the NLO polymers**, Atsushi Sugita, Yasuaki Tamaki, Nobuyuki Mase, Yoshimasa Kawata, Shigeru Tasaka, Shizuoka Univ. (Japan) [8258-34]

Coffee Break 10:20 to 10:50 am

SESSION 9

Room: 234 (Mezzanine) Wed. 10:50 am to 12:30 pm

Optical Fiber and Waveguide Devices I

Session Chair: Seth R. Marder, Georgia Institute of Technology (USA)

10:50 am: **EO-polymer waveguide based high dynamic range EM wave sensors** (*Invited Paper*), Che-Yun Lin, The Univ. of Texas at Austin (USA); Alan X. Wang, Oregon State Univ. (USA); Xingyu Zhang, Beomsuk Lee, Ray T. Chen, The Univ. of Texas at Austin (USA) [8258-35]

11:20 am: **Two-photon absorption of the nonlinear optical chromophore/polymer on SiN slot waveguide**, Shiyoshi Yokoyama, Feng Yu, Kazuhiro Yamamoto, Kyushu Univ. (Japan) [8258-36]

11:40 am: **Additional donor modification by oxy groups for strengthening electro-optic response of molecules** (*Invited Paper*), Akira Otomo, Toshiki Yamada, National Institute of Information and Communications Technology (Japan) [8258-09]

12:10 pm: **Design and characterization of poly(styrene)-based GI-POF with high bandwidth and high thermal stability for home networks**, Yoshihisa Akimoto, Keio Univ. (Japan); Makoto Asai, The Univ. of Tokyo (Japan); Kotaro Koike, Astushi Kondo, Kenji Makino, Azusa Inoue, Yasuhiro Koike, Keio Univ. (Japan) [8258-38]

Lunch/Exhibition Break 12:30 to 1:50 pm

SESSION 10

Room: 234 (Mezzanine) Wed. 1:50 to 3:20 pm

Optical Fiber and Waveguide Devices II

Session Chair: Ray T. Chen, The Univ. of Texas at Austin (USA)

1:50 pm: **Photopolymer-based three-dimensional optical waveguide devices** (*Invited Paper*), Manabu Kagami, Tatsuya Yamashita, Masatoshi Yonemura, Akari Kawasaki, Osamu Watanabe, Toyota Central R&D Labs., Inc. (Japan) [8258-39]

2:20 pm: **Fabrication of low loss binary amorphous copolymers for graded-index plastic optical fiber**, Toshimitsu Araki, Saori Nishino, Takahiro Kado, Kotaro Koike, Atsushi Kondo, Yasuhiro Koike, Keio Univ. (Japan) [8258-40]

2:40 pm: **Critical angle in fluorescent polymer optical fibers**, Inaki Bikandi, María Asunción Illarramendi, Joseba Zubia-Zaballa, Jon Arrue, Felipe Jimenez, Univ. del País Vasco (Spain); Luca Bazzana, Luceat S.p.A. (Italy) [8258-41]

3:00 pm: **On-chip sensing of volatile organic compounds in water by hybrid polymer and silicon photonic-crystal slot-waveguide devices**, Swapnajit Chakravarty, Omega Optics, Inc. (USA); Wei-Cheng Lai, Ray T. Chen, The Univ. of Texas at Austin (USA) [8258-42]

Coffee Break 3:20 to 3:50 pm

SESSION 11

Room: 234 (Mezzanine) Wed. 3:50 to 4:40 pm

Grating Formation

Session Chair: Ileana Rau, Polytechnical Univ. of Bucharest (Romania)

3:50 pm: **Quickly updatable hologram images with high performance photorefractive polymer composites** (*Invited Paper*), Naoto Tsutsumi, Kenji Kinashi, Asato Nonomura, Wataru Sakai, Kyoto Institute of Technology (Japan) [8258-43]

4:20 pm: **Grating couplers in polymer with a thin Si 3N 4 layer embedded**, Linghua Wang, Marco A. Garcia Porcel, Diedrik Vermeulen, Univ. Gent (Belgium); Xiyou Han, Jinyan Wang, Xigao Jian, Mingshan Zhao, Dalian Univ. of Technology (China); Geert Morthier, Univ. Gent (Belgium) [8258-44]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Picosecond polarization spectroscopy of fluorescein attached to different molecular volume polymer influenced by rotational motion, Yang Pu, Wubao Wang, The City College of New York (USA); Richard B. Dorshow, Covidien (USA); Robert R. Alfano, The City College of New York (USA) [8258-45]

A photo-aligned self-assembled monolayer for polymer transistors, Tatsuhiko Kawaguchi, Takehiro Okura, Yuusuke Suenaga, Tomonori Hanasaki, Ichiro Fujieda, Ritsumeikan Univ. (Japan) [8258-46]

Vibration-induced mobility enhancement for a polymer transistor, Yuuki Kondo, Tomonori Hiraki, Yuusuke Suenaga, Tomonori Hanasaki, Ichiro Fujieda, Ritsumeikan Univ. (Japan) [8258-47]

Ultrafast nonlinear optical studies of 3,8,13,18-Tetrachloro-2,7,12,17-tetramethoxy porphyrin and its derivatives, Swain Debasis, Rana Anup, Pradeepta Kumar Panda, Soma Venugopal Rao, Univ. of Hyderabad (India) [8258-48]

Femtosecond and picosecond nonlinear optical studies of Corroles, Hamad Syed, Gopala Krishna Podagatlapalli, Univ. of Hyderabad (India); Giribabu Lingamallu, Indian Institute of Commerce and Trade (India); Surya P. Tewari, Soma Venugopal Rao, Univ. of Hyderabad (India) [8258-49]

The effect of intramolecular charge transfer via biphenyl group on the optoelectronic properties of red fluorophore, Na Rae Park, Gweon Young Ryu, Dong Myung Shin, Hongik Univ. (Korea, Republic of) [8258-50]

Influence of the polymer processing conditions on the performance of bulk heterojunction solar cells, Annie Ng, Yechuan Sun, Man Kin Fung, Man Ching Ng, Aleksandra B. Djuricic, Wai Kin Chan, The Univ. of Hong Kong (Hong Kong, China) [8258-51]

Dependence on molecular stacking orientation of open-circuit voltage in organic solar cell based on pentacene and its derivatives, Chi-Ta Chou, Yian Tai, Chin-Hsin J. Liu, National Taiwan Univ. of Science and Technology (Taiwan); Li-Chyong Chen, National Taiwan Univ. (Taiwan); Kuei-Hsien Chen, Academia Sinica (Taiwan) [8258-52]

Vertical external cavity surface-emitting organic lasers: a dynamical laser modeling towards optimized performance, Hadi Rabbani-Haghighi, Sébastien Forget, Alain Siove, Sébastien Chenais, Univ. Paris 13 (France) and CNRS (France) [8258-53]

Multi high-order anisotropic self-diffraction in Cerium doped BaTiO₃ crystal, Prathan Buranasiri, Worakarn Neeyakorn, King Mongkut's Institute of Technology Ladkrabang (Thailand) [8258-54]

Fabrication of electronic device based on photonic gel films, Sung Woo Lee, Dong Myung Shin, Hongik Univ. (Korea, Republic of) [8258-55]

Efficient configuration transition in a new azobenzene-LC polymer for updatable hologram, Weidong Mao, Univ. of Miami (USA); Qunhui Sun, New Span Opto-Technology Inc. (USA); Sarfaraz Baig, Hui Lu, Michael R. Wang, Univ. of Miami (USA) [8258-57]

Optically tunable and switchable diffraction gratings in photochromic polymer thin films, Sebastiampillai G. Raymond, Grant Williams, My T. Do, Ayla P. Middleton, Mohamed M. Ashraf, M. Bhuiyan, Andrew Kay, Industrial Research Ltd. (New Zealand) [8258-58]

Development of fibre Bragg grating based strain/temperature sensing system, Sebastiampillai G. Raymond, Matthaeus Panczyk, Grant Williams, Industrial Research Ltd. (New Zealand); Kevin Stevens, QUEST Integrity Group, LLC (New Zealand) [8258-37]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

RF and Millimeter-Wave Photonics II

Conference Chairs: **Robert L. Nelson**, Air Force Research Lab. (USA); **Dennis W. Prather**, Univ. of Delaware (USA); **Chris Schuetz**, Phase Sensitive Innovations, Inc. (USA)

Program Committee: **Glenn D. Boreman**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Ray T. Chen**, The Univ. of Texas at Austin (USA); **Charles H. Cox III**, Photonic Systems, Inc. (USA); **Larry R. Dalton**, Univ. of Washington (USA); **Ronald Esman**, Defense Advanced Research Projects Agency (USA); **Yeshiahu Fainman**, Univ. of California, San Diego (USA); **Peter R. Herczfeld**, Drexel Univ. (USA); **Warren N. Herman**, Univ. of Maryland, College Park (USA); **Michael Hochberg**, Univ. of Washington (USA); **Yifei Li**, Univ. of Massachusetts Dartmouth (USA); **Joseph N. Mait**, U.S. Army Research Lab. (USA); **Mark S. Mirotznik**, Univ. of Delaware (USA); **Robert A. Norwood**, College of Optical Sciences, The Univ. of Arizona (USA); **Gernot S. Pomrenke**, Air Force Office of Scientific Research (USA); **Attila A. Szep**, Air Force Research Lab. (USA); **Keith I. Williams**, U.S. Naval Research Lab. (USA); **Qiwen Zhan**, Univ. of Dayton (USA)

Sunday 22 January

SESSION 1

Room: 234 (Mezzanine) Sun. 9:00 to 11:50 am

System Concepts

Session Chair: **Christopher A. Schuetz**, Phase Sensitive Innovations, Inc. (USA)

9:00 am: **Novel step-tunable wavelength-swept optical system based on a SSB modulator driven by a RF generator for fiber sensing networks**, Tianxin Yang, Changren Qiu, Zhaoying Wang, Chunfeng Ge, Mei Sang, Tianjin Univ. (China) [8259-01]

9:20 am: **Passive millimeter-wave holography enabled by optical up-conversion**, Janusz Murakowski, Garrett J. Schneider, Dennis W. Prather, Univ. of Delaware (USA) [8259-02]

9:40 am: **Wideband analog photonic links: some performance limits and considerations for multi-octave implementations (Invited Paper)**, Vincent J. Urlick, Jason D. McKinney, John F. Diehl, Keith J. Williams, U.S. Naval Research Lab. (USA) [8259-03]

Coffee Break 10:10 to 10:40 am

10:40 am: **Widely tunable opto-electronics oscillators**, Jeremy Maxin, Grégoire Pillet, Loic Morvan, Daniel Dolfi, Thales Research & Technology (France) [8259-04]

11:00 am: **Integrated silicon-photonic module for generating widely tunable, narrow-line RF using injection-locked lasers**, Garrett J. Schneider, Garrett A. Ejzak, David W. Grund, Janusz Murakowski, Shouyuan Shi, Dennis W. Prather, Univ. of Delaware (USA) [8259-05]

11:20 am: **A wideband photonic and compressive sampling analog-to-digital converter: architecture, requirements and applications (Invited Paper)**, Thomas R. Clark, Jr., Patrick T. Callahan, Michael L. Dennis, The Johns Hopkins Univ. Applied Physics Lab. (USA) [8259-06]

SESSION 2

Room: 234 (Mezzanine) Sun. 11:50 am to 12:50 pm

Materials and Components I

Session Chair: **Robert L. Nelson**, Air Force Research Lab. (USA)

11:50 am: **DNA-based nanoparticle composite materials for EMI shielding**, De-Yu Zang, IPITEK, Inc. (USA); James G. Grote, Air Force Research Lab. (USA) [8259-07]

12:10 pm: **High bandwidth constant current modulation circuit for carrier lifetime measurements in semiconductor lasers**, Umesh Singh, Univ. of Central Florida (USA) [8259-08]

12:30 pm: **Direct modulation of injection-locked external-cavity laser**, Janusz Murakowski, Garrett J. Schneider, Garrett A. Ejzak, David W. Grund, Dennis W. Prather, Univ. of Delaware (USA) [8259-09]

Lunch Break 12:50 to 1:50 pm

SESSION 3

Room: 234 (Mezzanine) Sun. 1:50 to 3:10 pm

Materials and Components II

Session Chair: **Robert L. Nelson**, Air Force Research Lab. (USA)

1:50 pm: **Fabrication and characterization of hybrid 1x4 silicon slot optical modulator array built on silicon photonics and EO polymer photonics technologies for optical phase array antenna applications**, Richard S. Kim, Attila A. Szep, Air Force Research Lab. (USA); Antao Chen, Haishan Sun, Univ. of Washington (USA); Shouyuan Shi, Univ. of Delaware (USA); Don C. Abeyasinghe, Univ. of Cincinnati (USA); Larry R. Dalton, Univ. of Washington (USA) [8259-10]

2:10 pm: **Broadband low-drive voltage electro-optic polymer modulator**, David L. K. Eng, Stephen Kozacik, Benjamin C. Olbricht, Shouyuan Shi, Dennis Prather, Univ. of Delaware (USA) [8259-11]

2:30 pm: **Vertical dual-slot modulator for mmW photonics**, Stephen Kozacik, David L. K. Eng, Maciej Murakowski, Benjamin C. Olbricht, Shouyuan Shi, Dennis W. Prather, Univ. of Delaware (USA) [8259-12]

2:50 pm: **Double mushroom 1.55 μm waveguide photodetectors for integrated E-band (60-90 GHz) wireless transmitter modules**, Vitaly Rymanov, Univ. Duisburg-Essen (Germany); Tolga Tekin, Technische Univ. Berlin (Germany); Andreas Stöhr, Univ. Duisburg-Essen (Germany) . . . [8259-13]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 234 (Mezzanine) Sun. 3:40 to 5:00 pm

Applications

Session Chair: **Janusz Murakowski**, Univ. of Delaware (USA)

3:40 pm: **Passive fully polarimetric W-band millimeter wave imaging (Invited Paper)**, Bruce E. Bernacki, James F. Kelly, David M. Sheen, Douglas L. McMakin, Jonathan R. Tedeschi, Robert V. Harris, Jr., Albert Mendoza, Thomas E. Hall, Brian K. Hatchell, Patrick L. J. Valdez, Pacific Northwest National Lab. (USA) [8259-14]

4:10 pm: **Advanced millimeter-wave security portal imaging techniques (Invited Paper)**, David M. Sheen, Bruce E. Bernacki, Douglas L. McMakin, Pacific Northwest National Lab. (USA) [8259-15]

4:40 pm: **Integration platform for 72 GHz photodiode-based wireless transmitter**, Bouchaib Bouhlal, Sascha Lutzmann, Merih Palandöken, Technische Univ. Berlin (Germany); Vitaly Rymanov, Andreas Stöhr, Univ. Duisburg-Essen (Germany); Tolga Tekin, Technische Univ. Berlin (Germany) [8259-16]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Ultrafast Phenomena and Nanophotonics XVI

Conference Chairs: **Markus Betz**, Technische Univ. Dortmund (Germany); **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada); **Jin-Joo Song**, Univ. of California, San Diego (USA); **Kong-Thon Tsen**, Arizona State Univ. (USA)

Program Committee: **Mischa Bonn**, FOM Institute for Atomic and Molecular Physics (Netherlands); **Yujie J. Ding**, Lehigh Univ. (USA); **Jan A. Gaj**, Univ. of Warsaw (Poland); **Kazuhiko Hirakawa**, The Univ. of Tokyo (Japan); **Rupert Huber**, Univ. Regensburg (Germany); **Robert A. Kaindl**, Lawrence Berkeley National Lab. (USA); **Dai-Sik Kim**, Seoul National Univ. (Korea, Republic of); **Torsten Meier**, Univ. Paderborn (Germany); **Walter Pfeiffer**, Univ. Bielefeld (Germany); **Mark I. Stockman**, Georgia State Univ. (USA); **Chi-Kuang Sun**, National Taiwan Univ. (Taiwan); **Fabrice Vallee**, Univ. Claude Bernard Lyon 1 (France); **Klaas Wynne**, Univ. of Strathclyde (United Kingdom); **Chih-Chung Yang**, National Taiwan Univ. (Taiwan)

Conference Cosponsor:



Sunday 22 January

SESSION 1

Room: 270 (Mezzanine) Sun. 9:00 to 10:15 am

Dynamics in Dots and Wires I

Session Chair: **Markus Betz**, Technische Univ. Dortmund (Germany)

9:00 am: **Ultrafast investigations of carrier and spin dynamics in an artificial molecule** (*Invited Paper*), Kai Müller, Alexander Bechtold, Walter Schottky Institut (Germany); Claudia Ruppert, Technische Univ. Dortmund (Germany); Hubert J. Krenner, Univ. Augsburg (Germany); José M. Villa-Boas, Univ. Federal de Uberlândia (Brazil); Markus Betz, Technische Univ. Dortmund (Germany); Gerhard Abstreiter, Jonathan J. Finley, Walter Schottky Institut (Germany) [8260-01]

9:30 am: **THz quantum-confined Stark effect in semiconductor quantum dots**, Dmitry Turchinovich, Technical Univ. of Denmark (Denmark); Boris S. Monozon, State Marine Technical Univ. of St. Petersburg (Russian Federation); Daniil A. Livshits, Innolume GmbH (Germany); Edik U. Rafailov, Univ. of Dundee (United Kingdom); Matthias C. Hoffmann, Univ. Hamburg (Germany) . . [8260-02]

9:45 am: **Theory of phonon-assisted intraband transitions in semiconductor quantum dots**, Sandra Kuhn, Franz Schulze, Marten Richter, Andreas Knorr, Alexander Carmele, Technische Univ. Berlin (Germany) [8260-03]

10:00 am: **Theory of non-equilibrium phonon statistics and multi-phonon assisted light emission from semiconductor quantum dots**, Julia Kabuss, Alexander Carmele, Marten Richter, Andreas Knorr, Technische Univ. Berlin (Germany) [8260-04]

Coffee Break 10:15 to 10:45 am

SESSION 2

Room: 270 (Mezzanine) Sun. 10:45 am to 12:15 pm

Spins in Bulk Semiconductors

Session Chair: **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada)

10:45 am: **Ultrafast spin dynamics in wide-gap magnetic semiconductors** (*Invited Paper*), Rudolf Bratschitsch, Technische Univ. Chemnitz (Germany) [8260-05]

11:15 am: **One- and two-photon indirect injection of carriers and spins in silicon** (*Invited Paper*), John E. Sipe, Jin Luo Cheng, Julien Rioux, Univ. of Toronto (Canada); Jaroslav Fabian, Univ. Regensburg (Germany) [8260-06]

11:45 am: **Optical orientation and coherent spin dynamics in bulk germanium** (*Invited Paper*), Christine Hautmann, Markus Betz, Technische Univ. Dortmund (Germany) [8260-07]

Lunch Break 12:15 to 1:30 pm

SESSION 3

Room: 270 (Mezzanine) Sun. 1:30 to 3:00 pm

Dynamics in Dots and Wires II

Session Chair: **Rudolf Bratschitsch**, Technische Univ. Chemnitz (Germany)

1:30 pm: **Ultrafast optical control of interacting spins in coupled quantum dots** (*Invited Paper*), Sam G. Carter, U.S. Naval Research Lab. (USA); Danny Kim, U.S. Naval Research Lab. (USA) and Univ. of Michigan (USA); Alex Greilich, U.S. Naval Research Lab. (USA) and Univ. of Maryland, College Park (USA); Allan S. Bracker, Daniel G. Gammon, U.S. Naval Research Lab. (USA) . [8260-08]

2:00 pm: **Room temperature spin relaxation in quantum dot based spin-optoelectronic devices**, Henning Soldat, Mingyuan Li, Arne Ludwig, Astrid Ebbing, Ruhr-Univ. Bochum (Germany); Frank Stromberg, Werner Keune, Heiko Wende, Univ. Duisburg-Essen (Germany); Dirk Reuter, Andreas D. Wieck, Nils C. Gerhardt, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) . . [8260-09]

2:15 pm: **Ultrafast charge transfer in Cu-doped ZnO nanowires**, Tze Chien Sum, Guozhong Xing, Guichuan Xing, Edbert Jarvis Sie, Tao, Tom Wu, Cheng Hon Alfred Huan, Nanyang Technological Univ. (Singapore) [8260-10]

2:30 pm: **Relationship of second order susceptibility to the dimensions of ZnO nanorods based on Lorentz local field**, Guan-Yu Zhuo, Kuo-Jen Hsu, Tung-Yu Su, Nan-Hsun Huang, Yang-Fang Chen, Shi-Wei Chu, National Taiwan Univ. (Taiwan) [8260-11]

2:45 pm: **Strong THz emission from low-energy acoustic-like surface plasmons in InAs nanowires**, Denis V. Seletskiy, The Univ. of New Mexico (USA) and Air Force Research Lab. (USA); Chia-Yeh Li, Michael P. Hasselbeck, The Univ. of New Mexico (USA); Jeffrey G. Cederberg, Sandia National Labs. (USA); Aaron M. Katzenmeyer, Maria E. Toimil-Molares, Francois Léonard, Sandia National Labs., California (USA); A. Alec Talin, Sandia National Labs., California (USA) and National Institute of Standards and Technology (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8260-12]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 270 (Mezzanine) Sun. 3:30 to 5:15 pm

Nonlinear Optical Phenomena

Session Chairs: **Jin-Joo Song**, Univ. of California, San Diego (USA); **Kong-Thon Tsen**, Arizona State Univ. (USA)

3:30 pm: **Ultrafast optical nonlinearities in a plasmonic nanorod metamaterial** (*Invited Paper*), Gregory A. Wurtz, King's College London (United Kingdom); Gary P. Wiederrecht, Argonne National Lab. (USA); Anatoly V. Zayats, King's College London (United Kingdom) [8260-13]

4:00 pm: **Giant AC Stark effect in germanium quantum wells**, Sangam Chatterjee, Niko S. Köster, Benjamin Ewers, Kolja Kolata, Ronja Woscholski, Philipps-Univ. Marburg (Germany); Christoph Lange, Univ. of Toronto (Canada); Daniel Chrastina, Giovanni Isella, Politecnico di Milano (Italy); Hans von Känel, ETH Zurich (Switzerland) [8260-15]

4:15 pm: **Nonlinear propagation of strong-field THz pulses in doped semiconductors**, Dmitry Turchinovich, Jørn M. Hvam, Technical Univ. of Denmark (Denmark); Matthias C. Hoffmann, Univ. Hamburg (Germany) [8260-16]

4:30 pm: **Spatiotemporal dynamics of few-cycle optical pulses in nonlinear media: collapse vs bullet cast**, Igor V. Melnikov, E.L.S. Co. (Russian Federation) [8260-17]

4:45 pm: **Numerical analysis of multi-photon parameters from ultrafast laser measurements**, Mary J. Potasek, Evgueni Parilov, Simphotek Inc. (USA) [8260-18]

5:00 pm: **Chirped pulses sum frequency generation for deep-UV picosecond pulse shaping**, Carlo Vicario, Alexandre Trisorio, Paul Scherrer Institut (Switzerland); Gunnar Arisholm, Norwegian Defence Research Establishment (Norway); Christoph P. Hauri, Paul Scherrer Institut (Switzerland) and Ecole Polytechnique Federale de Lausanne (Switzerland) [8260-19]

Monday 23 January

SESSION 5

Room: 270 (Mezzanine)..... Mon. 8:00 to 9:45 am

THz Spectroscopy I

Session Chair: Sangam Chatterjee, Philipps-Univ. Marburg (Germany)

8:00 am: **Compact and portable terahertz source based on frequency mixing using dual-frequency solid-state laser** (*Invited Paper*), Yujie J. Ding, Lehigh Univ. (USA) [8260-20]

8:30 am: **Detection of ultrafast THz pulses via electro-absorption in coupled asymmetric quantum wells**, Chia-Yeh Li, The Univ. of New Mexico (USA); Denis Seletskiy, The Univ. of New Mexico (USA) and Air Force Research Lab. (USA); Jeffrey G. Cederberg, Sandia National Labs. (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8260-21]

8:45 am: **Nonlinear response of semiconductors driven by intense THz pulses** (*Invited Paper*), Alexej Pashkin, Bernhard Mayer, Friederike Junginger, Christian Schmidt, Univ. of Konstanz (Germany); Olaf Schubert, Univ. Regensburg (Germany); Sebastian Mährlein, Univ. of Konstanz (Germany); Alexander Sell, Univ. of Konstanz (Germany) and Massachusetts Institute of Technology (USA); Rupert Huber, Univ. Regensburg (Germany); Alfred Leitenstorfer, Univ. of Konstanz (Germany) [8260-22]

9:15 am: **Ultrafast nonlinear terahertz studies of high-field charge transport in semiconductors** (*Invited Paper*), Thomas Elsässer, Pamela Bowlan, Klaus Reimann, Michael Woerner, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Rudolf Hey, Paul-Drude-Institut für Festkörperelektronik (Germany); Christos Flytzanis, Ecole Normale Supérieure (France) [8260-23]

Coffee Break 9:45 to 10:15 am

SESSION 6

Room: 270 (Mezzanine)..... Mon. 10:15 am to 12:00 pm

Dynamics in Microcavities

Session Chair: Yujie J. Ding, Lehigh Univ. (USA)

10:15 am: **Coherence properties and excitation spectra of single and coupled microcavity polariton condensates** (*Invited Paper*), Marc Assmann, Franziska Veit, Jean-Sebastian Tempel, Manfred Bayer, Technische Univ. Dortmund (Germany); Arash Rahimi-Iman, Andreas Löffler, Christian Schneider, Sven Höfling, Stephan Reitzenstein, Lukas Worschech, Alfred Forchel, Julius-Maximilians-Univ. Würzburg (Germany) [8260-24]

10:45 am: **Ultrafast transition from a photon to a polariton Bose-Einstein condensate in a semiconductor microcavity**, Elena Kammann, Maria Maragkou, Hamid Ohadi, Alastair J. D. Grundy, Alexey V. Kavokin, Pavlos G. Lagoudakis, Univ. of Southampton (United Kingdom) [8260-25]

11:00 am: **Phonon-driven resonantly enhanced polariton luminescence in organic microcavities**, Niccolò Somaschi, Foundation for Research and Technology-Hellas (Greece); Leonidas Mouchliadis, Univ. of Crete (Greece); Dave Coles, The Univ. of Sheffield (United Kingdom); Ilias Perakis, Foundation for Research and Technology-Hellas (Greece); David Lidzey, The Univ. of Sheffield (United Kingdom); Pavlos G. Lagoudakis, Univ. of Southampton (Italy); Pavlos Savvidis, Univ. of Crete (Greece) [8260-26]

11:15 am: **The single quantum-dot laser-emission properties in weak and strong coupling** (*Invited Paper*), Christopher Gies, Matthias Florian, Paul Gartner, Frank Jahnke, Univ. Bremen (Germany) [8260-27]

11:45 am: **Addressing phonons in semiconductor quantum dot-QED: entanglement, non-equilibrium phonon, and photon distributions**, Alexander Carmele, Julia Kabuss, Andreas Knorr, Technische Univ. Berlin (Germany) [8260-28]

Lunch Break 12:00 to 1:15 pm

SESSION 7

Room: 270 (Mezzanine)..... Mon. 1:15 to 3:30 pm

Coherent Optical Phenomena

Session Chair: Markus Betz, Technische Univ. Dortmund (Germany)

1:15 pm: **Generation of coherent charge oscillations in the plane of GaAs quantum wells** (*Invited Paper*), Shekhar Priyadarshi, Klaus Pierz, Uwe Siegner, Physikalisch-Technische Bundesanstalt (Germany); Philip Dawson, The Univ. of Manchester (United Kingdom); Mark Bieler, Physikalisch-Technische Bundesanstalt (Germany) [8260-29]

1:45 pm: **Quantum interference control of electrical currents: applications for ultrabroadband field-resolved spectroscopy** (*Invited Paper*), Claudia Ruppert, Sebastian Thunich, Elmar Sternemann, Technische Univ. Dortmund (Germany); Alexander Holleitner, Walter Schottky Institut (Germany); Markus Betz, Technische Univ. Dortmund (Germany) [8260-30]

2:15 pm: **Revealing exciton dephasing and transport dynamics in semiconductor quantum well/quantum dot systems using optical 2D Fourier transform spectroscopy** (*Invited Paper*), Galan Moody, JILA (USA) and National Institute of Standards and Technology (USA) and Univ. of Colorado (USA); Mark E. Siemens, Univ. of Denver (USA) and JILA (USA); Alan D. Bristow, West Virginia Univ. (USA) and JILA (USA); Xingcan Dai, Tsinghua Univ. (China) and JILA (USA); Denis Karaickaj, Univ. of South Florida (USA) and JILA (USA); Allan S. Bracker, Daniel Gammon, Naval Research Lab. (USA); Steven T. Cundiff, JILA (USA) and National Institute of Standards and Technology (USA) and Univ. of Colorado (USA) [8260-31]

2:45 pm: **Coherent ultrafast Rabi oscillations in metal-j-aggregate hybrid nanostructures** (*Invited Paper*), Christoph Lienau, Carl von Ossietzky Univ. Oldenburg (Germany) [8260-32]

3:15 pm: **THz control of matter states: coherent excitons beyond the Rabi-splitting**, Benjamin Ewers, Niko S. Köster, Ronja Woscholski, Sangam Chatterjee, Martin Koch, Philipps-Univ. Marburg (Germany); Hyatt M. Gibbs, Galina Khitrova, College of Optical Sciences, The Univ. of Arizona (USA); Andrea C. Klettke, Johannes T. Steiner, Mackillo Kira, Stephan W. Koch, Philipps-Univ. Marburg (Germany) [8260-33]

Coffee Break 3:30 to 4:00 pm

SESSION 8

Room: 270 (Mezzanine)..... Mon. 4:00 to 5:45 pm

Ultrafast Processes in Carbon and Polymer Nanocomposites

Session Chairs: Jin-Joo Song, Univ. of California, San Diego (USA);

Kong-Thon Tsen, Arizona State Univ. (USA)

4:00 pm: **Ultrafast carrier dynamics in graphite probed with time-resolved XUV photoemission** (*Invited Paper*), Michael Bauer, Christian-Albrechts-Univ. zu Kiel (Germany) [8260-34]

4:30 pm: **Terahertz imaging and spectroscopy of large-area single-layer graphene**, Yun-Shik Lee, Michael J. Paul, Joseph L. Tomaino, Andrew D. Jameson, Joshua W. Kevek, Ethan D. Minot, Oregon State Univ. (USA); Arend M. van der Zande, Robert A. Barton, Paul L. McEuen, Cornell Univ. (USA) [8260-35]

4:45 pm: **Nanoscale imaging of interface dynamics in polymer blends by ultrafast confocal microscopy** (*Invited Paper*), Dario Polli, Giulio Cerullo, Giulia Grancini, Guglielmo Lanzani, Politecnico di Milano (Italy) [8260-36]

5:15 pm: **Photoinduced dynamics in a terpyridine-based zinc(II) coordination polymer and their molecular fragments**, Ronald Siebert, Andreas Winter, Ulrich S. Schubert, Friedrich-Schiller-Univ. Jena (Germany); Ivan Scheblykin, Lund Univ. (Sweden); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany); Benjamin Dietzek, Friedrich-Schiller-Univ. Jena (Germany) [8260-37]

5:30 pm: **Ultrafast optical analyses and characteristics of nanocomposite media**, Christopher M. Collier, Xian Jin, Brandon Born, Jonathan F. Holzman, UBC Okanagan (Canada) [8260-38]

Tuesday 24 January

OPTO Plenary Session
Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am
Session Chairs: Klaus P. Streubel, OSRAM GmbH (Germany); David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)
 8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)
 8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
 8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)
 8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)
 9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)
 See p. 26 for details.

Coffee Break 10:10 to 10:30 am

Room: 270 (Mezzanine) Tues. 10:30 am to 12:30 pm

Metamaterials

Session Chair: Abdulhakem Y. Elezabi, Univ. of Alberta (Canada)

10:30 am: **Ultrafast metatronics (Keynote Presentation)**, Nader Engheta, Univ. of Pennsylvania (USA) [8260-39]

11:15 am: **High refractive index terahertz metamaterials (Invited Paper)**, Bumki Min, KAIST (Korea, Republic of) [8260-40]

11:45 am: **Strong coupling of the cyclotron transition of a high mobility 2D electron in a THz metamaterial**, Giacomo Scalari, Dana Turcinkova, Curdin Maissen, Christian Reichl, ETH Zurich (Switzerland); Dieter Schuh, Uni Regensburg (Germany); Werner Wegscheider, ETH Zurich (Switzerland); David Hagenmuller, Simone De Liberato, Cristiano Ciuti, Univ. Paris 7-Denis Diderot (France); Mattias Beck, Jérôme Faist, ETH Zurich (Switzerland) [8260-41]

12:00 pm: **Adjusting the functionality of terahertz split-ring resonators through geometry (Invited Paper)**, Hannes Merbold, ABB Ltd. (Switzerland) and Univ. Bern (Switzerland); Andreas Bitzer, Univ. Bern (Switzerland); Fabrizio Carbone, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Axel Murk, Univ. Bern (Switzerland); Jan Wallauer, Markus Walthner, Univ. Freiburg (Germany); Thomas Feurer, Univ. Bern (Switzerland) [8260-42]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 10

Room: 270 (Mezzanine) Tues. 2:00 to 3:15 pm

Plasmonics I

Session Chair: Fabrice Vallee, Univ. Claude Bernard Lyon 1 (France)

2:00 pm: **Closely coupled plasmons: real-space mapping and SERS (Invited Paper)**, Zee Hwan Kim, Korea Univ. (Korea, Republic of) [8260-43]

2:30 pm: **Plasmonic platform for rainbow trapping effect: from theoretical design to experimental realization (Invited Paper)**, Qiaoqiang Gan, Univ. at Buffalo (USA); Yujie Ding, Filbert J. Bartoli, Lehigh Univ. (USA) [8260-44]

3:00 pm: **Terahertz subwavelength ribbon waveguide based plasmonic sensors for refractive index and thickness detection**, Borwen You, Ja-yu Lu, National Cheng Kung Univ. (Taiwan); Tze-An Liu, Jin-Long Peng, Industrial Technology Research Institute (Taiwan) [8260-45]

Coffee Break 3:15 to 3:45 pm

SESSION 11

Room: 270 (Mezzanine) Tues. 3:45 to 5:30 pm

Plasmonics II

Session Chair: Christoph Lienau, Carl von Ossietzky Univ. Oldenburg (Germany)

3:45 pm: **Long-term CEP-stable high energy few-cycle pulses using the feed-forward method (Invited Paper)**, Fabian Lücking, FEMTOLASERS Produktions GmbH (Austria) and Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany); Alexandria Anderson, FEMTOLASERS Produktions GmbH (Austria); Alexander A. Apolonskiy, Ferenc Krausz, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany); Günther Steinmeyer, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Gabriel Tempea, FEMTOLASERS Produktions GmbH (Austria); Andreas Assion, FEMTOLASERS Produktions GmbH (USA) [8260-46]

4:15 pm: **Ultrafast spectroscopy of metal-based hybrid nanoparticles (Invited Paper)**, Fabrice Vallee, Denis Mongin, Vincent Juvé, Aurelien Crut, Paolo Maioli, Natalia Del Fatti, Univ. Claude Bernard Lyon 1 (France) [8260-47]

4:45 pm: **Nanoantenna-enhanced ultrafast nonlinear spectroscopy of a single gold nanoparticle**, Thorsten Schumacher, Daniela Ullrich, Mario Hentschel, Max-Planck-Institut für Festkörperforschung (Germany); Harald W. Giessen, Univ. Stuttgart (Germany); Markus Lippitz, Max-Planck-Institut für Festkörperforschung (Germany) [8260-48]

5:00 pm: **Subradiant plasmon resonances for spasing**, Dries Vercreysee, Pol Van Dorpe, Verellen Niels, Liesbet Lagae, IMEC (Belgium) and Katholieke Univ. Leuven (Belgium) [8260-49]

5:15 pm: **Are there novel resonances in nanoplasmonic structures due to nonlocal response?**, Martijn Wubs, Søren Raza, Giuseppe Toscano, Technical Univ. of Denmark (Denmark); Antti-Pekka Jauho, Technical Univ. of Denmark (Denmark) and Aalto Univ. (Finland); N. Asger Mortensen, Technical Univ. of Denmark (Denmark) [8260-50]

Wednesday 25 January

SESSION 12

Room: 270 (Mezzanine) Wed. 8:00 to 10:15 am

Ultrafast Acoustics

Session Chair: Fabrice Vallee, Univ. Claude Bernard Lyon 1 (France)

8:00 am: **Coherent acoustic excitation of membranes and nanostructures (Invited Paper)**, Thomas Dekorsy, Univ. Konstanz (Germany) [8260-51]

8:30 am: **Ultrafast dynamics of coherent optical phonons in GeTe/Sb₂Te₃ superlattices: thermal conductivity and coherent control**, Muneaki Hase, Univ. of Tsukuba (Japan); Junji Tominaga, National Institute of Advanced Industrial Science and Technology (Japan) [8260-52]

8:45 am: **Modulation of magnetization by picosecond acoustic pulses in ferromagnetic semiconductor GaMnAs (Invited Paper)**, Alexey V. Scherbakov, Ioffe Physical-Technical Institute (Russian Federation) [8260-53]

9:15 am: **Nonthermal processes of coherent acoustic phonons generation in semiconductors by femtosecond laser (Invited Paper)**, Pascal Ruello, Vitali Goussev, Philippe P. Babilotte, Gwenaëlle Vaudel, Thomas Pezeril, Denis Mounier, Univ. du Maine (France) [8260-54]

9:45 am: **Time-resolved acoustic phonons in low dimensional objects (Invited Paper)**, Arnaud Devos, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France) [8260-55]

Coffee Break 10:15 to 10:45 am

SESSION 13

Room: 270 (Mezzanine) Wed. 10:45 am to 12:00 pm

High Harmonics, X-rays, and Attosecond Phenomena

Session Chairs: **Jin-Joo Song**, Univ. of California, San Diego (USA); **Kong-Thon Tsen**, Arizona State Univ. (USA)

10:45 am: **Control and observation of attosecond electron dynamics in nanostructures** (*Invited Paper*), Matthias Friedrich Kling, Max-Planck-Institut für Quantenoptik (Germany) and Kansas-State Univ. (USA) [8260-56]

11:15 am: **Engineering high harmonic generation in semiconductors via pulse shaping**, Matthias Reichelt, Andrea Walther, Jens Förstner, Torsten Meier, Univ. Paderborn (Germany) [8260-57]

11:30 am: **Ultrafast magnetism as seen by x-rays** (*Invited Paper*), Ilie E. Radu, Radboud Univ. Nijmegen (Netherlands) and Helmholtz-Zentrum Berlin, BESSY II (Germany); Kadir Vahaplar, Radboud Univ. Nijmegen (Netherlands); Christian Stamm, Torsten Kachel, Niko Pontius, Helmholtz-Zentrum Berlin (Germany); Hermann Duerr, SLAC National Accelerator Lab. (USA); Thomas Ostler, Joe Barker, Richard Evans, Roy Chantrell, The Univ. of York (United Kingdom); Arata Tsukamoto, Akiyoshi Itoh, Nihon Univ. (Japan); Andrei Kirilyuk, Theo Rasing, Alexey Kimel, Radboud Univ. Nijmegen (Netherlands) [8260-58]

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

SESSION 14

Room: 270 (Mezzanine) Wed. 1:30 to 3:15 pm

THz Spectroscopy II

Session Chair: **Thomas Dekorsy**, Univ. Konstanz (Germany)

1:30 pm: **Terahertz magneto-optics in the quantum Hall system** (*Invited Paper*), Ryo Shimano, The Univ. of Tokyo (Japan) [8260-59]

2:00 pm: **THz time domain spectroscopy of quantum cascade lasers** (*Invited Paper*), Michael Martl, Juraj Darmo, Daniel Dietze, Alexander Benz, Christoph Deutsch, Herman Detz, Aaron Maxwell Andrews, Gottfried Strasser, Karl Unterrainer, Technische Univ. Wien (Austria) [8260-60]

2:30 pm: **THz time-resolved investigation of a Cu/Cu_xO Schottky barrier** (*Invited Paper*), Pouya Maraghechi, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [8260-61]

3:00 pm: **Terahertz spectroscopy of Ni-Ti alloy thin films**, Yun-Shik Lee, Andrew D. Jameson, Joseph L. Tomaino, Michael J. Paul, Joshua W. Kevek, Ethan D. Minot, Meghan T. Hemphill-Johnston, Milo D. Koretsky, Oregon State Univ. (USA) [8260-62]

Coffee Break 3:15 to 3:45 pm

SESSION 15

Room: 270 (Mezzanine) Wed. 3:45 to 5:30 pm

Near-Field Imaging

Session Chair: **Markus Betz**, Technische Univ. Dortmund (Germany)

3:45 pm: **Terahertz near-field imaging of electric and magnetic resonances in plasmonic microstructures** (*Invited Paper*), Markus Walther, Jan Wallauer, Stefan Waselkowsky, Albert-Ludwigs-Univ. Freiburg (Germany) [8260-63]

4:15 pm: **Nanofocusing of mid-infrared light** (*Invited Paper*), Rainer Hillenbrand, CIC nanoGUNE Consolider (Spain) [8260-64]

4:45 pm: **Experimental demonstration of an offset-apertured near-field scanning optical microscope probe**, Matthew S. Sederberg, Jonathan A. J. Backs, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [8260-65]

5:00 pm: **Bethe-hole magnetic polarization analyzer**, Dai-Sik Kim, Seoul National Univ. (Korea, Republic of); H. W. Kihm, Harvard Univ. (USA); Sukmo Koo, Q. H. Kim, J. E. Kihm, Namkyoo Park, Seoul National Univ. (Korea, Republic of) [8260-66]

5:15 pm: **Combining nano-optical fields and coherent spectroscopy on systems with delocalized excitons**, Marten Richter, Felix Schlosser, Mario Schoth, Technische Univ. Berlin (Germany); Sven Burger, Frank Schmidt, Zuse-Institut Berlin (ZIB) (Germany); Andreas Knorr, Technische Univ. Berlin (Germany); Shaul Mukamel, Univ. of California, Irvine (USA) [8260-67]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Laser initial chirp effect on femtosecond optical Kerr effect measurement, Hao Bian, Feng Chen, Hwei Liu, Qing Yang, Jinhai Si, Xi'an Jiaotong Univ. (China) [8260-68]

A nanoplasmonic contour bowtie antenna for nanoscale confinement of mid-infrared radiation, Shawn Sederberg, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [8260-69]

A dual-mode terahertz metallic resonator, Cameron J. Straatsma, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [8260-70]

Courses of Related Interest

- SC746 Introduction to Ultrafast Technology (Trebino) Tuesday, 1:30 to 5:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

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Terahertz Technology and Applications V

Conference Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA); **Crédhe M. O'Sullivan**, National Univ. of Ireland, Maynooth (Ireland)

Program Committee: **Antao Chen**, Univ. of Washington (USA); **Robert H. Giles**, Univ. of Massachusetts Lowell (USA); **R. Jennifer Hwu**, InnoSys, Inc. (USA); **J. Anthony Murphy**, National Univ. of Ireland, Maynooth (Ireland); **Michael C. Wanke**, Sandia National Labs. (USA); **Tianxin Yang**, Tianjin Univ. (China)

Wednesday 25 January

SESSION 1

Room: 272 (Mezzanine) Wed. 8:20 to 10:30 am

THz Imaging, Spectroscopy, and Instrumentation I

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA);
Tianxin Yang, Tianjin Univ. (China)

8:20 am: **Critical comparison of GaAs and InGaAs THz photoconductors** (Invited Paper), Elliott Brown, M. Martin, Wright State Univ. (USA) [8261-01]

8:50 am: **Portable terahertz spectrometer with InP related semiconductor photonic devices**, Kyung Hyun Park, Namje Kim, Hyunsung Ko, Han-Cheol Ryu, Jeong-Woo Park, Sang-Pil Han, Electronics and Telecommunications Research Institute (Korea, Republic of); Min Yong Jeon, Chungnam National Univ. (Korea, Republic of) [8261-02]

9:10 am: **High-speed three-dimensional terahertz tomography using electronically controlled optical sampling**, Kyung Hwan Jin, KAIST (Korea, Republic of); Jaeyong Joo, Korea Research Institute of Standards and Science (Korea, Republic of); Jong Chul Ye, KAIST (Korea, Republic of); Dae-Su Yee, Korea Research Institute of Standards and Science (Korea, Republic of) [8261-03]

9:30 am: **Terahertz dynamic scanning reflectometry of soldier protective material**, Anis Rahman, Applied Research & Photonics, Inc. (USA); Mark Mentzer, U.S. Army Aberdeen Test Ctr. (USA) [8261-04]

9:50 am: **Towards monolithically integrated CMOS cameras for active imaging with 600 GHz radiation**, Alvydas Lisauskas, Sebastian Boppel, Viktor Krozer, Hartmut G. Roskos, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany) [8261-05]

10:10 am: **Liquid crystals for terahertz technology**, Hongkyu Park, Fan Fan, Hong Kong Univ. of Science and Technology (Hong Kong, China); Haewook Han, Pohang Univ. of Science and Technology (Korea, Republic of); Vladimir G. Chigrinov, Emma MacPherson, Hong Kong Univ. of Science and Technology (Hong Kong, China) [8261-06]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: 272 (Mezzanine) Wed. 11:00 am to 12:00 pm

THz Imaging, Spectroscopy, and Instrumentation II

Session Chairs: **Robert H. Giles**, Univ. of Massachusetts Lowell (USA);
Michael C. Wanke, Sandia National Labs. (USA)

11:00 am: **Miniature self-aligned external cavity tunable single frequency laser for THz imaging**, Frank Havermeier, Ondax, Inc. (USA); Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Ron T. Logan, Jr., EMCORE Corp. (USA); Lawrence Ho, Ondax, Inc. (USA); Joseph R. Demers, EMCORE Corp. (USA) [8261-07]

11:20 am: **Evaluation of terahertz spectra using chemometric methods**, Joachim Jonuscheit, Garik Torosyan, Frank Ellrich, Sabine Wohnsiedler, Michael Herrmann, Rene Beigang, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Frank Platte, Konstantinos Nalpantidis, IANUS Simulation GmbH (Germany); Thorsten Sprenger, Heiko Wolf, Huebner GmbH (Germany) [8261-08]

11:40 am: **Application of graphene membrane in micro-Golay cell array**, Elizabeth Ledwosinska, Thomas Szkopek, McGill Univ. (Canada) [8261-09]

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

SESSION 3

Room: 272 (Mezzanine) Wed. 1:30 to 3:20 pm

THz Modeling and Simulation

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA);
Crédhe M. O'Sullivan, National Univ. of Ireland, Maynooth (Ireland)

1:30 pm: **THz lasing in InAs/GaSb broken-gap heterostructure devices and quantum-dot pillar arrays** (Invited Paper), Dwight L. Woolard, U.S. Army Research Office (USA) and North Carolina State Univ. (USA); Weidong Zhang, North Carolina State Univ. (USA) [8261-11]

2:00 pm: **Energy conversion efficiency calculation model for direct-bonding planar-waveguide THz emitters based on optical rectification effects in GaAs**, Tianxin Yang, Xuehui Niu, Junlong Wang, Mei Sang, Tianjin Univ. (China) [8261-12]

2:20 pm: **Long-term frequency and amplitude stability of a solid-nitrogen-cooled continuous wave THz quantum cascade laser**, Andriy Danylov, Jerry Waldman, Thomas M. Goyette, Alexander R. Light, Robert H. Giles, Xifeng Qian, Neelima Chandrayan, William D. Goodhue, Univ. of Massachusetts Lowell (USA); William E. Nixon, National Ground Intelligence Ctr. (USA) [8261-13]

2:40 pm: **Plasmonic response of grating-gated InGaAs/InP HEMT device to terahertz and millimeter wave radiation**, Nima Nader Esfahani, Robert E. Peale, Christopher J. Fredricksen, Univ. of Central Florida (USA); Justin Cleary, Walter R. Buchwald, Air Force Research Lab. (USA) [8261-14]

3:00 pm: **New developments in waveguide mode matching techniques for far-infrared astronomy**, J. Anthony Murphy, Neil Trappe, Stephen Doherty, Tully Peacocke, National Univ. of Ireland, Maynooth (Ireland) [8261-15]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: 272 (Mezzanine) Wed. 3:50 to 5:10 pm

THz Sources, Generation, and Detection I

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA);
R. Jennifer Hwu, InnoSys, Inc. (USA)

3:50 pm: **Spoof plasmon analogue of metal-insulator-metal waveguides**, Mikhail A. Kats, David Woolf, Romain Blanchard, Nanfang Yu, Harvard Univ. (USA); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) [8261-16]

4:10 pm: **Wide-range broadband terahertz emission from high chi(2) dendrimer**, Anis Rahman, Applied Research & Photonics, Inc. (USA) . . [8261-17]

4:30 pm: **Thin-film platinum nanowires as sub-wavelength bolometers**, Pauline Renoux, Sigurdur A. Jónsson, Univ. of Iceland (Iceland); Levente J. Klein, Hendrik F. Hamann, IBM Thomas J. Watson Research Ctr. (USA); Snorri Ingvarsson, Univ. of Iceland (Iceland) [8261-18]

4:50 pm: **Terahertz transmission enhancement through GaN quantum wells controlled by DC voltage**, Laurent Thibault, Institut d'Électronique Fondamentale (France); Rajesh Sharma, Jérémie Torres, Philippe Nouvel, Stéphane Blin, Alexandre Penot, Luca Varani, Dominique Coquillat, Wojciech Knap, Univ. Montpellier 2 (France); Yvon Codier, M. Chmielowska, S. Chenot, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Jean-Pierre Faurie, Bernard Beaumont, LUMILOG (France); E. Starikov, Z. Shiktorov, Viktoras Gruzinskis, TeraVil Ltd. (Lithuania); Vadym Korotyeyev, Viatcheslav Kochelap, V. Lashkaryov Institute of Semiconductor Physics (Ukraine). [8261-19]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Aberrations of the large aperture attenuating THz lenses, Maciej Sypek, Warsaw Univ. of Technology (Poland); Jean-Louis Coutaz, IMEP-LAHC (France); Andrzej Kolodziejczyk, Michal Makowski, Jaroslaw Suszek, Warsaw Univ. of Technology (Poland) [8261-10]

Thursday 26 January

SESSION 5

Room: 272 (Mezzanine) Thurs. 8:00 to 10:10 am

THz Sources, Generation, and Detection II

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA); **Tianxin Yang**, Tianjin Univ. (China)

8:00 am: **Real-world applications of terahertz pulsed technology** (*Invited Paper*), Philip F. Taday, TeraView Ltd. (United Kingdom) [8261-20]

8:30 am: **One-half milliwatt 2.33 THz CW QCL operating at 77K**, Xifeng Qian, Neelima Chandrayan, Shivashankar R. Vangala, William D. Goodhue, Andriy Danylov, Jerry Waldman, Robert Giles, Univ. of Massachusetts Lowell (USA); William Nixon, National Ground Intelligence Ctr. (USA) [8261-21]

8:50 am: **Backwards wave oscillators combined with solid state frequency multipliers extend spectral coverage of electronic sources to 2.2 THz**, Walter C. Hurlbut, Microtech Instruments, Inc. (USA); Vladimir G. Kozlov, LightCounting LLC (USA); Dylan Fast, Microtech Instruments, Inc. (USA) [8261-22]

9:10 am: **Upper band operation of active photonic crystal terahertz lasers**, Alexander Benz, Martin Brandstetter, Christoph Deutsch, Hermann Detz, Aaron M. Andrews, Werner Schrenk, Gottfried Strasser, Karl Unterrainer, Technische Univ. Wien (Austria) [8261-23]

9:30 am: **Portable real-time THz imaging setup based on QC lasers**, Giacomo Scalari, Christopher Bonzon, Maria Amanti, Fabrizio Castellano, Dana Turcinkova, Matthias Beck, Jerome Faist, ETH Zurich (Switzerland) [8261-24]

9:50 am: **Exploring performance limits of silicon CMOS FET detectors for THz frequencies**, Sebastian Boppel, Alvydas Lisauskas, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany); Linas Minkevicius, Dalius Seliuta, Irmantas Kašalynas, Gintaras Valušis, TeraVil Ltd. (Lithuania); Viktor Krozer, Hartmut G. Roskos, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany) [8261-25]

Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 272 (Mezzanine) Thurs. 10:40 am to 12:00 pm

THz Materials and Configurations

Session Chairs: **Antao Chen**, Univ. of Washington (USA); **J. Anthony Murphy**, National Univ. of Ireland, Maynooth (Ireland)

10:40 am: **Propagation loss optimization in dielectric/metal coated hollow flexible terahertz waveguides**, Pallavi Doradla, Cecil S. Joseph, Jayant Kumar, Robert H. Giles, Univ. of Massachusetts Lowell (USA) [8261-26]

11:00 am: **Thin Film Lithium Tantalate (TFLT[®]) pyroelectric detectors**, Vincent E. Stenger, SRICO Inc. (USA) [8261-27]

11:20 am: **Metamaterial-based tunable absorber in the infrared regime**, Iftekhar Mirza, Shouyuan Shi, Univ. of Delaware (USA); Ahmed Sharkawy, Lumilant, Inc. (USA); Dennis Prather, Univ. of Delaware (USA) [8261-28]

11:40 am: **Changing growth of neurites of sensory ganglions by terahertz radiation**, Maria Tsurkan, Olga Smolyanskaya, Victor Bespalov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Valentina Penniyainen, Pavlov Institute of Physiology (Russian Federation); Anna Kipenko, Ekaterina Lopatina, Pavlov Institute of Physiology (Russian Federation) and Almazov Federal Heart, Blood and Endocrinology Ctr. (Russian Federation); Boris Krylov, Pavlov Institute of Physiology (Russian Federation) [8261-29]

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

SESSION 7

Room: 272 (Mezzanine) Thurs. 1:30 to 3:00 pm

THz Sources, Generation, and Detection III

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA); **R. Jennifer Hwu**, InnoSys, Inc. (USA)

1:30 pm: **Advances in biomedical imaging using THz technology** (*Invited Paper*), Zachary D. Taylor, Univ. of California, Los Angeles (USA) [8261-30]

2:00 pm: **Generation and detection of broadband THz pulses (>10 THz) with organic nonlinear optical crystals OH1 and DSTMS as alternatives to DAST**, Mojca Jazbinsek, Rainbow Photonics AG (Switzerland); Marcel Stillhart, Blanca Ruiz, ETH Zurich (Switzerland); Carolina Medrano, Rainbow Photonics AG (Switzerland); Peter Günter, ETH Zurich (Switzerland) [8261-31]

2:20 pm: **Terahertz generation from quasi-phase matched gallium arsenide using a type II ring cavity optical parametric oscillator**, Walter C. Hurlbut, Vladimir G. Kozlov, Patrick F. Tekavec, Microtech Instruments, Inc. (USA); Konstantin L. Vodopyanov, Stanford Univ. (USA) [8261-32]

2:40 pm: **Log periodic antenna coupled microbolometer using low temperature VOx for the mm-wave detection**, Daesung Lee, Korea Electronics Technology Institute (Korea, Republic of) [8261-33]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Room: 272 (Mezzanine) Thurs. 3:30 to 4:30 pm

THz Sources, Generation, and Detection IV

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA); **Robert H. Giles**, Univ. of Massachusetts Lowell (USA)

3:30 pm: **Continuous wave terahertz reflection imaging of ex vivo nonmelanoma skin cancers**, Cecil S. Joseph, Univ. of Massachusetts Lowell (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) and Massachusetts General Hospital (USA); Victor A. Neel, Massachusetts General Hospital (USA); Thomas M. Goyette, Robert H. Giles, Univ. of Massachusetts Lowell (USA) [8261-34]

3:50 pm: **THz time-domain spectroscopy in different carbon nanotube and graphene thin-films**, Ehsan Dadrasnia, Horacio Lamela Rivera, Univ. Carlos III de Madrid (Spain); Mohan Babu Kuppam, Frédéric Garete, Jean-Louis Coutaz, IMEP-LAHC (France) [8261-35]

4:10 pm: **Laser driven generation of intense single-cycle THz field**, Carlo Vicario, Clemens Ruchert, Paul Scherrer Institut (Switzerland); Fernando L. Ardana, Christoph P. Hauri, Paul Scherrer Institut (Switzerland) and Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8261-36]

Courses of Related Interest

- SC547 Terahertz Wave Technology and Applications (Zhang) Sunday, 1:30 to 5:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

OPTO

Gallium Nitride Materials and Devices VII

Conference Chairs: **Jen-Inn Chyi**, National Central Univ. (Taiwan); **Yasushi Nanishi**, Ritsumeikan Univ. (Japan); **Hadis Morkoç**, Virginia Commonwealth Univ. (USA) *Conference Co-Chairs:* **Joachim Piprek**, NUSOD Institute LLC (USA); **Euijoon Yoon**, Seoul National Univ. (Korea, Republic of)

Program Committee: **Hiroshi Amano**, Nagoya Univ. (Japan); **Jong Hyeob Baek**, Korea Photonics Technology Institute (Korea, Republic of); **Shoou-Jinn Chang**, National Cheng Kung Univ. (Taiwan); **Shigefusa F. Chichibu**, Tohoku Univ. (Japan); **Hiroshi Fujioka**, The Univ. of Tokyo (Japan); **Bernard Gil**, Univ. Montpellier 2 (France); **Nicolas Grandjean**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Shangjr Gwo**, National Tsing Hua Univ. (Taiwan); **Hideki Hirayama**, RIKEN (Japan); **Detlef Hommel**, Univ. Bremen (Germany); **Yoichi Kawakami**, Kyoto Univ. (Japan); **Nam Seog Kim**, Seoul Semiconductor (Korea, Republic of); **Katsumi Kishino**, Sophia Univ. (Japan); **Michael Kneissl**, Technische Univ. Berlin (Germany); **Hao-Chung Kuo**, National Chiao Tung Univ. (Taiwan); **Narihiko Maeda**, NTT Photonics Labs. (Japan); **Hidetoshi Miyake**, Mie Univ. (Japan); **Yong-Tae Moon**, LG Electronics Inc. (Korea, Republic of); **Takashi Mukai**, Nichia Corp. (Japan); **Ümit Özgür**, Virginia Commonwealth Univ. (USA); **Young Soo Park**, Samsung Advanced Institute of Technology (Korea, Republic of); **Ulrich T. Schwarz**, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); **Tae-Yeon Seong**, Korea Univ. (Korea, Republic of); **Jong-In Shim**, Hanyang Univ. (Korea, Republic of); **Chih-Chung Yang**, National Taiwan Univ. (Taiwan)

Monday 23 January

SESSION 1

Room: 302 (Esplanade) Mon. 8:00 to 10:00 am

Growth I

Session Chair: **Hadis Morkoç**, Virginia Commonwealth Univ. (USA)

8:00 am: **High growth rate of AlGaIn for buffer structures for GaN on Si to increase throughput** (*Invited Paper*), Koh Matsumoto, Akinori Ubukata, Kazutada Ikenaga, Kazuki Naito, Jun Yamamoto, Yoshiki Yano, Toshiya Tabuchi, Akira Yamaguchi, Yuzaburo Ban, Kosuke Uchiyama, Taiyo Nippon Sanso EMC Ltd. (Japan) [8262-01]

8:30 am: **Low temperature growth of group III nitrides by pulsed sputtering and its applications to large area devices** (*Invited Paper*), Hiroshi Fujioka, The Univ. of Tokyo (Japan) and JST-CREST (Japan) [8262-02]

9:00 am: **Reduction of threading dislocation density by regrowth on In-polar InN**, Tsutomu Araki, Tsutomu Sakamoto, Akira Miki, Nao Uematsu, Yuuki Takamatsu, Ritsumeikan Univ. (Japan); Tomohiro Yamaguchi, Kogakuin Univ. (Japan); Euijoon Yoon, Seoul National Univ. (Korea, Republic of); Yasushi Nanishi, Ritsumeikan Univ. (Japan) [8262-03]

9:20 am: **Pyramid nano-voids in GaN and InGaIn**, Andrew Yankovich, Alex V. Kvit, Univ. of Wisconsin-Madison (USA); Huiyong Liu, Xing Li, Fang Zhang, Vitaliy Avrutin, Natalia Izyumskaya, Umüt Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA); Paul M. Voyles, Univ. of Wisconsin-Madison (USA) [8262-04]

9:40 am: **Effects of tensile strain on GaN nano- and micro-rods growth on Si (111) substrates**, Suk-Min Ko, Jong-Moon Yoon, Yong-Hoon Cho, KAIST (Korea, Republic of) [8262-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 302 (Esplanade) Mon. 10:30 am to 12:00 pm

Growth II

Session Chair: **Euijoon Yoon**, Seoul National Univ. (Korea, Republic of)

10:30 am: **Reduction of dislocation density and strain by three-dimensional islands growth on TiC buffer layer in HVPE-GaN crystal** (*Invited Paper*), Akira Usui, Haruo Sunakawa, Norihiko Sumi, Kazutomi Yamamoto, Huiyuan Geng, Furukawa Co., Ltd. (Japan); Atsushi Yamaguchi, Kanazawa Institute of Technology (Japan) [8262-06]

11:00 am: **GaN substrates with variable vicinal angle for laser diode applications**, Marcin Sarzynski, Tadeusz Suski, Piotr Perlin, Michal Leszczynski, Institute of High Pressure Physics (Poland) [8262-07]

11:20 am: **Molecular beam epitaxial growth and characterization of nearly intrinsic and Si-doped InN nanowires**, Songrui Zhao, Saeed Fathololoumi, Kai Cui, McGill Univ. (Canada); Qiming Li, George T. Wang, Sandia National Labs. (USA); Zetian Mi, McGill Univ. (Canada) [8262-08]

11:40 am: **Growth of less bowed GaN/sapphire using low temperature GaN with nanocolumnar microstructure and InN interlayer**, In Su Shin, Keon-Hun Lee, Sung Hyun Park, Dae Young Moon, Minhwa Kim, Seoul National Univ. (Korea, Republic of); Jinsub Park, Hanyang Univ. (Korea, Republic of); Yasushi Nanishi, Ritsumeikan Univ. (Japan); Euijoon Yoon, Seoul National Univ. (Korea, Republic of) [8262-09]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: 302 (Esplanade) Mon. 1:30 to 3:00 pm

Doping

Session Chair: **Yasushi Nanishi**, Ritsumeikan Univ. (Japan)

1:30 pm: **Carbon-doped p-type (0001) plane AlGaIn (Al= 0.06 to 0.55) with high hole density** (*Invited Paper*), Hideo Kawanishi, Kogakuin Univ. (Japan) [8262-10]

2:00 pm: **Rare earth doping of III-nitrides: in situ doping vs. ion implantation**, Katharina Lorenz, S. Magalhães, S. Miranda, N. Catarino, N. Franco, E. Alves, Instituto Tecnológico e Nuclear (Portugal); M. Peres, J. Rodrigues, T. Monteiro, Univ. de Aveiro (Portugal); I. Roqan, K. O'Donnell, Univ. of Strathclyde (United Kingdom); E. Nogales, B. Mendez, Univ. Complutense de Madrid (Spain); V. Fellmann, B. Daudin, Commissariat à l'Énergie Atomique (France); A. Nishikawa, Y. Fujiwara, Osaka Univ. (Japan) [8262-11]

2:20 pm: **A local vibration mode in a carbon doped (1-101)AlGaIn**, Nobuhiko Sawaki, Kiyotaka Hagiwara, Aichi Institute of Technology (Japan); Norikatsu Koide, Yoshio Honda, Masahito Yamaguchi, Hiroshi Amano, Nagoya Univ. (Japan) [8262-12]

2:40 pm: **AlGaIn polarization doping for highly efficient LEDs**, Joachim Piprek, NUSOD Institute LLC (USA) [8262-13]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 302 (Esplanade) Mon. 3:30 to 6:00 pm

Material Characterization

Session Chair: **Joachim Piprek**, NUSOD Institute LLC (USA)

3:30 pm: **Natural band alignments of wurtzite InN/GaN/AlN heterojunctions** (*Invited Paper*), Shangjr Gwo, Cheng-Tai Kuo, National Tsing Hua Univ. (Taiwan) [8262-14]

4:00 pm: **Recombination and diffusion processes in polar and nonpolar bulk GaN investigated by time-resolved photoluminescence and nonlinear optical techniques**, Kestutis Jarasiunas, Patrik Scajev, Ramunas Aleksiejunas, Vilnius Univ. (Lithuania); Serdal Okur, Umüt Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA); Jacob Leach, Tanya Paskova, Kyma Technologies, Inc. (USA) [8262-15]

4:20 pm: **Absence of electron accumulation at the InN(11-20) cleavage surface**, Holger Eisele, Technische Univ. Berlin (Germany); Sarah Schaafhausen, Forschungszentrum Jülich GmbH (Germany); Andrea Lenz, Technische Univ. Berlin (Germany); Aizhan Sabitova, Forschungszentrum Jülich GmbH (Germany); Lena Ivanova, Mario Daehne, Technische Univ. Berlin (Germany); Y. L. Hong, Shangjr Gwo, National Tsing Hua Univ. (Taiwan); Philipp Ebert, Forschungszentrum Jülich GmbH (Germany) [8262-16]

4:40 pm: **Structural and electronic properties of Al₂O₃/InN heterointerfaces**, Kana Okubo, Atsushi Kobayashi, Jitsuo Ohta, Hiroshi Fujioka, Masaharu Oshima, The Univ. of Tokyo (Japan) [8262-17]

5:00 pm: **Cathodoluminescence microscopy of polarization-reduced GaN directly grown on patterned (112) Si substrate**, Frank Bertram, Sebastian Metzner, Christopher Karbaum, Juergen Christen, Otto-von-Guericke-Universität Magdeburg (Germany); Shujian Liu, Natalia Izyumskaya, Vitaliy Avrutin, Umüt Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) [8262-18]

5:20 pm: **Auger effect in nonpolar quantum wells**, Lukas Schade, Ulrich T. Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) and Univ. Freiburg (Germany); Tim Wernicke, Technische Univ. Berlin (Germany); Markus Weyers, Ferdinand-Braun-Institut (Germany); Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin (Germany) [8262-19]

5:40 pm: **Electron paramagnetic resonance study of the Mg impurity in nitride films**, Mary Ellen Zvanut, Jamiyanaa Dashdorj, The Univ. of Alabama at Birmingham (USA) [8262-20]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: Klaus P. Streubel, OSRAM GmbH (Germany); David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 5

Room: 302 (Esplanade) Tues. 10:30 am to 12:00 pm
Nano Structures and Devices I

Session Chair: Jen-Inn Chyi, National Central Univ. (Taiwan)

10:30 am: **Terahertz emitters based on GaN/AlGaIn HEMTs** (*Invited Paper*), Wojciech Knap, Nina Dyakonova, Dominique Coquillat, Frederic Teppe, Univ. Montpellier 2 (France) [8262-21]

11:00 am: **Scaling of GaN single nanowire MOSFET with cut-off frequency 150GHz**, Jeng-Wei Yu, Yuh-Renn Wu, Lung-Han Peng, National Taiwan Univ. (Taiwan) [8262-22]

11:20 am: **Hardened planar nitride based cold cathode electron emitter**, Rajeev R. Pillai, Integrated Micro Sensors, Inc. (USA); David Starikov, Integrated Micro Systems, Inc. (USA); Chris Boney, Abdelhak Bensaoula, Univ. of Houston (USA) [8262-23]

11:40 am: **Properties of (In,Ga)N/GaN single quantum wells on defect-free micro-crystals obtained by molecular beam epitaxial overgrowth of GaN nanowires on Si(111)**, Pinar Dogan, Sergio Fernandez-Garrido, Oliver Brandt, Jonas Lähnemann, Raffaella Calarco, Achim Trampert, Lutz Geelhaar, Henning Riechert, Paul-Drude-Institut für Festkörperelektronik (Germany) [8262-24]

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

SESSION 6

Room: 302 (Esplanade) Tues. 1:30 to 3:10 pm

Nano Structures and Devices II

Session Chair: Shangjr Gwo, National Tsing Hua Univ. (Taiwan)

1:30 pm: **Molecular beam epitaxy growth of InGaIn nanowires and InGaIn/GaN nanowire heterostructures** (*Invited Paper*), Bruno Daudin, Gabriel Tourbot, Diane Sam-Giao, Catherine Bougerol, Adeline Grenier, David Cooper, Bruno Gayral, Commissariat à l'Énergie Atomique (France); Zackaria Mahfoud, Mathieu Kociak, Univ. Paris-Sud 11 (France) [8262-25]

2:00 pm: **Analysis and control of emission properties of InGaIn-on-GaN nanocolumns grown by molecular-beam epitaxy on Si(111) substrates** (*Invited Paper*), Pierre Lefebvre, ISOM, Univ. Politécnica de Madrid (Spain) and Lab. Charles Coulomb, CNRS, Univ. Montpellier 2 (France); Steven Albert, A. Bengoechea-Encabo, Miguel A. Sanchez-Garcia, Enrique Calleja, ISOM, Univ. Politécnica de Madrid (Spain) [8262-80]

2:30 pm: **Reduction of dislocation density in GaN nanorods**, Che-Hao Liao, Horng-Shyang Chen, Chih-Yen Chen, Chieh Hsieh, Wen-Ming Chang, Hao-Tsung Chen, Yu-Feng Yao, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [8262-27]

2:50 pm: **Helium temperature scanning transmission electron microscopy cathodoluminescence for nano-characterization of nitrides**, Jürgen Christen, Frank Bertram, Gordon Schmidt, Peter Veit, Otto-von-Guericke-Univ. Magdeburg (Germany) [8262-28]

Coffee Break 3:10 to 3:40 pm

SESSION 7

Room: 302 (Esplanade) Tues. 3:40 to 5:20 pm

Nano Structures and Devices III

Session Chair: Oliver Brandt, Paul-Drude-Institut für Festkörperelektronik (Germany)

3:40 pm: **Photonic cavities with high quality factors embedding nitride quantum dots** (*Invited Paper*), Thierry Guillet, Meletios Mexis, Univ. Montpellier 2 (France) and CNRS (France); Delphine Néel, Institut d'Électronique Fondamentale (France); Sylvain Sergent, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Christelle Brimont, Thierry Bretagnon, Bernard Gil, Univ. Montpellier 2 (France) and CNRS (France); Diane Sam-Giao, Bruno Gayral, Commissariat à l'Énergie Atomique (France); Fabrice Semond, Mathieu Leroux, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Sylvain David, Xavier Checoury, Philippe Boucaud, Institut d'Électronique Fondamentale (France) [8262-29]

4:10 pm: **3D GaN for core-shell LEDs** (*Invited Paper*), Andreas Waag, Technische Univ. Braunschweig (Germany) [8262-30]

4:40 pm: **Electronic and thermal tuning of violet GaN coupled cavity laser**, Oleg Guziy, Technische Univ. Delft (Netherlands); Mike Leszczynski, Piotr Perlin, Institute of High Pressure Physics (Poland); Huub Salemink, Technische Univ. Delft (Netherlands) [8262-31]

5:00 pm: **Lasng action in gallium nitride photonic quasicrystal nanorod arrays**, Shih-Pang Chang, Kuok-Pan Sou, National Chiao Tung Univ. (Taiwan); Yuh-Jen Cheng, Academia Sinica (Taiwan); Yi-Chen Chen, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan) [8262-32]

Photonics West maps:

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Walking Map p. 4

OPTO

Wednesday 25 January

SESSION 8

Room: 302 (Esplanade) Wed. 8:00 to 10:10 am

Photovoltaic Devices

Session Chair: Bernard Gil, Univ. Montpellier 2 (France)

- 8:00 am: **Nitride semiconductor based photo-chemical cells** (*Invited Paper*), Kazuhiro Ohkawa, Tokyo Univ. of Science (Japan) [8262-33]
- 8:30 am: **Concentrating properties of nitride-based solar cells**, Mikiko Mori, Shota Yamamoto, Yosuke Kuwahara, Takahiro Fujii, Tatsuro Nakao, Shinichiro Kondo, Motoaki Iwaya, Tetsuya Takeuchi, Satoshi Kamiyama, Isamu Akasaki, Meijo Univ. (Japan); Hiroshi Amano, Nagoya Univ. (Japan) [8262-43]
- 8:50 am: **High efficiency InGaN solar cell with a graded p-InGaN top layer**, Nobuhiko Sawaki, Tomoki Fujisawa, Aichi Institute of Technology (Japan) [8262-35]
- 9:10 am: **Efficiency enhancement of InGaN multi-quantum-well solar cells via antireflective SiO₂ nano-honeycombs**, Po-Han Fu, Guan-Jhong Lin, Cheng-Han Ho, Chin-An Lin, Kun-Yu Lai, Jr-Hau He, National Taiwan Univ. (Taiwan) [8262-36]
- 9:30 am: **Optimization of electrode structure in GaInN based solar cells**, Shota Yamamoto, Mikiko Mori, Tatsuro Nakao, Shinichiro Kondo, Yosuke Kuwahara, Yoshiki Morita, Takahiro Fujii, Toru Sugiyama, Motoaki Iwaya, Tetsuya Takeuchi, Satoshi Kamiyama, Isamu Akasaki, Meijo Univ. (Japan); Hiroshi Amano, Nagoya Univ. (Japan) [8262-37]
- 9:50 am: **Temperature dependent behavior of the surface photovoltage for GaN**, Michael A. Foussekis, Joy D. McNamara, Fan Zhang, Hadis Morkoc, Michael A. Reshchikov, Alison A. Baski, Virginia Commonwealth Univ. (USA) [8262-38]
- Coffee Break 10:10 to 10:40 am

SESSION 9

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

Laser Diodes I

Session Chair: Hiroshi Fujioka, The Univ. of Tokyo (Japan)

- 10:40 am: **Absorber bias dependence of self-pulsation in GaN-based multi-section laser diodes**, Wolfgang G. Scheibenzuber, Ulrich T. Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Luca Sulmonì, Julien Dorsaz, Jean-Francois Carlin, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8262-49]
- 11:00 am: **Analysis of the deep level responsible for the degradation of InGaN-based laser diodes by DLTS**, Matteo Meneghini, Carlo de Santi, Nicola Trivellin, Gaudenzio Meneghesso, Enrico Zanoni, Univ. degli Studi di Padova (Italy); Shinichi Takigawa, Kenji Orita, Tsuyoshi Tanaka, Panasonic Corp. (Japan) [8262-40]
- 11:20 am: **Highly doped GaN: a material for plasmonic claddings for blue/green InGaN laser diodes**, Piotr Perlin, Lucja Marona, Tadek Suski, Szymon Grzanka, Mike Leszczynski, Michal Bockowski, Institute of High Pressure Physics (Poland); Maciej Kuc, Tomasz Czeszanowski, Robert Sarzala, Technical Univ. of Lodz (Poland) [8262-41]
- 11:40 am: **Estimation of the recombination coefficients in aged InGaN laser diodes**, Lucja Marona, Piotr Perlin, Szymon Grzanka, Robert Czernecki, Tadek Suski, Mike Leszczynski, Michal Bockowski, Institute of High Pressure Physics (Poland) [8262-42]
- Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 10

Room: 302 (Esplanade) Wed. 1:30 to 3:20 pm

Laser Diodes II

Session Chair: Akira Usui, Furukawa Co., Ltd. (Japan)

- 1:30 pm: **Polarization of eigenmodes and the effect on the anisotropic gain in laser structures on nonpolar and semipolar GaN**, Jens Rass, Tim Wernicke, Simon Ploch, Technische Univ. Berlin (Germany); Moritz Brendel, Andreas Kruse, Andreas Hangleiter, Technische Univ. Braunschweig (Germany); Wolfgang Scheibenzuber, Ulrich Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Markus Weyers, Ferdinand-Braun-Institut (Germany); Michael Kneissl, Technische Univ. Berlin (Germany) [8262-43]
- 1:50 pm: **Effect of ridge waveguide etch depth on laser threshold of InGaN MQW laser diodes**, Luca Redaelli, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (Germany); Joachim Piprek, NUSOD Institute LLC (USA); Carsten Netzel, Avia Linke, Yuri V. Flores, Sven Einfeldt, Ferdinand-Braun-Institut (Germany); Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut (Germany); Günther Tränkle, Ferdinand-Braun-Institut (Germany) [8262-44]
- 2:10 pm: **Modeling gallium-nitride-based semiconductor blue lasers for data storage of information technology**, Meng-Mu Shih, Univ. of Florida (USA) [8262-45]
- 2:30 pm: **Comparison of gain formation in polar and nonpolar/semipolar laser diodes from violet to green**, Thiago Melo, Claude Weisbuch, Univ. of California, Santa Barbara (USA); Mathew C. Schmidt, Aurelien David, Bryan Ellis, Christiane Poblenz, You-Da Lin, Michael R. Krames, James W. Raring, Soraa, Inc. (USA) [8262-46]
- 2:50 pm: **Polariton lasers based on GaN microcavities** (*Invited Paper*), Alexey V. Kavokin, Univ. of Southampton (United Kingdom) [8262-60]
- Coffee Break 3:20 to 3:50 pm

SESSION 11

Room: 302 (Esplanade) Wed. 3:50 to 5:20 pm

Poster Highlights

Session Chair: Ümit Özgür, Virginia Commonwealth Univ. (USA)

This session will include 5-minute oral presentations of the Posters listed below.

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

- Impact of carrier localization, recombination, and diffusivity on excited state dynamics in InGaN/GaN quantum wells and double heterostructures**, Kestutis Jarasunas, Vilnius Univ. (Lithuania) and Virginia Commonwealth Univ. (USA); Tadas Malinauskas, Arunas Kadyas, Tomas Grinys, Saulius Nargelas, Ramunas Aleksiejunas, Saulius Miasojedovas, Juras Mickevicius, Roland Tomasiunas, Mikas Vengris, Vilnius Univ. (Lithuania); Serdal Okur, Xing Li, Fang Zhang, Vitaliy Avrutin, Umit Ozgur, Hadis Morkoc, Virginia Commonwealth Univ. (USA) [8262-63]
- Impact of indium surface segregation on optical properties of ultrathin InGaN/GaN quantum wells**, Mykhaylo V. Klymenko, Oleksiy V. Shulika, Kharkov National Univ. of Radio Electronics (Ukraine); Igor A. Sukhoivanov, Univ. de Guanajuato (Mexico) [8262-64]
- Measurements of off-state electrical stress in AlIn/AlN/GaN heterostructure field-effect transistors with varying In compositions**, Romualdo A. Ferreyra, Cemil Kayis, Mo Wu, Umit Ozgur, Hadis Morkoc, Virginia Commonwealth Univ. (USA) [8262-65]
- AlGaIn/GaN based field effect transistors for terahertz detection and imaging**, Maciej Sakowicz, Maria B. Lifshits, Oleg A. Klimenko, Salman Nadar, Dominique Coquillat, Nina Dyakonova, Frédéric Teppe, Univ. Montpellier 2 (France); Christophe Gaquière, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France); Marie-Antoinette Poisson, Sylvain Delage, III-V Lab. (France); Wojciech Knap, Univ. Montpellier 2 (France) [8262-66]

Thursday 26 January

SESSION 12

Room: 302 (Esplanade) Thurs. 8:00 to 10:10 am

LEDs I

Session Chair: **Andreas Waag**,
Technische Univ. Braunschweig (Germany)

- 8:00 am: **Highly efficient InGaN/GaN blue LED on 8-inch Si (111) substrate** (*Invited Paper*), Jun-Youn Kim, Youngjo Tak, Jaekyun Kim, Hyun-Gi Hong, Suhee Chae, Jae Won Lee, Hyoji Choi, Young Soo Park, U-In Chung, Samsung Advanced Institute of Technology (Korea, Republic of); Jong-Ryeol Kim, Sejong Univ. (Korea, Republic of); Jongin Shim, Hanyang Univ. (Korea, Republic of) [8262-47]
- 8:30 am: **Roles of the radiative and nonradiative recombination rates on the efficiency droop in InGaN-based quantum-well light-emitting diodes**, Jong-In Shim, Hyunsung Kim, Dong-Soo Shin, Hanyang Univ. (Korea, Republic of); Han-Youl Ryu, Inha Univ. (Korea, Republic of); Yong-Tae Moon, Dae-Seob Han, Joong-Seo Park, LG Electronics Inc. (Korea, Republic of) [8262-48]
- 8:50 am: **Device characteristics of InGaN quantum well light-emitting diodes with AlInN thin barrier insertion**, Guangyu Liu, Jing Zhang, Lehigh Univ. (USA); Hongping Zhao, Case Western Reserve Univ. (USA); Nelson Tansu, Lehigh Univ. (USA) [8262-49]
- 9:10 am: **The quantum efficiency of InGaN light emitting diodes: effects of active layer design, electron cooler, and electron blocking layer**, Xing Li, Fan Zhang, Serdal Okur, Shujian Liu, Umüt Özgür, Hadis Morkoc, Virginia Commonwealth Univ. (USA); Steve M. Hong, Sheng-Hong Yen, Ta-Cheng Hsu, Epistar Corp. (Taiwan); Arvydas Matulionis, TeraVil Ltd. (Lithuania) [8262-50]
- 9:30 am: **High-voltage thin GaN LEDs array**, Ray-Hua Horng, Jia-Hua Lin, Dong-Sing Wu, National Chung Hsing Univ. (Taiwan) [8262-51]
- 9:50 am: **InGaN/GaN quantum-well light-emitting diodes with a reversed piezoelectric polarization field**, Meng-Jie Lee, Hsueh-Hsing Liu, Jen-Inn Chyi, National Central Univ. (Taiwan) [8262-52]
- Coffee Break 10:10 to 10:40 am

SESSION 13

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

LEDs II

Session Chair: **Jong-In Shim**, Hanyang Univ. (Korea, Republic of)

- 10:40 am: **VLED for Si wafer-level packaging** (*Invited Paper*), Chiming Chen, Jui-Kang Yen, Chen-Fu Chu, Yung-Wei Chen, Semi-Photonics Co., Ltd. (Taiwan); Chingfu Tsou, Chunming Chang, Feng Chia Univ. (Taiwan); Trung Doan, Chuong A. Tran, Semi-Photonics Co., Ltd. (Taiwan) [8262-53]
- 11:10 am: **Large-scaled fabrication of InGaN Nanowire LED using economic nano-crack lithography**, Po-Hsiang Chang, Meng-Che Tsai, Yun-Chorng Chang, National Cheng Kung Univ. (Taiwan) [8262-54]
- 11:30 am: **Improved performance of 375 nm InGaN/GaN light-emitting diodes by incorporating a heavily Si-doped transition layer**, Shih-Cheng Huang, Kun-Ching Shen, National Chung Hsing Univ. (Taiwan); Po-Min Tu, National Chiao Tung Univ. (Taiwan); Dong-Sing Wu, National Chung Hsing Univ. (Taiwan); Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan); Ray-Hua Horng, National Chung Hsing Univ. (Taiwan) [8262-55]
- 11:50 am: **Improved performance of nonpolar a-plane GaN light emitting diodes by controlled integration of silica nano-spheres into GaN buffer layers**, Sung Hyun Park, Seoul National Univ. (Korea, Republic of); Jinsub Park, Hanyang Univ. (Korea, Republic of); Kisu Joo, Duck-Jae You, Daeyoung Moon, Dong-Uk Kim, Hojun Jang, Seunghyun Moon, Yoon-Kyu Song, Heonsu Jeon, Seoul National Univ. (Korea, Republic of); Yasushi Nanishi, Ritsumeikan Univ. (Japan); Euijoon Yoon, Seoul National Univ. (Korea, Republic of) [8262-56]
- Lunch/Exhibition Break 12:10 to 1:40 pm

Degradation in InAlN/AlN/GaN heterostructure field-effect transistors using low-frequency noise and current-transient methods: hot phonon effects, Cemil Kayis, Romualdo A. Ferreyra, Mo Wu, Xing Li, Ümit Özgür, Virginia Commonwealth Univ. (USA); Arvydas Matulionis, TeraVil Ltd. (Lithuania); Hadis Morkoc, Virginia Commonwealth Univ. (USA) [8262-67]

Efficiency enhancement of GaN/In_{0.11}Ga_{0.89}N solar cells grown on strain release sapphire substrate and biomimetic anti-reflection surface, Hsun-Wen Wang, Chien-Chung Lin, Hao-Wei Han, Min-An Tsai, Hao-Chung Kuo, Peichen Yu, Shiuan-Huei Lin, National Chiao Tung Univ. (Taiwan) [8262-68]

Investigation of emission polarization and strain in InGaN/GaN multiple quantum wells on nanorod epitaxially lateral overgrowth templates, Huei-Min Huang, Tien-Chang Lu, Chiao-Yun Chang, Yu-Pin Lan, Shih-Chun Ling, Wei-Wen Chan, Hao-Chung Kuo, Shing-Chung Wang, National Chiao Tung Univ. (Taiwan) [8262-69]

Free-standing a-plane GaN substrates grown by HVPE, Yin-Hao Wu, Yen-Hsien Yeh, Kuei-Ming Chen, Yu-jei Yang, Wei-I Lee, National Chiao Tung Univ. (Taiwan) [8262-70]

Homoepitaxial growth of GaN on nonpolar and semipolar free-standing substrates, Daiki Jinno, Bei Ma, Hideto Miyake, Kazumasa Hiramatsu, Mie Univ. (Japan) [8262-71]

High performance 375 nm ultraviolet InGaN/AlGaIn light-emitting diodes by using a heavily Si-doped GaN growth mode transition layer, Shih-Cheng Huang, Po-Min Tu, Shun-Kuei Yang, Ya-Wen Lin, Chih-Peng Hsu, Advanced Optoelectronic Technology, Inc. (Taiwan) [8262-72]

Reduction of efficiency droop in InGaN-based UV light-emitting diodes with InAlGa barrier, Ching-Hsueh Chiu, Po-Min Tu, Jet-Rung Chang, Wei-Ting Chang, Hao-Chung Kuo, Chun-Yen Chang, National Chiao Tung Univ. (Taiwan) [8262-73]

Thermally stable low-resistance Ohmic contacts to N-polar n-type GaN for high-power vertical light-emitting diodes, Joon-Woo Jeon, Tae-Yeon Seong, Korea Univ. (Korea, Republic of) [8262-74]

Effect of MOCVD growth conditions on the optical properties of semipolar (1 -1 0 1) GaN on Si patterned substrates, Natalya Izyumskaya, Shujian Liu, Vitaliy Avrutin, Serdal Okur, Ümit Özgür, Virginia Commonwealth Univ. (USA); Sebastian Metzner, Christopher Karbaum, Frank Bertram, Juergen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); David Smith, Arizona State Univ. (USA); Hadis Morkoc, Virginia Commonwealth Univ. (USA) [8262-75]

Degradation mechanism of InAlN/GaN based HFETs under high electric field stress, Congyong Zhu, Mo Wu, Cemil Kayis, Fan Zhang, Xing Li, Vitaliy Avrutin, Umüt Özgür, Hadis Morkoc, Virginia Commonwealth Univ. (USA) [8262-76]

Electrical properties of ZnO:Ga as a transparent conducting oxide in InGaN-based light emitting diodes, Huiyong Liu, Xing Li, Fan Zhang, Vitaliy Avrutin, Natalia Izyumskaya, Ümit Özgür, Virginia Commonwealth Univ. (USA); Andy Yankovich, Alex Kvit, Paul Voyles, Univ. of Wisconsin-Madison (USA); Hadis Morkoc, Virginia Commonwealth Univ. (USA) [8262-77]

Effects of polarization fields on avalanche breakdown of AlGaIn quantum-well photodiode, Shengkun Zhang, Borough of Manhattan Community College (USA); Wubao Wang, Robert Alfano, The City College of New York (USA); Amir Dabiran, Andrew Wowchak, Peter Chow, SVT Associates, Inc. (USA) . . [8262-78]

Balancing intrinsic polarization and external fields in AlN/GaN heterostructures, Kristian Berland, Martin Stättin, Tommy Ive, Anders Larsson, Per Hyldgaard, Thorvald G. Andersson, Chalmers Univ. of Technology (Sweden) [8262-79]

Optical properties of a hybrid nitride-ZnO microcavity, Pierre Lefebvre, Christelle Brimont, Thierry Guillet, Thierry Bretagnon, Bernard Gil, P. Valvin, Univ. Montpellier 2 (France) and Lab. Charles Coulomb, CNRS, Univ. Montpellier 2 (France); François Médard, Martine Mihailovic, LASMEA, CNRS, Univ. Blaise Pascal (France); Jesus Zuniga-Perez, Mathieu Leroux, Fabrice Semon, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications, CNRS (France); Sophie Bouchoule, Lab. de Photonique et de Nanostructures, CNRS (France) [8262-81]

Conference 8262 · Room: 302 (Esplanade)

SESSION 14

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

LEDs III

Session Chair: Katsumi Kishino, Sophia Univ. (Japan)

1:40 pm: **Production technology of high power LED grown on 6" sapphire substrate for general illumination** (*Invited Paper*), MyeongSeok Oh, LG Innotek (Korea, Republic of) [8262-57]

2:10 pm: **Nitride- and oxynitride-based phosphors for LED lighting devices** (*Invited Paper*), Yongchi Tian, Lightscape Materials, Inc. (USA) [8262-58]

2:40 pm: **High-efficiency phosphor-free InGaN/GaN dot-in-a-wire white-light-emitting diodes on silicon**, Hieu P. Nguyen, Kai Cui, Shaofei Zhang, Saeed Fatholouloumi, Roufan Wu, Zetian Mi, McGill Univ. (Canada) [8262-59]

Coffee Break 3:00 to 3:30 pm

SESSION 15

Room: 302 (Esplanade) Thurs. 3:30 to 4:30 pm

Novel Devices

Session Chair: Hadis Morkoç, Virginia Commonwealth Univ. (USA)

3:30 pm: **III-nitride intersubband photonics** (*Invited Paper*), Francois H. Julien, Univ. Paris-Sud 11 (France) [8262-61]

4:00 pm: **Second harmonic generation in GaN-based photonic crystals for single molecule investigations** (*Invited Paper*), Dominique Coquillat, Jérémie Torres, Marine Le Vassor d'Yerville, David Cassagne, Frédéric Teppe, Nina Dyakonova, Wojciech Knap, Univ. Montpellier 2 (France); Richard M. De La Rue, Univ. of Malaya (Malaysia); Sophie Bouchoule, Ctr. National de la Recherche Scientifique (France); Emmanuel Margeat, Catherine Royer, Ctr. de biochimie Structurale (France) [8262-62]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Don't miss the free Photonics West Exhibition

24-26 January 2012
South Hall ABC and North Hall D
Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm
Thursday · 10:00 am to 4:00 pm

Oxide-based Materials and Devices III

Conference Chairs: **Ferechteh H. Teherani**, Nanovation (France); **David C. Look**, Wright State Univ. (USA); **David J. Rogers**, Nanovation (France)

Program Committee: **Ivan Bozovic**, Brookhaven National Lab. (USA); **Stefan T. Bromley**, Univ. de Barcelona (Spain); **Jean-Jacques Delaunay**, The Univ. of Tokyo (Japan); **Aleksandra B. Djurisc**, The Univ. of Hong Kong (Hong Kong, China); **Rodrigo Ferrão de Paiva Martins**, CEMOP/Uninova (Portugal); **Michael D. Gerhold**, U.S. Army Research Office (USA); **Hanns-Ulrich Habermeier**, Max-Planck-Institut für Festkörperforschung (Germany); **Axel Hoffmann**, Technische Univ. Berlin (Germany); **Masashi Kawasaki**, Tohoku Univ. (Japan); **Katharina Lorenz**, Instituto Tecnológico e Nuclear (Portugal); **Andreia Luisa da Rosa**, Univ. Bremen (Germany); **Tatsuo Okada**, Kyushu Univ. (Japan); **Manijeh Razeghi**, Northwestern Univ. (USA); **Bruno Viana**, Ecole Nationale Supérieure de Chimie de Paris (France); **Takafumi Yao**, Tohoku Univ. (Japan)

Sunday 22 January

SESSION 1

Room: 212 (Mezzanine) Sun. 8:00 to 10:00 am

Highly Conducting Transparent Oxides I

Session Chairs: **David C. Look**, Wright State Univ. (USA); **Axel Hoffmann**, Technische Univ. Berlin (Germany)

8:00 am: **Making highly conductive ZnO: creating donors and killing acceptors**, David C. Look, Wright State Univ. (USA); Kevin D. Leedy, Air Force Research Lab. (USA) [8263-01]

8:20 am: **Optical characterization of high mobility polycrystalline ZnO:Al films** (*Invited Paper*), Florian Ruske, Mark Wimmer, Grit Köppel, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Andreas Pflug, Fraunhofer-Institut für Schicht- und Oberflächentechnik (Germany); Bernd Rech, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) [8263-02]

8:45 am: **First-principles investigation of unusual electronic structures of oxides** (*Invited Paper*), Su-Huai Wei, National Renewable Energy Lab. (USA) [8263-03]

9:10 am: **Hydrothermal growth and properties of group III (indium, gallium, and aluminum) doped bulk ZnO crystals** (*Invited Paper*), Buguo Wang, Solid State Scientific Corp. (USA); Michael Snure, Matthew Mann, Air Force Research Lab. (USA); David Look, Wright State Univ. (USA) [8263-04]

9:35 am: **Novel fabrication method for ZnO films via nitrogen-mediated crystallization** (*Invited Paper*), Naho Itagaki, Kazunari Kuwahara, Kouichi Matsushima, Kouichiro Oshikawa, Kyushu Univ. (Japan) [8263-05]

Coffee Break 10:00 to 10:25 am

SESSION 2

Room: 212 (Mezzanine) Sun. 10:25 to 11:40 am

Highly Conducting Transparent Oxides II

Session Chairs: **Axel Hoffmann**, Technische Univ. Berlin (Germany); **David C. Look**, Wright State Univ. (USA)

10:25 am: **Unraveling the mystery of conductivity at polar/nonpolar perovskite interfaces** (*Invited Paper*), Scott A. Chambers, Pacific Northwest National Lab. (USA) [8263-06]

10:50 am: **Properties of TCO anodes deposited by APCVD and their applications to OLED lighting** (*Invited Paper*), Roman Y. Korotkov, Pierre Ricou, Liang Fang, Arkema Research Ctr. (USA); Holger Schwab, Manfred Ruske, Philips Technologie GmbH (Germany); Daniel Gaspar, Asanga B. Padmaperuma, Pacific Northwest National Lab. (USA) [8263-07]

11:15 am: **Electronic and optical properties of transparent conductive oxides from ab-initio calculations** (*Invited Paper*), Andre Schleife, Lawrence Livermore National Lab. (USA); Claudia Roedel, Frank Fuchs, Karsten Hannewald, Juergen Furthmueller, Benjamin Hoeffling, Friedrich-Schiller-Univ. Jena (Germany); Patrick Rinke, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Joel B. Varley, Anderson Janotti, Chris G. Van de Walle, Univ. of California, Santa Barbara (USA); Friedhelm Bechstedt, Friedrich-Schiller-Univ. Jena (Germany) [8263-08]

Lunch Break 11:40 am to 12:40 pm

SESSION 3

Room: 212 (Mezzanine) Sun. 12:40 to 2:20 pm

Doping and Band Structure Studies

Session Chairs: **Masashi Kawasaki**, Tohoku Univ. (Japan); **Andreia Luisa da Rosa**, Univ. Bremen (Germany)

12:40 pm: **Thermal process induced change of conductivity in As-doped ZnO** (*Invited Paper*), Chi-Chung Ling, S. C. Fan, The Univ. of Hong Kong (China) [8263-09]

1:05 pm: **Doped gallium oxide nanowires for photonics** (*Invited Paper*), Emilio Nogales, Iñaki López, Bianchi Méndez, Javier Piqueras, Univ. Complutense de Madrid (Spain); Katharina Lorenz, Eduardo Alves, Instituto Tecnológico e Nuclear (Portugal); José Ángel García, Univ. del País Vasco (Spain) [8263-10]

1:30 pm: **Structural defects and shallow impurities in ZnO** (*Invited Paper*), Axel Hoffmann, Markus R. Wagner, Technische Univ. Berlin (Germany) [8263-11]

1:55 pm: **Proliferating metal-insulator transition by x-ray in an electron doped vanadium dioxide thin film** (*Invited Paper*), Keisuke Shibuya, RIKEN (Japan); Masashi Kawasaki, Yoshinori Tokura, The Univ. of Tokyo (Japan) [8263-12]

SESSION 4

Room: 212 (Mezzanine) Sun. 2:20 to 3:35 pm

Material Growth

Session Chairs: **Michael D. Gerhold**, U.S. Army Research Office (USA); **Takafumi Yao**, Tohoku Univ. (Japan)

2:20 pm: **Growth and characterization of large-diameter lithium-free ZnO single crystals** (*Invited Paper*), Shaoping Wang, Fairfield Crystal Technology, LLC (USA) [8263-13]

2:45 pm: **New application fields of periodically polarity-inverted ZnO structures** (*Invited Paper*), Jinsub Park, Hanyang Univ. (Korea, Republic of); Soon-Ku Hong, Chungnam National Univ. (Korea, Republic of); Jiho Chang, Korea Maritime Univ. (Korea, Republic of); Takafumi Yao, Tohoku Univ. (Japan) [8263-14]

3:10 pm: **Innovative and cost-effective eco-synthesis of oxide-based materials by Electrostatic Spray Assisted Vapour Deposition** (*Invited Paper*), Kwang-Leong Choy, The Univ. of Nottingham (United Kingdom) [8263-15]

Coffee Break 3:35 to 4:00 pm

SESSION 5

Room: 212 (Mezzanine) Sun. 4:00 to 6:25 pm

Light Emitters I

Session Chairs: **David J. Rogers**, Nanovation (France); **Aleksandra B. Djurisc**, The Univ. of Hong Kong (Hong Kong, China)

4:00 pm: **Recent advances and novel approaches of p-type doping of zinc oxide** (*Invited Paper*), Oleg Maksimov, The Pennsylvania State Univ. (USA) [8263-67]

4:25 pm: **ZnO microwire quantum well heterostructures**, Christof P. Dietrich, Martin Lange, Marko Stölzel, Helena Franke, Marius Grundmann, Univ. Leipzig (Germany) [8263-16]

4:45 pm: **Modification and applications of ZnO nanocrystals by laser irradiation** (*Invited Paper*), Tatsuo Okada, Kota Okazaki, Kazuki Kubo, Tetsuya Shimogaki, Mitsuhiro Higashihata, Daisuke Nakamura, Kyushu Univ. (Japan) [8263-17]

Conference 8263 · Room: 212 (Mezzanine)

5:10 pm: **White-light lasing in ZnO microspheres fabricated by laser ablation** (*Invited Paper*), Shinya Okamoto, Yosuke Minowa, Masaaki Ashida, Osaka Univ. (Japan) [8263-18]

5:35 pm: **White light upconversion emission in Yb³⁺/Er³⁺/Tm³⁺ codoped oxy-fluoride lithium tungsten tellurite glass ceramics** (*Invited Paper*), Ghizal F. Ansari, All Saints' College of Technology (India); Sachin K. Mahajan, Samrat Ashok Technological Institute (India) [8263-19]

6:00 pm: **Optimization of photoluminescence and electroluminescence of silicon nanocrystals in a superlattice host** (*Invited Paper*), Michael Roman, Dennis W. Prather, Univ. of Delaware (USA) [8263-20]

Monday 23 January

SESSION 6

Room: 212 (Mezzanine) Mon. 8:00 to 9:15 am

Light Emitters II

Session Chairs: Aleksandra B. Djuriscic, The Univ. of Hong Kong (Hong Kong, China); David J. Rogers, Nanovation (France)

8:00 am: **Metal oxide nanostructures and white light emission** (*Invited Paper*), Magnus Willander, Linköping Univ. (Sweden) [8263-21]

8:25 am: **ZnO nanowire for tunable near-UV blue LED** (*Invited Paper*), Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France) [8263-22]

8:50 am: **Photoresponse comparison of indium oxide (In₂O₃) nanomaterials** (*Invited Paper*), Shayla Sawyer, Liqiao Qin, Dali Shao, Rensselaer Polytechnic Institute (USA) [8263-23]

SESSION 7

Room: 212 (Mezzanine) Mon. 9:15 to 10:05 am

Material Processing

Session Chairs: Michael D. Gerhold, U.S. Army Research Office (USA); Masashi Kawasaki, Tohoku Univ. (Japan)

9:15 am: **Oxide crystal-fibers grown by micro-pulling-down technique and applications for lasers and scintillators** (*Invited Paper*), Julien Didierjean, FiberCryst (France); François Balembois, Lab. Charles Fabry (France); Nicolas Aubry, Didier Perrodin, Jean-Marie Fourmigué, Adrien Aubourg, Igor Martial, FiberCryst (France); Xavier Delen, Patrick Georges, Lab. Charles Fabry (France) [8263-24]

9:40 am: **Novel approach for chemical lift-off and wafer bonding of (In)GaN based devices using sacrificial ZnO template layers** (*Invited Paper*), Abdallah Ougazzaden, Georgia Tech-Lorraine (France); David J. Rogers, Ferechteh H. Teherani, Nanovation (France); Simon Gautier, Tarik Moudakir, Supélec (France); Manijeh Razeghi, Northwestern Univ. (USA) [8263-25]

Coffee Break 10:05 to 10:30 am

SESSION 8

Room: 212 (Mezzanine) Mon. 10:30 to 11:45 am

Band Gap Engineering

Session Chairs: Stefan T. Bromley, Univ. de Barcelona (Spain); "David J. Rogers, Nanovation (France)

10:30 am: **Highly correlated quantum Hall system realized at MgZnO/ZnO interfaces** (*Invited Paper*), Yusuke Kozuka, Joseph Falson, The Univ. of Tokyo (Japan); Denis Maryenko, RIKEN (Japan); Atsushi Tsukazaki, The Univ. of Tokyo (Japan); Christopher Bell, Minu Kim, Yasuyuki Hikita, Harold Y. Hwang, Stanford Univ. (USA); Shintaro Nakamura, Satoshi Awaji, Tohoku Univ. (Japan); Kazunori Ueno, Masashi Kawasaki, The Univ. of Tokyo (Japan) [8263-26]

10:55 am: **Time-resolved photoluminescence spectroscopy investigations of nonpolar homoepitaxial ZnO/(Zn,Mg)O quantum wells** (*Invited Paper*), Thierry Bretagnon, Luc Béaur, Bernard Gil, Thierry Guillet, Christelle Brimont, Univ. Montpellier 2 (France); Jean-Michel Chauveau, Univ. de Nice Sophia Antipolis (France) [8263-27]

11:20 am: **Ion beams as a tool for advanced structural characterization in ZnO-based materials** (*Invited Paper*), Andrés Redondo-Cubero, Katharina Lorenz, Eduardo Alves, Instituto Tecnológico e Nuclear (Portugal); Raul Gago, Instituto de Ciencia de Materiales de Madrid (Spain); Adrian Hierro, Univ. Politécnica de Madrid (Spain); Mykola Vinnichenko, Helmholtz-Zentrum Dresden-Rossendorf e. V. (Germany); Jean-Michel Chauveau, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Atsushi Nakamura, Shizuoka Univ. (Japan); Matthias Krause, Helmholtz-Zentrum Dresden-Rossendorf e. V. (Germany); Jiro Temmyo, Shizuoka Univ. (Japan); Elias Muñoz, Univ. Politécnica de Madrid (Spain); Matthias Brandt, Fritz Henneberger, Humboldt-Univ. zu Berlin (Germany) [8263-28]

Lunch Break 11:45 am to 12:45 pm

SESSION 9

Room: 212 (Mezzanine) Mon. 12:45 to 3:15 pm

Optical Properties

Session Chairs: Katharina Lorenz, Instituto Tecnológico e Nuclear (Portugal); Rodrigo Ferrão de Paiva Martins, CEMOP/Uninova (Portugal)

12:45 pm: **Optical properties of excitons in CuMO₂ delafossite-type oxide thin films** (*Invited Paper*), Takayuki Makino, RIKEN (Japan) [8263-29]

1:10 pm: **Microscopic origins of the surface exciton photoluminescence in ZnO nanostructures** (*Invited Paper*), Enda McGlynn, Dublin City Univ. (Ireland) [8263-30]

1:35 pm: **Excitonic transport in ZnO** (*Invited Paper*), Frank Bertram, Martin Noltemeyer, Thomas Hempel, Juergen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Matthias A. Brandt, Michael Lorenz, Marius Grundmann, Univ. Leipzig (Germany) [8263-31]

2:00 pm: **Electro-optical properties of barium titanate films epitaxially grown on silicon** (*Invited Paper*), Stefan Abel, Daniele Caimi, Marilyne Sousa, Thilo Stöferle, Christophe P. Rossel, Chiara Marchiori, IBM Zürich Research Lab. (Switzerland); Alexei Chelnokov, CEA-LETI (France); Jean Fompeyrine, IBM Zürich Research Lab. (Switzerland) [8263-32]

2:25 pm: **Optical probe of heterointerfaces composed of correlated electron oxides** (*Invited Paper*), Masao Nakamura, RIKEN (Japan) and The Univ. of Tokyo (Japan); Masashi Kawasaki, Yoshinori Tokura, The Univ. of Tokyo (Japan) [8263-33]

2:50 pm: **Tuning optical properties of complex oxides: examples of nanoporous materials and perovskite heterostructures** (*Invited Paper*), Peter V. Sushko, Univ. College London (United Kingdom) [8263-34]

Coffee Break 3:15 to 3:40 pm

SESSION 10

Room: 212 (Mezzanine) Mon. 3:40 to 4:55 pm

Oxide-Organic Hybridization

Session Chairs: Axel Hoffmann, Technische Univ. Berlin (Germany); Manijeh Razeghi, Northwestern Univ. (USA)

3:40 pm: **Inorganic/organic ZnO-based hybrid structures for optoelectronics** (*Invited Paper*), Fritz Henneberger, Humboldt-Univ. zu Berlin (Germany) [8263-35]

4:05 pm: **Functionalization of ZnO surfaces with organic molecules** (*Invited Paper*), Andreia Luisa da Rosa, Ney Moreira, Adriel Dominguez, Thomas Frauenheim, Univ. Bremen (Germany) [8263-36]

4:30 pm: **Transparent conducting oxides for building applications** (*Invited Paper*), Arnaud Verger, Saint-Gobain Recherche (France) [8263-37]

SESSION 11

Room: 212 (Mezzanine) Mon. 4:55 to 6:05 pm

Oxide-based Devices I

Session Chairs: **Bruno Viana**, Ecole Nationale Supérieure de Chimie de Paris (France); **Rodrigo Ferrão de Paiva Martins**, CEMOP/Uninova (Portugal)

4:55 pm: **Reactive dual magnetron sputtering of Ta₂O₅, Y₂O₃, TiO₂, Al₂O₃, Zr₂O₃, and Nb₂O₃: optical and structural properties and thin film applications**, Stuart J. Pearce, Hassan Esfandiarijahromi, Martin D. B. Charlton, Univ. of Southampton (United Kingdom) [8263-38]

5:15 pm: **P-type oxide thin film transistors produced at low temperatures** (*Invited Paper*), Rodrigo Ferrão de Paiva Martins, CEMOP/Uninova (Portugal) [8263-39]

5:40 pm: **Multicomponent dielectrics for oxide TFT** (*Invited Paper*), Luis M. Pereira, Pedro Barquinha, Gonçalo Gonçalves, Elvira Fortunato, Rodrigo Martins, Univ. Nova de Lisboa (Portugal) and CEMOP/UNINOVA (Portugal) [8263-40]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 12

Room: 212 (Mezzanine) Tues. 10:30 am to 12:10 pm

Oxide-based Devices II

Session Chairs: **Rodrigo Ferrão de Paiva Martins**, CEMOP/Uninova (Portugal); **Bruno Viana**, Ecole Nationale Supérieure de Chimie de Paris (France)

10:30 am: **Growth and characterization of Ga₂O₃ on sapphire substrates for UV sensor applications** (*Invited Paper*), Sin-Liang Ou, Dong-Sing Wu, Yu-Chuan Fu, Tzu-Yu Wang, Ray-Hua Horng, National Chung Hsing Univ. (Taiwan) [8263-41]

10:55 am: **Controlling trap depth to enhance optical properties of oxides materials for medical imaging** (*Invited Paper*), Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France) [8263-42]

11:20 am: **Development of functional magnetic nanoparticles for biomedical application** (*Invited Paper*), Yuko Ichinaga, Yokohama National Univ. (Japan) [8263-43]

11:45 am: **Vertically aligned ZnO-ZnGa₂O₄ core-shell nanowires for photoelectrochemical water splitting** (*Invited Paper*), Miao Zhong, Yanbo Li, Jean-Jacques Delaunay, The Univ. of Tokyo (Japan) [8263-44]

Lunch/Exhibition Break 12:10 to 1:10 pm

SESSION 13

Room: 212 (Mezzanine) Tues. 1:10 to 3:15 pm

Superconductivity

Session Chairs: **Hanns-Ulrich Habermeier**, Max-Planck-Institut für Festkörperforschung (Germany); **Ivan Bozovic**, Brookhaven National Lab. (USA)

1:10 pm: **Transient and persistent photoconductivity in complex oxide heterostructures and superlattices** (*Invited Paper*), Hanns-Ulrich Habermeier, Max-Planck-Institut für Festkörperforschung (Germany) [8263-45]

1:35 pm: **Atomic-layer engineering of oxide superconductors** (*Invited Paper*), Ivan Bozovic, Brookhaven National Lab. (USA) [8263-46]

2:00 pm: **Metallic quantum well states in artificial structures based on strongly correlated oxide** (*Invited Paper*), Hiroshi Kumigashira, The Univ. of Tokyo (Japan) [8263-47]

2:25 pm: **Tuning electronic phases by electric double layer transistor** (*Invited Paper*), Yoshihiro Iwasa, The Univ. of Tokyo (Japan) and RIKEN (Japan) [8263-48]

2:50 pm: **X-ray absorption spectroscopy (XAS) study of superconducting thin film single crystals** (*Invited Paper*), Hiroyuki Oyanagi, National Institute of Advanced Industrial Science and Technology (Japan); Akio Tsukada, NTT Basic Research Labs. (Japan) and Tokyo Univ. of Agriculture and Technology (Japan); Michio Naito, Tokyo Univ. of Agriculture and Technology (Japan) [8263-49]

Coffee Break 3:15 to 3:40 pm

SESSION 14

Room: 212 (Mezzanine) Tues. 3:40 to 6:10 pm

Growth, Properties, and Applications of Nanostructures

Session Chairs: **Jean-Jacques Delaunay**, The Univ. of Tokyo (Japan); **Tatsuo Okada**, Kyushu Univ. (Japan)

3:40 pm: **Structure and properties of nano-oxides: a theoretical overview** (*Invited Paper*), Stefan T. Bromley, Univ. de Barcelona (Spain) [8263-51]

4:05 pm: **Morphological effects on optical and electrical properties of ZnO nanostructures** (*Invited Paper*), Sang Hyun Lee, Jun Xu, Xiaoguang Zhang, Chad M. Parish, Ho Nyung Lee, Barton Smith, Oak Ridge National Lab. (USA); Takafumi Yao, Takenari Goto, Hiroshi Miyazaki, Tohoku Univ. (Japan) [8263-52]

4:30 pm: **Real-space distribution of cavity modes in single ZnO nanowires** (*Invited Paper*), Frank Güell, Univ. de Barcelona (Spain); Alejandro R. Gofí, Consejo Superior de Investigaciones Científicas (Spain); Josep Oriol Ossó, MATGAS (Spain); Luis A. Perez, Eduardo A. Coronado, La Univ. Nacional de Córdoba (Argentina); Joan Ramón Morante, Institut de Recerca en Energia de Catalunya (Spain) [8263-53]

4:55 pm: **Influence of hydrothermal treatment on morphology and properties of ZnO nanostructures** (*Invited Paper*), Xin Yi Chen, Alan M. C. Ng, Aleksandra B. Djurić, Wai Kin Chan, The Univ. of Hong Kong (Hong Kong, China) [8263-54]

5:20 pm: **Solution-based strategies for synthesizing ZnO nanostructures with controlled morphology and composition** (*Invited Paper*), Xudong Wang, Univ. of Wisconsin-Madison (USA) [8263-55]

5:45 pm: **Engineered ZnO nanowire arrays using different nanopatterning techniques** (*Invited Paper*), János Volk, Research Institute for Technical Physics and Materials Science (Hungary); Zoltán Szabó, Research Institute for Technical Physics and Materials Science (Hungary) and Univ. of Pannonia, Faculty of Information Technology (Hungary); Róbert Erdélyi, Khanh Quoc Nguyen, Research Institute for Technical Physics and Materials Science (Hungary) [8263-56]

Wednesday 25 January

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Fabrication and characterization of titanium dioxide and zinc oxide based ultraviolet photodetectors. James C. Moore, Ryan Stansell, Laura R. Covington, Coastal Carolina Univ. (USA) [8263-57]

Effect of V dopants on the electrical and optical properties of AZO thin films prepared by magnetron sputtering. Yu Shan Wei, Cheng-Yi Liu, National Central Univ. (Taiwan) [8263-58]

Analysis of ZnO microfilms luminescence features caused by shallow levels. Mikhail V. Ryzhkov, Charus M. Briskina, Valery M. Markushev, Stepan Rummyantsev, Andrey Borodkin, Institute of Radio Engineering and Electronics (Russian Federation) [8263-59]

Carrier-concentration separation model for transparent conducting Sn:In₂O₃. Yen-Shuo Liu, Yung Hsun Lin, Cheng-Yi Liu, National Central Univ. (Taiwan) [8263-60]

Mach-Zehnder optical sensor based on pedestal anti-resonant reflecting optical waveguides. Daniel Orquiza de Carvalho, Marco Isaias Alayo, Escola Politecnica da Univ. de São Paulo (Brazil) [8263-61]

Time-resolved photoluminescence study of homoepitaxial ZnO/ZnMgO quantum wells grown by metal organic vapor phase epitaxy. Thierry Bretagnon, Univ. Montpellier 2 (France); Nadia Haneche, Univ. de Versailles Saint-Quentin-en Yvelines (France); Luc Béaur, Univ. Montpellier 2 (France); Alain Lusson, Corinne Sartel, Vincent Sallet, Univ. de Versailles Saint-Quentin-en Yvelines (France) [8263-62]

Erbium-doped silicon MOS devices for optoelectronic applications. Joan Manel Ramírez, Yonder Berencén, Federico Ferrarese-Lupi, Olivier Jambois, Daniel Navarro-Urrios, Univ. de Barcelona (Spain); Oleksiy Anopchenko, Alessandro Marconi, Nikola Prtjaga, Andrea Tengattini, Lorenzo Pavesi, Univ. degli Studi di Trento (Italy); Jean-Phillippe Colonna, Jean-Marc Fédéli, CEA-LETI (France); Blas Garrido, Univ. de Barcelona (Spain) . . . [8263-63]

Green-emissive BaSi₂O₅:Eu²⁺ thin film phosphor and its transparent plasma display application. Sang Hyun Lim, Pukyong National Univ. (Korea, Republic of) [8263-64]

Electroluminescence in thick ZnGa₂O₄:Mn²⁺ phosphor film. Ji Min Lim, Pukyong National Univ. (Korea, Republic of) [8263-65]

Investigation for stressed Kane type semiconductors. Subhamoy Singha Roy, JIS College of Engineering (India) [8263-66]

Raman scattering study of wurtzite Zn_{1-x}Mg_xO under high pressure. Yan-Cheng Lin, Wu-Ching Chou, National Chiao Tung Univ. (Taiwan) [8263-68]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

**Don't miss the free
Photonics West
Exhibition**

24-26 January 2012
South Hall ABC and North Hall D
Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm
Thursday · 10:00 am to 4:00 pm

Integrated Optics: Devices, Materials, and Technologies XVI

Conference Chairs: **Jean Emmanuel Broquin**, IMEP-LAHC (France); **Gualtiero Nunzi Conti**, Istituto di Fisica Applicata Nello Carrara (Italy)

Conference Co-Chairs: **Pierre Berini**, Univ. of Ottawa (Canada); **Christoph M. Greiner**, LightSmyth Technologies, Inc. (USA)

Program Committee: **Pavel Cheben**, National Research Council Canada (Canada); **Xudong Fan**, Univ. of Michigan (USA); **Helmut Heidrich**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Andrea Melloni**, Politecnico di Milano (Italy); **Robert L. Nelson**, Air Force Research Lab. (USA); **Jens H. Schmid**, National Research Council Canada (Canada); **Frank Schmidt**, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); **Yakov Sidorin**, Quarles Brady LLP (USA); **Stefano Taccheo**, Swansea Univ. (United Kingdom); **Christoph A. Wächter**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Qiwen Zhan**, Univ. of Dayton (USA)

Monday 23 January

SESSION 1

Room: 236 (Mezzanine) Mon. 8:10 to 10:20 am

Waveguide Engineering I

Session Chair: **Jean Emmanuel Broquin**, IMEP-LAHC (France)

8:10 am: **Hybrid organic integrated optical isolators** (*Invited Paper*), Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA) . . . [8264-01]

8:40 am: **Magneto-optical mode conversion in a hybrid glass waveguide made by sol-gel and ion-exchange techniques**, François Royer, Hadi Amata, Univ. Jean Monnet Saint-Etienne (France); François Parsy, IMEP-LAHC (France); Damien Jamon, Univ. Jean Monnet Saint-Etienne (France); Elise Ghibaudo, Jean Emmanuel Broquin, IMEP-LAHC (France); Sophie Neveu, Univ. Pierre et Marie Curie (France) [8264-02]

9:00 am: **Slow light electro-optic modulator based on EO polymer-infiltrated slotted silicon photonic crystal waveguides**, Shin-ichiro Inoue, Akira Otomo, National Institute of Information and Communications Technology (Japan) [8264-03]

9:20 am: **TiO₂ nanophotonic waveguides for on-chip nonlinear optical devices**, Jonathan D. B. Bradley, Christopher C. Evans, Jennifer T. Choy, Orad Reshef, Parag B. Deotare, Marko Loncar, Eric Mazur, Harvard Univ. (USA) [8264-04]

9:40 am: **Fabrication of barrier-type slab waveguides in Er³⁺-doped tellurite glass by single- and double-energy MeV N⁺ ion implantation**, István Bányász, Zsolt Zolnai, Research Institute for Solid-State Physics and Optics (Hungary); Stefano Pelli, Simone Berneschi, Gualtiero Nunzi-Conti, Istituto di Fisica Applicata Nello Carrara (Italy); Miklós Fried, Tivadar Lohner, Péter Petrik, Research Institute for Solid-State Physics and Optics (Hungary); Massimo Brenni, Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy) [8264-05]

10:00 am: **On-chip electro-optic waveguides in isotropic liquid crystal blends for switching applications**, Florenta A. Costache, Martin Blasl, Kirstin Bornhorst, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [8264-06]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 236 (Mezzanine) Mon. 10:50 am to 12:20 pm

Amplifiers and Lasers

Session Chair: **Gualtiero Nunzi Conti**, Istituto di Fisica Applicata Nello Carrara (Italy)

10:50 am: **Rare-earth activated potassium double tungstate waveguide lasers and amplifiers** (*Invited Paper*), Sonia M. Garcia-Blanco, Dimitri Gekus, Koop Van Dalssen, Shanmugam Aravazhi, Markus Pollnau, Univ. Twente (Netherlands) [8264-07]

11:20 am: **1.55- μ m hybrid waveguide laser made by ion-exchange and wafer bonding**, Marco Casale, Davide Bucci, Lionel Bastard, Jean-Emmanuel Broquin, IMEP-LAHC (France) [8264-08]

11:40 am: **Supercontinuum generation using integrated Q-switched laser made by ion-exchange**, Bertrand Charlet, Fabien Geoffroy, Lionel Bastard, Jean-Emmanuel Broquin, Institut de Microélectronique Électromagnétisme et Photonique (France) [8264-09]

12:00 pm: **Analytical modeling of mid-infrared silicon raman lasers**, Jichi Ma, Sasan Fathpour, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8264-10]

Lunch Break 12:20 to 1:40 pm

SESSION 3

Room: 236 (Mezzanine) Mon. 1:40 to 3:30 pm

Photonic Integration

Session Chair: **Pavel Cheben**, National Research Council Canada (Canada)

1:40 pm: **Hybrid silicon/III-V laser sources based on adiabatic mode transformers** (*Invited Paper*), Badhise Ben Bakir, Antoine Descos, Nicolas Olivier, Damien Bordel, Philippe Grosse, Jean Marc Fedeli, CEA-LETI (France) [8264-11]

2:10 pm: **Edge-emitting III-V/Si hybrid laser: fabrication and efficient coupling to silicon waveguide**, Olesya Bondarenko, Qing Gu, Aleksandar Simic, Boris Slutsky, Maziar Nezhad, Yeshaiahu Fainman, Univ. of California, San Diego (USA) [8264-12]

2:30 pm: **Recombination and loss mechanisms in Ga(NAsP)/(BGa)P QW lasers grown lattice-matched to exact (001) silicon**, Nadir Hossain, Stephen Sweeney, Univ. of Surrey (United Kingdom); Sven Liebich, Peter Ludewig, Martin Zimprich, Kerstin Volz, Bernardette Kunert, Wolfgang Stolz, Philipps-Univ. Marburg (Germany) [8264-13]

2:50 pm: **Highly efficient coupling between a photonic crystal cavity and a bus waveguide**, Kapil Debnath, Thomas F. Krauss, Liam O'Faolain, Univ. of St. Andrews (United Kingdom) [8264-14]

3:10 pm: **Polymer waveguides based on silicon optical benches**, Chin-Ta Chen, Bo-Kuan Shen, Chia-Chi Chang, Jen-Yu Li, Hsu-Liang Hsiao, National Central Univ. (Taiwan); Yun-Chih Lee, Centera Photonics Inc. (Taiwan); Mount-Learn Wu, National Central Univ. (Taiwan) [8264-15]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 236 (Mezzanine) Mon. 4:00 to 5:40 pm

Modelling

Session Chair: **Christoph A. Wächter**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

4:00 pm: **A perturbation approach for the design of coupled resonator optical waveguides (CROWs)**, Osman S. Ahmed, McMaster Univ. (Canada); Mohamed A. Swillam, Univ. of Toronto (Canada); Mohamed H. Bakr, Xun Li, McMaster Univ. (Canada) [8264-16]

4:20 pm: **Theoretical model for the effective nonlinearity of surface plasmons based on a Green function formalism**, Israel De Leon, Robert W. Boyd, Univ. of Ottawa (Canada); John E. Sipe, Univ. of Toronto (Canada) [8264-17]

4:40 pm: **Modeling and analysis of multiple ring-resonator performance as optical filter**, Sanjoy Mandal, Indian School of Mines (India); Sabitabrata Dey, College of Engineering and Management, Kolaghat (India) [8264-18]

5:00 pm: **Design of multilayered strip SiON waveguide for polarizer application**, Vishnu Priye, Janardan Prasad, Anamika Singh, Indian School of Mines (India) [8264-19]

5:20 pm: **Asymmetrically coupled bus with tunable ring resonators for multiple functionalities: Fano resonance, asymmetric transmission, and wavelength shifting**, Weiqiang Ding, Chengwei Qiu, National Univ. of Singapore (Singapore) [8264-20]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany);
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 5

Room: 236 (Mezzanine) Tues. 10:30 am to 12:00 pm

Sensors I

Session Chair: **Jens H. Schmid**,
National Research Council Canada (Canada)

10:30 am: **Enhancing gradient optical force in silicon photonic devices** (*Invited Paper*), Mo Li, Univ. of Minnesota, Twin Cities (USA) [8264-21]

11:00 am: **Array of subwavelength rectangular holes in palladium for optical hydrogen detection**, Etsuo Maeda, Takanori Matsuki, Ichiro Yamada, The Univ. of Tokyo (Japan); Gilles Léronnel, Univ. de Technologie Troyes (France); Jean-Jacques Delaunay, The Univ. of Tokyo (Japan) [8264-24]

11:20 am: **The development of a novel monolithic spectrometer chip concept**, Stephen J. Sweeney, Yaping Zhang, Ian D. Goodyer, ZINIR Ltd. (United Kingdom) [8264-22]

11:40 am: **On-chip interrogation of a silicon-on-insulator microring resonator based ethanol vapor sensor with an arrayed waveguide grating(AWG) spectrometer**, Nebiyu A. Yebo, Wim Bogaerts, Zeger Hens, Roel Baets, Univ. Gent (Belgium) [8264-23]

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

SESSION 6

Room: 236 (Mezzanine) Tues. 1:30 to 3:00 pm

Sensors II

1:30 pm: **Amorphous photonic membranes for broadband chemical sensing applications** (*Invited Paper*), Ralph D. Whaley, Jr., Sonja D. Abbey, Parthiban Rajan, Ohio Univ. (USA) [8264-25]

2:00 pm: **Foil-based optical technology platform for optochemical sensors**, Sandeep Kalathimekkad, Jeroen Missinne, Bram Van Hoe, Erwin Bosman, Univ. Gent (Belgium); Erwin Meinders, Rajesh Mandamparambil, Holst Ctr. (Netherlands); Geert Van Steenberge, Jan Vanfleteren, Univ. Gent (Belgium) [8264-26]

2:20 pm: **Compact static Fourier transform spectrometer in glass integrated optics in the NIR and visible domain**, Amélie Creux, Alain Morand, Pierre Benech, IMEP-LAHC (France); Bruno Martin, Institut de Planétologie et d'Astrophysique de Grenoble (France); Grégory Grosa, IMEP-LAHC (France); Etienne Le Coarer, Pierre Kern, Institut de Planétologie et d'Astrophysique de Grenoble (France) [8264-27]

2:40 pm: **Development of a slow-light spectrometer on a chip**, Sangeeta Murugkar, Israel De Leon, Univ. of Ottawa (Canada); Zhimin Shi, Univ. of Rochester (USA); Gisela López-Galmiche, Jeff Salvail, Edwin Ma, Univ. of Ottawa (Canada); Boshen Gao, Andreas C. Liapis, Joseph E. Vornehm, Univ. of Rochester (USA); Robert Boyd, Univ. of Ottawa (Canada) [8264-28]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: 236 (Mezzanine) Tues. 3:30 to 5:50 pm

Waveguide Engineering II

Session Chair: **Christoph M. Greiner**,
LightSmyth Technologies, Inc. (USA)

3:30 pm: **Volume structuring of transparent materials by ultrashort laser pulses: potential and applications** (*Invited Paper*), Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) [8264-29]

4:00 pm: **Mode-conversion cavities-applications in integrated optics** (*Invited Paper*), Marcel W. Pruessner, Todd H. Stievater, William S. Rabinovich, U.S. Naval Research Lab. (USA); Jacob B. Khurgin, The Johns Hopkins Univ. (USA) [8264-30]

4:30 pm: **Broad-area laser diode with stable single-mode output**, Thomas Nappetz, Thales Avionics S.A. (France); Elise Ghibaudo, IMEP-LAHC (France); Philippe Rondeau, Jean-Pierre Schlotterbeck, Thales Avionics S.A. (France); Jean-Emmanuel Broquin, IMEP-LAHC (France) [8264-31]

4:50 pm: **Photonic nanojet-induced modes: fundamentals and applications**, Arash Darafsheh, Stephen A. Burand, Kenneth W. Allen, Thomas C. Hutchens, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA); Anatole Lupu, Maria Tchernycheva, Univ. Paris-Sud 11 (France); Vasily N. Astratov, The Univ. of North Carolina at Charlotte (USA) [8264-32]

5:10 pm: **Polarizer based on graphene**, Jin Tae Kim, Sung-Yool Choi, Electronics and Telecommunications Research Institute (Korea, Republic of) [8264-33]

5:30 pm: **Polymer waveguides with reduced in-plane bend loss for electro-optical PCBs**, Richard C. Pitwon, Callum Smith, Xyratex Technology Ltd. (United Kingdom); Kai Wang, Univ. College London (United Kingdom); Jasper Graham-Jones, Plymouth Univ. (United Kingdom); David R. Selviah, Univ. College London (United Kingdom); Markus Halter, Vario-optics AG (Switzerland) [8264-58]

Wednesday 25 January

SESSION 8

Room: 236 (Mezzanine) Wed. 8:30 to 10:10 am

Plasmonics

Session Chair: **Pierre Berini**, Univ. of Ottawa (Canada)

8:30 am: **Silicon-plasmonic router for optical interconnects: PLATON approach** (*Invited Paper*), Alain Dereux, Karim Hassan, Laurent Markey, Jean-Claude Weeber, Lab. Interdisciplinaire Carnot de Bourgogne (France); Sergey I. Bozhevolnyi, Univ. of Southern Denmark (Denmark); O. Tsilipakos, A. Piliatakis, E. Kriezis, S. Papaioannou, K. Vyrsokinos, Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece); Tolga Tekin, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Matthias Baus, AMO GmbH (Germany); D. Kalavrouziotis, G. Giannoulis, H. Avramopoulos, National Technical Univ. of Athens (Greece) [8264-35]

9:00 am: **Engineered plasmonic nanostructures for microfluidic biosensing** (*Invited Paper*), Hyungsoon Im, Nathan J. Wittenberg, Si Hoon Lee, Timothy W. Johnson, Lukas R. Jordan, Nathan C. Lindquist, Univ. of Minnesota, Twin Cities (USA); Jennifer A. Maynard, The Univ. of Texas at Austin (USA); Arthur E. Warrington, Moses Rodriguez, Mayo Clinic College of Medicine (USA); David J. Norris, ETH Zurich (Switzerland); Sang-Hyun Oh, Univ. of Minnesota, Twin Cities (USA) [8264-36]

9:30 am: **Integration of nanostructures and waveguide core for surface enhanced Raman spectroscopy: a novel excitation method**, Stuart J. Pearce, Martin D. B. Charlton, Michael E. Pollard, Swezin Oo, Ruiqi Y. Chen, Univ. of Southampton (United Kingdom) [8264-38]

9:50 am: **Compact optical microcavity structures for enhancement of absorption and transmission cross sections of subwavelength plasmonic devices**, Changjun Min, Yin Huang, Liu Yang, Georgios Veronis, Louisiana State Univ. (USA) [8264-39]

Coffee Break 10:10 to 10:50 am

SESSION 9

Room: 236 (Mezzanine) Wed. 10:50 am to 12:30 pm

Optofluidics

Session Chair: Xudong Fan, Univ. of Michigan (USA)

10:50 am: **Optofluidic SERS on inkjet-fabricated paper-based substrates** (*Invited Paper*), Ian M. White, Wei W. Yu, Univ. of Maryland, College Park (USA) [8264-41]

11:20 am: **Optofluidics: waveguides and devices** (*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) [8264-42]

11:50 am: **Vertically coupled polymer microresonators for optofluidic label-free biosensors**, Camille Delezoides, Joseph Lautru, Joseph Zyss, Isabelle Ledoux-Rak, Chi Thanh Nguyen, Ecole Normale Supérieure de Cachan (France) [8264-43]

12:10 pm: **High Q silica microbubble resonators**, Daniele Farnesi, Simone Berneschi, Massimo Brenchi, Franco Cosi, Gualtiero Nunzi Conti, Stefano Pelli, Giancarlo C. Righini, Silvia Soria, Istituto di Fisica Applicata Nello Carrara (Italy) [8264-44]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Waveguide grating couplers in low index materials, Michael Pollard, Stuart Pearce, Ruiqi Chen, Swezin Oo, Martin Charlton, Univ. of Southampton (United Kingdom) [8264-34]

Sensor for optical characteristics of liquid using gapped waveguides: theory, Kazutaka Baba, Kohei Nemoto, Sendai National College of Technology (Japan) [8264-45]

Design of multiple nano-ring based metallic nanophotonic superlens, Jong-ryul Choi, Youngjin Oh, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8264-46]

Integrated surface plasmon resonance array sensor using semiconductor optical amplifier, Geum-Yoon Oh, Chung-Ang Univ. (Korea, Republic of); Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Hong-Seung Kim, Tae-Kyeong Lee, Byeong-Hyeon Lee, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [8264-47]

Experimental measurement of photonic/plasmonic crystal dispersion applied to the investigation of surface plasmon dispersion for SERS sensing applications, M. Firdaus A. Muttalib, Martin D. B. Charlton, Swe Z. Oo, Univ. of Southampton (United Kingdom) [8264-48]

Nanowire coupled to a waveguide for the characterization of the guided light, Laurent Arnaud, Aniello Apuzzo, Rafael Salas-Montiel, Mikael Renault, Yassine Hadjar, Aurélien Bruyant, Gilles Lérondel, Sylvain Blaize, Univ. de Technologie Troyes (France) [8264-49]

Analysis of total internal reflection mirror based on horizontal slot waveguide, Tae-Kyeong Lee, Hong-Seung Kim, Geum-Yoon Oh, Byeong-Hyeon Lee, Chung-Ang Univ. (Korea, Republic of); Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [8264-50]

Visible and near infrared wavelength photonic crystal fiber splitter for multi wavelength spectral domain optical coherence tomography, Joo Beom Eom, Korea Photonics Technology Institute (Korea, Republic of); Eun Jung Min, Byeong-Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [8264-51]

Polarization-dependent phase modulators incorporating low loss birefringent polymers, Jun-Whee Kim, Su-Hyun Park, Beom-Jun Cheon, Kyung-Jo Kim, Woo-Sung Chu, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of) [8264-52]

Near infrared external cavity tunable laser based on polymer waveguide Bragg grating, Nam-Seon Son, Kyung-Jo Kim, Jun-Whee Kim, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of) [8264-53]

Evaluation of damping ratio in a glass-based guided-wave optical microphone with a diaphragm, Masashi Ohkawa, Kazuya Murata, Takashi Sato, Niigata Univ. (Japan) [8264-54]

Waveguide polarization converters incorporating UV-curable reactive mesogen, Woo-Sung Chu, Sung-Moon Kim, Jun-Whee Kim, Kyung-Jo Kim, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of) [8264-55]

Polymer waveguide integrated-optic current transducers, Min-Cheol Oh, Woo-Sung Chu, Kyung-Jo Kim, Jun-Whee Kim, Pusan National Univ. (Korea, Republic of) [8264-56]

Colorimetric resonant detection of biochemical agents in mesoporous silicon based photonic crystals, Silvia Soria, Istituto di Fisica Applicata Nello Carrara (Italy); Irina A. Kolmychek, Sergei E. Svakhovskiy, Tatyana V. Murzina, Lomonosov Moscow State Univ. (Russian Federation); Francesco Baldini, Giacomo Ghini, Ambra Giannetti, Cosimo Trono, Gualtiero Nunzi Conti, Istituto di Fisica Applicata Nello Carrara (Italy) [8264-57]

Nano sensor technology based on semiconductor nanocrystals, Thomas Otto, Jörg Martin, Fraunhofer-Institut für Elektronische Nanosysteme (Germany); Ulrike Staudinger, Emrah Demir, Petra Pötschke, Brigitte Voit, Leibniz-Institut für Polymerforschung Dresden e.V. (Germany); Thomas Gessner, Fraunhofer-Institut für Elektronische Nanosysteme (Germany) [8264-59]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

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OPTO

Optoelectronic Integrated Circuits XIV

Conference Chairs: **Louay A. Eldada**, SunEdison (USA); **Ei-Hang Lee**, Inha Univ. (Korea, Republic of)

Program Committee: **Yung-Jui Chen**, Univ. of Maryland, Baltimore County (USA); **Larry A. Coldren**, Univ. of California, Santa Barbara (USA); **Mario Dagenais**, Univ. of Maryland, College Park (USA); **P. Daniel Dapkus**, The Univ. of Southern California (USA); **Yeshiahu Fainman**, Univ. of California, San Diego (USA); **Chennupati Jagadish**, The Australian National Univ. (Australia); **Richard M. Osgood, Jr.**, Columbia Univ. (USA); **Manijeh Razeghi**, Northwestern Univ. (USA); **Giancarlo C. Righini**, Istituto di Fisica Applicata Nello Carrara (Italy); **David J. Rogers**, Nanovation (France) and Univ. of St. Andrews (France)

Wednesday 25 January

SESSION 1

Room: 307 (Esplanade) Wed. 8:00 to 10:00 am

Optical Interconnects in High Performance Computing

Joint Session with Conference 8267

Session Chair: **Louay A. Eldada**, SunEdison (USA)

8:00 am: **Optics in computers, servers, and data centers** (*Invited Paper*), Harmen J. S. Dorren, Technische Univ. Eindhoven (Netherlands) [8267-30]

8:30 am: **Chip-scale integrated optical interconnects: a key enabler for future high-performance computing** (*Invited Paper*), Michael W. Haney, Univ. of Delaware (USA) [8267-31]

9:00 am: **Requirements for optical interconnect and networking devices for low-energy communications within digital systems** (*Invited Paper*), Anthony L. Lentine, Sandia National Labs. (USA) [8265-01]

9:30 am: **Multicore fiber link demonstrating large bandwidth density for future multimode optical interconnects** (*Invited Paper*), Benjamin G. Lee, Christian Baks, Fuad E. Doany, Daniel M. Kuchta, Petar K. Pepeljugoski, Clint L. Schow, IBM Thomas J. Watson Research Ctr. (USA) [8265-02]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 307 (Esplanade) Wed. 10:30 am to 12:30 pm

Nanophotonics for Optical Interconnects

Joint Session with Conference 8267

Session Chair: **Ray T. Chen**, The Univ. of Texas at Austin (USA)

10:30 am: **Silicon photonics in computing applications** (*Invited Paper*), Michael Watts, Massachusetts Institute of Technology (USA) [8265-03]

11:00 am: **Chip-scale photonic interconnection networks for energy efficient processor-memory communications** (*Invited Paper*), Keren Bergman, Columbia Univ. (USA) [8267-32]

11:30 am: **Low-power integration of on-chip nanophotonic interconnect for high-performance opto-electrical IC** (*Invited Paper*), Duo Ding, David Z. Pan, The Univ. of Texas at Austin (USA) [8267-33]

12:00 pm: **Multiprocessor silicon photonic interconnects: a systems perspective** (*Invited Paper*), Pranay Koka, Oracle Labs. (USA) [8265-04]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 3

Room: 236 (Mezzanine) Wed. 2:00 to 3:00 pm

Silicon OEICs I

Session Chair: **Ei-Hang Lee**, Inha Univ. (Korea, Republic of)

2:00 pm: **Advanced silicon device technologies for optical interconnects** (*Invited Paper*), Lech Wosinski, Royal Institute of Technology (Sweden); Zhechao Wang, Univ. Gent (Belgium); Fei Lou, Royal Institute of Technology (Sweden); Daoxin Dai, Zhejiang Univ. (China); Sebastian Lourduoss, Lars Thylen, Royal Institute of Technology (Sweden) [8265-05]

2:30 pm: **Recent advances in manufactured silicon photonics integrated circuits** (*Invited Paper*), Dazeng Feng, B. Jonathan Luff, Mehdi Asghari, Kotura, Inc. (USA) [8265-06]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 236 (Mezzanine) Wed. 3:30 to 4:30 pm

Silicon OEICs II

Session Chair: **Ei-Hang Lee**, Inha Univ. (Korea, Republic of)

3:30 pm: **Silicon-based nonlinear photonics** (*Invited Paper*), Alexander L. Gaeta, Cornell Univ. (USA) [8265-07]

4:00 pm: **Advanced integration, processing, and interconnection technologies for high-energy conversion efficiency crystalline silicon solar cells** (*Invited Paper*), Louay A. Eldada, SunEdison (USA) [8265-08]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Micro-integrated, high power, narrow linewidth diode lasers for precision quantum optics experiments in space, Andreas Wicht, Ferdinand-Braun-Institut (Germany) and Humboldt-Univ. zu Berlin (Germany); Erdenetsetseg Luvsandamdin, Anja Kohfeldt, Ferdinand-Braun-Institut (Germany); Max Schiemangk, Humboldt-Univ. zu Berlin (Germany); Stefan Spiessberger, Alexander Sahn, Frank Bugge, Jörg Fricke, Hans Wenzel, Ferdinand-Braun-Institut (Germany); Achim Peters, Humboldt-Univ. zu Berlin (Germany) and Ferdinand-Braun-Institut, Leibniz Institut für Höchstfrequenztechnik (Germany); Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) [8265-21]

Integration of 3D plasmonic devices with silicon-on-insulator-based optical circuitry, Ruoxi Yang, Zhaolin Lu, Rochester Institute of Technology (USA) [8265-22]

Integrated Si/III-V racetrack lasers, photodetectors, and waveguide-to-fiber surface grating couplers, Antoine Descos, Badhise Ben Bakir, Nicolas Olivier, Jean-Marc Fedeli, Bernard André, CEA-LETI (France) [8265-23]

Thursday 26 January

SESSION 5

Room: 236 (Mezzanine). Thurs. 8:30 to 10:10 am

VLSI Photonics

Session Chair: El-Hang Lee, Inha Univ. (Korea, Republic of)

8:30 am: **Scaling CMOS photonics transceivers beyond 100 Gb/s** (*Invited Paper*), Attila Mekis, Sherif Abdalla, Peter M. De Dobbelaere, Dennis Foltz, Steffen Gloeckner, Steven Hovey, Steven Jackson, Yi Liang, Michael Mack, Gianlorenzo Masini, Rafaela Novais, Mark Peterson, Thierry Pinguet, Subal Sahni, Jeff Schramm, Michael Sharp, Daniel Song, Brian P. Welch, Kosei Yokoyama, Shuhuan Yu, Luxtera (USA) [8265-09]

9:00 am: **Photonic integrated system-in-package platform for Tb/s silicon-plasmonic router**, Tolga Tekin, Technische Univ. Berlin (Germany); Alpaslan Suna, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Oriol Gili de Villasante, Paul Tcheg, Technische Univ. Berlin (Germany); Bei Wang, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Sascha Lutzmann, Bouchaib Bouhhal, Technische Univ. Berlin (Germany); Nikos Pleros, Emmanouil Kriezis, Aristotle Univ. of Thessaloniki (Greece); Matthias Baus, Matthias Karl, AMO GmbH (Germany) [8265-10]

9:20 am: **Chip-scale demonstration of 3D integrated intrachip free-space optical interconnect** (*Invited Paper*), Hui Wu, Berkehan Ciftcioglu, Rebecca Berman, Jiyanhun Hu, Shang Wang, Ioannis Savidis, Manish Jain, Duncan Moore, Michael Huang, Eby Friedman, Gary Wicks, Univ. of Rochester (USA) [8265-11]

9:50 am: **Low-loss photonic wires defined by LOCAL Oxidation of Silicon (LOCOS)**, Yule Xiong, Winnie N. Ye, Carleton Univ. (Canada) [8265-12]

Coffee Break 10:10 to 10:40 am

SESSION 6

Room: 236 (Mezzanine). Thurs. 10:40 am to 12:30 pm

Nanoscale and Quantum OEICs

Session Chair: Louay A. Eldada, SunEdison (USA)

10:40 am: **Nanophotonics for datacom and telecom applications** (*Invited Paper*), Dieter D. Bimberg, Dejan Arsenijevic, Holger Schmeckebier, Christian Meuer, Gerrit Fiol, Technische Univ. Berlin (Germany); Gadi Eisenstein, Technion-Israel Institute of Technology (Israel) [8265-13]

11:10 am: **Rolled-up InAs/InGaAsP quantum dot microtube lasers**, Pablo Bianucci, Ecole Polytechnique de Montréal (Canada) and McGill Univ. (Canada); Shouvik Mukherjee, M. Hadi Tavakoli Dastjerdi, McGill Univ. (Canada); Philip J. Poole, NRC Institute for Microstructural Sciences (Canada); Zetian Mi, McGill Univ. (Canada) [8265-14]

11:30 am: **Identification of localized group-velocity dispersion of nanostructured silicon waveguide devices using white-light interferometry** (*Invited Paper*), Kyong-Hon Kim, Seung-Hwan Kim, Dongwook Kim, Seoung Hun Lee, El-Hang Lee, Inha Univ. (Korea, Republic of) [8265-15]

12:00 pm: **Plasmonic coherent perfect absorption by guided-mode resonance for active switching and integrated photonics application** (*Invited Paper*), Seok-Ho Song, Myungjin Jung, Hanyang Univ. (Korea, Republic of); Jaewoong Yoon, Robert Magnusson, The Univ. of Texas at Arlington (USA); El-Hang Lee, Inha Univ. (Korea, Republic of) [8265-16]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 7

Room: 236 (Mezzanine). Thurs. 2:00 to 3:50 pm

Trends in OEICs

Session Chair: Kyong-Hon Kim, Inha Univ. (Korea, Republic of)

2:00 pm: **Light guidance through void: silicon slot waveguides and their rigorous characterizations** (*Invited Paper*), B. M. Azizur Rahman, David Leung, Syed N. Ahsan, Ping Tang, Kenneth T. V. Grattan, The City Univ. (United Kingdom) [8265-17]

2:30 pm: **A speckle-based CMOS sensor for arbitrary surface movement detection with correlated double sampling and gain error correction**, Chao Wang, Steve Tanner, Pierre-André Farine, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8265-18]

2:50 pm: **Time-and-Frequency-Domain Modeling (TFDM) of hybrid photonic integrated circuits** (*Invited Paper*), Cristina Arellano, Igor Koltchanov, André Richter, VPIsystems GmbH (Germany); Eugene Sokolov, Sergei Mingaleev, VPI Development Ctr. (Belarus) [8265-19]

3:20 pm: **Integrated silicon photonic nanocircuits and technologies for optical communications and optical sensing** (*Invited Paper*), Sailing He, Daoxin Dai, Zhejiang Univ. (China) [8265-20]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Silicon Photonics VII

Conference Chairs: **Joel Kubby**, Univ. of California, Santa Cruz (USA); **Graham Trevor Reed**, Univ. of Surrey (United Kingdom)

Program Committee: **Laurence W. Cahill**, La Trobe Univ. (Australia); **Philippe M. Fauchet**, Univ. of Rochester (USA); **L. Cary Gunn**, Genalyte, Inc. (USA); **Siegfried Janz**, National Research Council Canada (Canada); **Andrew P. Knights**, McMaster Univ. (Canada); **Laura Maria Lechuga**, Ctr. d'Investigacions en Nanociència i Nanotecnologia (Spain); **Sebania Libertino**, Istituto per la Microelettronica e Microsistemi (Italy); **Goran Z. Mashanovich**, Univ. of Surrey (United Kingdom); **Mario J. Paniccia**, Intel Corp. (USA); **Andrew W. Poon**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Holger Schmidt**, Univ. of California, Santa Cruz (USA); **Dan-Xia Xu**, National Research Council Canada (Canada); **Zhiping Zhou**, Peking Univ. (China)

Sunday 22 January

SESSION 1

Room: 124 (Exhibit Level) Sun. 8:30 to 10:30 am

Lab-on-a-Chip I

Session Chair: **Holger Schmidt**, Univ. of California, Santa Cruz (USA)

8:30 am: **Biophotonic sensors on a silicon chip for Raman spectroscopy and optical coherence tomography** (*Invited Paper*), Markus Pollnau, Nur Ismail, B. Imran Akca, Kerstin Wörhoff, Rene M. de Ridder, Univ. Twente (Netherlands) [8266-01]

9:00 am: **Temperature-independent vertically coupled double-ring sensor**, Yule Xiong, Winnie N. Ye, Carleton Univ. (Canada) [8266-02]

9:20 am: **Investigation of parallel coupling mechanisms in silicon integrated chip sensors**, Oleg Zero, Astrid Aksnes, Norwegian Univ. of Science and Technology (Norway) [8266-03]

9:40 am: **Optonomechanical sensors based on silicon waveguides** (*Invited Paper*), Gregory P. Nordin, Ryan Anderson, Weisheng Hu, Stanley J. Ness, Timothy M. Gustafson, Ben Tsai, Joseph Oxborrow, Danny C. Richards, Adam T. Woolley, Brian Mazzeo, Brigham Young Univ. (USA) [8266-04]

10:10 am: **Manipulation, trapping, and SERS detection of nanoparticle-coated microspheres in optofluidic waveguides**, Kaelyn D. Leake, Shamik Mascharak, Philip Measor, Univ. of California, Santa Cruz (USA); Brian S. Phillips, Aaron R. Hawkins, Brigham Young Univ. (USA); Pradip Mascharak, Holger Schmidt, Univ. of California, Santa Cruz (USA) [8266-05]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: 124 (Exhibit Level) Sun. 11:00 am to 12:00 pm

Lab-on-a-Chip II

Session Chair: **Holger Schmidt**, Univ. of California, Santa Cruz (USA)

11:00 am: **Optical resonators for ultra-sensitive biosensing** (*Invited Paper*), Frank Vollmer, Max Planck Institute for the Science of Light (Germany) [8266-06]

11:30 am: **Photonic crystals: a versatile platform for optics-based biological detection** (*Invited Paper*), Brian T. Cunningham, Univ. of Illinois at Urbana-Champaign (USA) [8266-07]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: 124 (Exhibit Level) Sun. 1:30 to 3:00 pm

Materials

Session Chair: **Graham Trevor Reed**, Univ. of Surrey (United Kingdom)

1:30 pm: **Photo-induced trimming of chalcogenide-assisted silicon photonic circuits** (*Invited Paper*), Andrea I. Melloni, Stefano Grillanda, Antonio Canciamilla, Carlo Ferrari, Francesco Morichetti, Politecnico di Milano (Italy); Michael J. Strain, Marc Sorel, Univ. of Glasgow (United Kingdom); Vivek Singh, Massachusetts Institute of Technology (USA); Anu Agarwal, Lionel Kimerling, Massachusetts Institute of Technology (USA) [8266-08]

2:00 pm: **Tensile strained germanium for photonics**, Malo de Kersauson, Moustafa El Kurdi, Sylvain J. David, Xavier Checoury, Guy Fishman, Sebastien Sauvage, Institut d'Electronique Fondamentale (France); Roberto Jakomin, Ludovic Largeau, Olivia Mauguin, Gregoire Beaudoin, Ctr. National de la Recherche Scientifique (France); Razvigor Ossikovski, Gérald Ndong, Marc Chaigneau, Isabelle Sagnes, Ecole Polytechnique (France); Philippe Boucaud, Institut d'Electronique Fondamentale (France) [8266-09]

2:20 pm: **Glass-based silicon-clad optical device designs**, Robert C. Gauthier, Kristian Medir, Carleton Univ. (Canada) [8266-10]

2:40 pm: **Loss reduction of silicon slot waveguides with ALD-grown thin films**, Antti Säynätjoki, Lasse Karvonen, Aalto Univ. School of Electrical Engineering (Finland); Tapani Alasaarela, Beneq Oy (Finland); Dietmar Korn, Luca Alloatti, Karlsruhe Institut für Technologie (Germany); Ari Tervonen, Aalto Univ. School of Electrical Engineering (Finland); Robert Palmer, Christian Koos, Juerg Leuthold, Wolfgang Freude, Karlsruhe Institut für Technologie (Germany); Seppo K. Honkanen, Aalto Univ. School of Electrical Engineering (Finland) and Univ. of Eastern Finland (Finland) [8266-11]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 124 (Exhibit Level) Sun. 3:30 to 5:30 pm

Photonic Crystals and Wires

Session Chair: **Graham Trevor Reed**, Univ. of Surrey (United Kingdom)

3:30 pm: **New concepts in silicon component design using subwavelength structures** (*Invited Paper*), Inigo Molina-Fernandez, Univ. de Málaga (Spain) [8266-12]

4:00 pm: **Deterministic aperiodic nanostructures for silicon photonics** (*Invited Paper*), Luca Dal Negro, Boston Univ. (USA) [8266-13]

4:30 pm: **Selecting the polarization in silicon photonic wire components** (*Invited Paper*), Dan-Xia Xu, Andre Delage, Rubin Ma, Shurui Wang, Jean Lapointe, Jens Schmid, Pavel Cheben, Martin Vachon, Siegfried Janz, National Research Council Canada (Canada) [8266-14]

5:00 pm: **Broadband signal processing in photonic crystal waveguides** (*Invited Paper*), Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) [8266-15]

Monday 23 January

SESSION 5

Room: 124 (Exhibit Level) Mon. 8:30 to 10:30 am

Waveguides

Session Chair: **Graham Trevor Reed**, Univ. of Surrey (United Kingdom)

8:30 am: **Design and applications of silicon waveguide grating couplers** (*Invited Paper*), Xia Chen, The Chinese Univ. of Hong Kong (Hong Kong, China) and Univ. of Surrey (United Kingdom); Hon K. Tsang, The Chinese Univ. of Hong Kong (Hong Kong, China) [8266-16]

9:00 am: **Compact and efficient couplers for silicon slot waveguides**, Antti Säynätjoki, Lasse Karvonen, Aalto Univ. School of Science and Technology (Finland); Xiaoguang Tu, Tsung-Yang Liow, A*STAR Institute of Microelectronics (Singapore); Ari Tervonen, Aalto Univ. School of Science and Technology (Finland); Guo-Qiang Lo, A*STAR Institute of Microelectronics (Singapore); Seppo K. Honkanen, Aalto Univ. School of Science and Technology (Finland) and Univ. of Eastern Finland (Finland) [8266-17]

9:20 am: **Realization of all-optical discrete cosine and sine transforms using MMI structures on an SOI platform**, Trung-Thanh Le, Hanoi Univ. of Natural Resources (Viet Nam); Laurence W. Cahill, La Trobe Univ. (Australia) [8266-18]

Tuesday 24 January

9:40 am: **Parallel-coupled dual racetrack silicon microresonators for quadrature amplitude modulation**, Ryan A. Integlia, Lianghong Yin, Rutgers, The State Univ. of New Jersey (USA); Duo Ding, David Z. Pan, The Univ. of Texas at Austin (USA); Douglas M. Gill, Alcatel-Lucent Bell Labs. (USA); Weiwei Song, Wei Jiang, Rutgers, The State Univ. of New Jersey (USA) [8266-19]
 10:00 am: **Optical signal processing using silicon resonance and slow-light structures** (*Invited Paper*), Linjie Zhou, Jianping Chen, Xiaomeng Sun, Jingya Xie, Haikou Zhu, Shanghai Jiao Tong Univ. (China) [8266-20]
 Coffee Break 10:30 to 11:00 am

SESSION 6

Room: 124 (Exhibit Level) Mon. 11:00 am to 12:10 pm

Modulators and Detectors

Session Chair: **Andrew W. Poon**,

Hong Kong Univ. of Science and Technology (Hong Kong, China)

11:00 am: **High speed silicon optical modulation using the silicon-on-insulator platform** (*Invited Paper*), Frédéric Y. Gardes, David J. Thomson, Youfang Hu, Milan M. Milosevic, Rob Topley, Paul Thomas, Graham T. Reed, Univ. of Surrey (United Kingdom); Liam O'Faolain, Kapil Debnath, Thomas F. Krauss, Univ. of St. Andrews (United Kingdom); Leon J. Lever, Robert W. Kelsall, Zoran Ikonc, Univ. of Leeds (United Kingdom); Jason J. Ackert, Andrew P. Knights, McMaster Univ. (United Kingdom); Xue-Chao Liu, Maksym Myronov, Andy Dobbie, R. J. Morris, David R. Leadley, The Univ. of Warwick (United Kingdom) [8266-21]

11:30 am: **Deep-level charge state control: a novel method for optical modulation in silicon waveguides**, Andrew P. Knights, Edgar Huante-Ceron, Dylan Logan, McMaster Univ. (Canada); Paul E. Jessop, Wilfrid Laurier Univ. (Canada) [8266-22]

11:50 am: **A compact high-speed and low-cost hyperspectral imager**, Nicolaas Tack, Andy Lambrechts, Philippe Soussan, Luc Haspelslagh, Francesco Pessolano, IMEC (Belgium) [8266-23]
 Lunch Break 12:10 to 1:40 pm

SESSION 7

Room: 124 (Exhibit Level) Mon. 1:40 to 3:20 pm

Emitters and Lasers

Session Chair: **Philippe M. Fauchet**, Univ. of Rochester (USA)

1:40 pm: **Time-resolved photoluminescence and optical gain of Ga(NAsP) heterostructures pseudomorphically grown on silicon (001) substrate**, Nektarios Koukourakis, Maximilian Klimasch, Dominic A. Funke, Nils C. Gerhardt, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany); Bernardette Kunert, NAsP III/V GmbH (Germany); Sven Liebich, Martin Zimprich, Kerstin Volz, Wolfgang Stolz, Philipps-Univ. Marburg (Germany) [8266-24]

2:00 pm: **NIR spectral characteristics of avalanche electroluminescent silicon CMOS light emitters**, Alfons W. Bogalecki, INSiAVA (Pty) Ltd. (South Africa); Monuko du Plessis, Petrus J. Venter, Univ. of Pretoria (South Africa) [8266-25]

2:20 pm: **Kinetics of energy transfer in Er-doped SiO₂/nc-Si multilayers**, Halina Krzyzanowska, Yijing Fu, Karl S. Ni, Philippe M. Fauchet, Univ. of Rochester (USA) [8266-26]

2:40 pm: **Efficient infrared electroluminescence from Er-doped SiO₂/nc-Si multilayers under lateral carrier injection**, Halina Krzyzanowska, Karl S. Ni, Yijing Fu, Philippe M. Fauchet, Univ. of Rochester (USA) [8266-27]

3:00 pm: **Silicon-based three-dimensional photonic crystal with enhanced spontaneous emission**, Aniwat Tандачанурат, The Univ. of Tokyo (Japan); Norman Hauke, Thomas Zabel, Thorsten Reichert, Walter Schottky Institut (Germany); Hiroyuki Takagi, The Univ. of Tokyo (Japan); Michael Kaniber, Walter Schottky Institut (Germany); Satoshi Iwamoto, The Univ. of Tokyo (Japan); Dominique Bougeard, Univ. Regensburg (Germany); Jonathan J. Finley, Gerhard Abstreiter, Walter Schottky Institut (Germany); Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [8266-28]

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)
 8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
 8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)
 8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)
 9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

Wednesday 25 January

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

FTDT simulation method for silicon photonic elements, Abbas Olyaei, The Univ. of Mazandran (Iran, Islamic Republic of) [8266-29]

Gas absorption sensors on the basis of porous silicon, Liubomyr S. Monastyrsky, Igor B. Olenych, Olena Aksimentyeva, Bogdan S. Sokolovskii, Ivan Franko National Univ. of L'viv (Ukraine) [8266-30]

Free-carrier electro-absorption and electro-refraction modulation in group IV materials at mid-infrared wavelengths, Milos Nedeljkovic, Univ. of Surrey (United Kingdom); Richard A. Soref, Univ. of Massachusetts Boston (USA); Goran Z. Mashanovich, Univ. of Surrey (United Kingdom) [8266-31]

SOI-based trapezoidal waveguide with 45° microreflector for non-coplanar light bending, Po-Kuan Shen, Chia-Chi Chang, Chin-Ta Chen, Hsu-Liang Hsiao, Mount-Learn Wu, National Central Univ. (Taiwan); Yun-Chih Lee, Centra Photonics Inc. (Taiwan) [8266-32]

Courses of Related Interest

SC817 Silicon Photonics (Michel, Saini) Tuesday, 8:30 am to 12:30 pm
 SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Optoelectronic Interconnects XII

Conference Chairs: **Alexei L. Glebov**, OptiGrate Corp. (USA); **Ray T. Chen**, The Univ. of Texas at Austin (USA)

Program Committee: **Bill Blubaugh**, US Conec Ltd. (USA); **John E. Cunningham**, Oracle (USA); **Allen M. Earman**, Intersil Corp. (USA); **Ruth Houbertz-Krauss**, Fraunhofer-Institut für Silicatiforschung (Germany); **Jürgen Jahns**, FernUniv. in Hagen (Germany); **D. A. Livshits**, Innolume GmbH (Germany); **Edris M. Mohammed**, Intel Corp. (USA); **Bert-Jan Offrein**, IBM Zürich Research Lab. (Switzerland); **David Z. Pan**, The Univ. of Texas at Austin (USA); **Hyo-Hoon Park**, KAIST (Korea, Republic of); **Henning Schröder**, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); **Harish Subbaraman**, Omega Optics, Inc. (USA); **Peter Van Daele**, Univ. Gent (Belgium); **Michael R. Wang**, Univ. of Miami (USA); **Ian H. White**, Univ. of Cambridge (United Kingdom); **Tetsuzo Yoshimura**, Tokyo Univ. of Technology (Japan)

Monday 23 January

SESSION 1

Room: 307 (Esplanade) Mon. 8:30 to 10:10 am

Optical PCB I

Session Chair: **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:30 am: **Development of electro-optical PCBs with polymer waveguides for high-speed on-board optical interconnects** (*Invited Paper*), Marika P. R. Immonen, TTM Technologies (Finland); Jinhua Wu, Peifeng Chen, Dan Tin Ma, Jian Xiang Xu, Tarja Rapala-Virtanen, TTM Technologies, Inc. (China) . [8267-01]

9:00 am: **Injection molded optical backplane for broadcast architecture** (*Invited Paper*), Paul K. Rosenberg, Sagi Mathai, Wayne Sorin, Moray McLaren, Joseph Straznicky, Georgios Panotopoulos, Hewlett-Packard Labs. (USA); David Warren, Terrel Morris, Hewlett-Packard Co. (USA); Michael R. Tan, Hewlett-Packard Labs. (USA) [8267-02]

9:30 am: **Fabrication and characterization of single mode polysiloxane waveguides for optical interconnects**, Brandon Swatowski, David DeShazer, Jeremy Beebe, Craig Yeakle, Jon V. DeGroot, Jr., Dow Corning Corp. (USA) [8267-03]

9:50 am: **Design of a highly parallel board-level-interconnection with 320-Gbps capacity**, Ulrich Lohmann, Jürgen Jahns, FernUniv. in Hagen (Germany); Steffen Limmer, Dietmar Fey, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Hannes Bauer, MICROSENS GmbH & Co. KG (Germany) . [8267-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 307 (Esplanade) Mon. 10:40 am to 12:20 pm

Optical PCB II

Session Chair: **Ian H. White**, Univ. of Cambridge (United Kingdom)

10:40 am: **3D optical interconnects: from research to reality** (*Invited Paper*), Ruth Houbertz-Krauss, Sönke Steenhusen, Fraunhofer-Institut für Silicatiforschung (Germany); Markus B. K. Riestler, Maris TechCon Technology and R & D Consulting (Austria) [8267-05]

11:10 am: **Polymer waveguide components and interconnection architectures for board-level optical communications** (*Invited Paper*), Richard V. Penty, Nikolaos Bamiedakis, Aeffendi H. Hashim, Y. Hao, Joseph Beals IV, Ian H. White, Univ. of Cambridge (United Kingdom) [8267-06]

11:40 am: **Polymer optical waveguide based bi-directional optical bus architecture for high speed optical backplane**, Xinyuan Dou, Xiaohui Lin, The Univ. of Texas at Austin (USA); Xiaolong A. Wang, Oregon State Univ. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) [8267-07]

12:00 pm: **Characterization and analysis of graded index optical waveguides for the realization of low-power, high-density, and high-speed optical link**, Hsiang-Han Hsu, Keio Univ. (Japan) and IBM Research - Tokyo (Japan); Takaaki Ishigure, Keio Univ. (Japan); Shigeru Nakagawa, IBM Research - Tokyo (Japan) [8267-08]

Lunch Break 12:20 to 1:30 pm

SESSION 3

Room: 307 (Esplanade) Mon. 1:30 to 3:00 pm

Integrated Tx/Rx Modules

Session Chair: **Bert-Jan Offrein**, IBM Zürich Research Lab. (Switzerland)

1:30 pm: **Heterogeneous integrated photonic circuits** (*Invited Paper*), Alexander W. Fang, Gregory A. Fish, Eric Hall, Aurion, Inc. (USA) [8267-09]

2:00 pm: **A 25-Gbps high-sensitivity optical receiver with 10-Gbps photodiode using inductive input coupling for optical interconnects**, Hideki Oku, Kiyomi Narita, Takashi Shirashi, Satoshi Ide, Kazuhiro Tanaka, Fujitsu Labs., Ltd. (Japan) [8267-10]

2:20 pm: **4 channels x 10-Gbps optoelectronic transceiver based on silicon optical bench technology**, Chin-Ta Chen, Hsu-Liang Hsiao, Chia-Chi Chang, Bo-Kuan Shen, Guan-Fu Lu, National Central Univ. (Taiwan); Yun-Chih Lee, Centera Photonics Inc. (Taiwan); Shou-Fu Chang, Yo-Shen Lin, Mount-Learn Wu, National Central Univ. (Taiwan) [8267-11]

2:40 pm: **Multigigabit optical transceivers for high data rate military applications**, Brian Catanzaro, CFE Services (USA); Charlie Kuznia, Ultra Communications, Inc. (USA) [8267-12]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 307 (Esplanade) Mon. 3:30 to 5:00 pm

Si Photonics for Interconnects

Session Chair: **Hyo-Hoon Park**, KAIST (Korea, Republic of)

3:30 pm: **Si-based optical I/O for optical memory interface** (*Invited Paper*), Kyoung-Ho Ha, Dongjae Shin, Kwanghyun Lee, Hochul Ji, Junghyung Pyo, Kyungwon Na, Kwan-Sik Cho, Beomsuk Lee, Seonggu Kim, Sungdong Suh, Seokyong Hong, Hyunil Byun, In-Sung Joe, Hanmei Choi, Bongjin Kuh, Kichul Kim, Yoondong Park, Chilhee Chung, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) [8267-13]

4:00 pm: **Widely tunable photonic crystal filters for optical interconnects on Si chip**, Anna Baldycheva, Trinity College Dublin (Ireland); Vladimir A. Tolmachev, Ioffe Physico-Technical Institute (Russian Federation); Kevin Berwick, Dublin Institute of Technology (Ireland); Tatiana S. Perova, Trinity College Dublin (Ireland) [8267-14]

4:20 pm: **Silicon nanomembranes for high performance flexible photonic interconnects and devices**, Harish Subbaraman, Omega Optics, Inc. (USA); Xiaochuan Xu, Nassibe Rahimi, Amir Hosseini, Ray T. Chen, The Univ. of Texas at Austin (USA) [8267-15]

4:40 pm: **Photonic crystal cavity based cascaded modulators for WDM interconnects**, Kapil Debnath, Liam O'Faolain, Univ. of St. Andrews (United Kingdom); Frederic Gardes, Graham Reed, Univ. of Surrey (United Kingdom); Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) [8267-16]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany);
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

- 8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)
- 8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
- 8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)
- 8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)
- 9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 5

Room: 307 (Esplanade) Tues. 10:30 am to 12:10 pm

Waveguides for Opto-PCB

Session Chair: **Ruth Houbertz-Krauss**,
Fraunhofer-Institut für Silicatforschung (Germany)

- 10:30 am: **Link power budget advantage in GI-core polymer optical waveguide link for optical printed circuit boards**, Sho Yakabe, IBM Research - Tokyo (Japan) and Keio Univ. (Japan); Takaaki Ishigure, Keio Univ. (Japan); Shigeru Nakagawa, IBM Research - Tokyo (Japan) [8267-17]
- 10:50 am: **Novel optical interconnect devices applying Mask-Transfer Self-Written method**, Nobuhiko Ishizawa, Yusuke Matsuzawa, Yu Tokiwa, Kenichi Nakama, Osamu Mikami, Tokai Univ. (Japan) [8267-18]
- 11:10 am: **Coplanar optical waveguides for optical interconnects**, Jin Tae Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) [8267-19]
- 11:30 am: **Single-mode glass waveguide technology for optical interchip communication on board level**, Lars Brusberg, Marcel Neitz, Henning Schröder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany) [8267-20]
- 11:50 am: **Optical waveguide end roughness in correlation to optical coupling**, Kevin Kruse, Michigan Technological Univ. (USA); Casey Demars, Calumet Electronics Corp. (USA); Nicholas Riegel, Christopher T. Middlebrook, Michael C. Roggemann, Michigan Technological Univ. (USA) [8267-21]
- Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 6

Room: 307 (Esplanade) Tues. 1:30 to 3:10 pm

Passive Components

Session Chair: **Michael R. Wang**, Univ. of Miami (USA)

- 1:30 pm: **Next-generation high-density low-cost multimode optical interconnect** (*Invited Paper*), Mike Hughes, Darrell Childers, Joe Graham, US Conec Ltd. (USA) [8267-22]
- 2:00 pm: **Rapid prototyping of interfacing microcomponents for printed circuit board-level optical interconnects** (*Invited Paper*), Jurgen Van Erps, Vrije Univ. Brussel (Belgium) [8267-23]
- 2:30 pm: **Tailored hybrid materials for sub-100 nm two-photon lithography and micro-optical applications**, Sönke Steenhusen, Nico Tucher, Ruth Houbertz-Krauss, Fraunhofer-Institut für Silicatforschung (Germany) . . [8267-24]
- 2:50 pm: **Soft lithography fabricated polymer waveguides and 45° inclined mirrors for card-to-backplane optical interconnects**, Guomin Jiang, Sarfaraz Baig, Michael R. Wang, Univ. of Miami (USA) [8267-25]
- Coffee Break 3:10 to 3:40 pm

SESSION 7

Room: 307 (Esplanade) Tues. 3:40 to 5:20 pm

Packaging and Integration

Session Chair: **Jürgen Jahns**, FernUniv. in Hagen (Germany)

- 3:40 pm: **Aspects of short-range interconnect packaging** (*Invited Paper*), Denis Wohlfeld, Karl-Heinz Brenner, Ruprecht-Karls-Univ. Heidelberg (Germany) [8267-26]
- 4:10 pm: **Novel coupling and packaging approaches for optical interconnects** (*Invited Paper*), Bram Van Hoe, Erwin Bosman, Jeroen Missinne, Sandeep Kalathimekkad, Geert Van Steenberge, Peter Van Daele, Univ. Gent (Belgium) [8267-27]
- 4:40 pm: **Chip-to-chip interconnects based on 3D stacking of opto-electrical dies on Si**, Pinxiang Duan, Oded Raz, Barry Smalbrugge, Harmen Dorren, Technische Univ. Eindhoven (Netherlands) [8267-28]
- 5:00 pm: **Proposal and FDTD simulation of reflective self-organizing lightwave network (R-SOLNET) using phosphor**, Masatoshi Seki, Tetsuzo Yoshimura, Tokyo Univ. of Technology (Japan) [8267-29]

Wednesday 25 January

SESSION 8

Room: 307 (Esplanade) Wed. 8:00 to 10:00 am

Optical Interconnects in High Performance Computing

Joint Session with Conference 8265

Session Chair: **Louay A. Eldada**, SunEdison (USA)

- 8:00 am: **Optics in computers, servers, and data centers** (*Invited Paper*), Harmen J. S. Dorren, Technische Univ. Eindhoven (Netherlands) [8267-30]
- 8:30 am: **Chip-scale integrated optical interconnects: a key enabler for future high-performance computing** (*Invited Paper*), Michael W. Haney, Univ. of Delaware (USA) [8267-31]
- 9:00 am: **Requirements for optical interconnect and networking devices for low-energy communications within digital systems** (*Invited Paper*), Anthony L. Lentine, Sandia National Labs. (USA) [8265-01]
- 9:30 am: **Multicore fiber link demonstrating large bandwidth density for future multimode optical interconnects** (*Invited Paper*), Benjamin G. Lee, Christian Baks, Fuad E. Doany, Daniel M. Kuchta, Petar K. Pepeljuginoski, Clint L. Schow, IBM Thomas J. Watson Research Ctr. (USA) [8265-02]
- Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 307 (Esplanade) Wed. 10:30 am to 12:30 pm

Nanophotonics for Optical Interconnects

Joint Session with Conference 8265

Session Chair: **Ray T. Chen**, The Univ. of Texas at Austin (USA)

- 10:30 am: **Silicon photonics in computing applications** (*Invited Paper*), Michael Watts, Massachusetts Institute of Technology (USA) [8265-03]
- 11:00 am: **Chip-scale photonic interconnection networks for energy efficient processor-memory communications** (*Invited Paper*), Keren Bergman, Columbia Univ. (USA) [8267-32]
- 11:30 am: **Low-power integration of on-chip nanophotonic interconnect for high-performance opto-electrical IC** (*Invited Paper*), Duo Ding, David Z. Pan, The Univ. of Texas at Austin (USA) [8267-33]
- 12:00 pm: **Multiprocessor silicon photonic interconnects: a systems perspective** (*Invited Paper*), Pranay Koka, Oracle Labs. (USA) [8265-04]
- Lunch/Exhibition Break 12:30 to 1:40 pm

OPTO

Conference 8267 · Room: 307 (Esplanade)

SESSION 10

Room: 307 (Esplanade) Wed. 1:40 to 3:20 pm

Components

Session Chair: Henning Schröder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany)

1:40 pm: **Nanophotonics for information systems** (*Invited Paper*), Yeshaiahu Fainman, Univ. of California, San Diego (USA) [8267-34]

2:10 pm: **Energy-efficient high-speed 850 nm VCSELs for optical interconnects** (*Invited Paper*), James A. Lott, Nikolay N. Ledentsov, VI Systems GmbH (Germany). [8267-35]

2:40 pm: **Design and experimental study on the grating outcouplers providing the controlled 2D-intensity profile of the output beam from a broad area laser diode**, Oleg V. Smolski, Viktor O. Smolski, Eric C. Browy, Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA); Zane A. Shellenbarger, SRI International Sarnoff (USA) [8267-36]

3:00 pm: **Novel VCSEL driving technique with virtual back termination for high-speed optical interconnection**, Mariko Sugawara, Yukito Tsunoda, Hideki Oku, Satoshi Ide, Kazuhiro Tanaka, Fujitsu Labs., Ltd. (Japan) . [8267-37]

Coffee Break 3:20 to 3:50 pm

SESSION 11

Room: 307 (Esplanade) Wed. 3:50 to 5:30 pm

Optical Links

Session Chair: Peter Van Daele, Univ. Gent (Belgium)

3:50 pm: **Application of MIMO technology for next-generation optical and millimeter-wave interconnects** (*Invited Paper*), Gee-Kung Chang, Georgia Institute of Technology (USA) [8267-38]

4:20 pm: **Device design for multiple-input multiple-output (MIMO) over multimode optical fiber** (*Invited Paper*), Seth R. Bank, Sriram Vishwanath, K. Appaiah, S. Zisman, The Univ. of Texas at Austin (USA) [8267-39]

4:50 pm: **A high-speed 0.35µm CMOS optical communication link**, Marius E. Goosen, INSiAVA (Pty) Ltd. (South Africa) and Univ. of Pretoria (South Africa); Antonie C. Alberts, Pieter Rademeyer, Alfons W. Bogalecki, INSiAVA (Pty) Ltd. (South Africa); Monuko du Plessis, Petrus J. Venter, Univ. of Pretoria (South Africa) [8267-40]

5:10 pm: **Increasing bandwidth through increased coupling efficiency: 0.75 - 0.85 micron Si Av LEDs into optical fibres**, Lukas W. Snyman, Dieter Schmieder, Tshwane Univ. of Technology (South Africa). [8267-41]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Design and fabrication of a compact 1-by-4 multimode interference power splitter, Li Ma, Hongliang Zhu, Institute of Semiconductors (China); Minghua Chen, Tsinghua Univ. (China) [8267-42]

Transmitting part of optical interconnect module with three-dimensional optical path, Chia-Chi Chang, Po-Kuan Shen, Chin-Ta Chen, Hsu-Liang Hsiao, National Central Univ. (Taiwan); Yun-Chih Lee, Centera Photonics Inc. (Taiwan); Yen Chung Chang, Mount-Learn Wu, National Central Univ. (Taiwan). . [8267-43]

Improved performance of traveling wave directional coupler modulator based on electro-optic polymer, Xingyu Zhang, Beom-Suk Lee, Che-Yun Lin, The Univ. of Texas at Austin (USA); Alan Wang, Omega Optics, Inc. (USA); Amir Hosseini, Xiaohui Lin, Ray T. Chen, The Univ. of Texas at Austin (USA) [8267-44]

80µm-core graded-index multimode fiber for consumer electronic devices, Denis Molin, Marianne Bigot-Astruc, Pierre Sillard, Prysmian/Draka (France) [8267-46]

Mode coupling due to isotropic random heterogeneities in graded-index plastic optical fibers, Azusa Inoue, Kenji Makino, Atsushi Kondo, Keio Univ. (Japan); Takafumi Sassa, RIKEN (Japan); Yasuhiro Koike, Keio Univ. (Japan) [8267-47]

Inverted-tapered mode-size converter for coupling of optical fiber with Si-photonics chip, Do-Won Kim, Gyungok Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) [8267-48]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Quantum Sensing and Nanophotonic Devices IX

Conference Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

Conference Co-Chairs: **Eric Tournie**, Univ. Montpellier 2 (France); **Gail J. Brown**, Air Force Research Lab. (USA)

Program Committee: **Jong Hyeob Baek**, Korea Photonics Technology Institute (Korea, Republic of); **Jean-Francois Baumard**, Agence Nationale de la Recherche (France); **Vincent Berger**, Univ. Paris 7-Denis Diderot (France); **David A. Cardimona**, Air Force Research Lab. (USA); **Raffaele Colombelli**, Univ. Paris-Sud 11 (France); **Henry O. Everitt**, Duke Univ. (USA) and U.S. Army Research, Development and Engineering Command (USA); **John E. Hubbs**, Ball Aerospace & Technologies Corp. (USA); **Jean-Pierre Huignard**, Consultant (France); **Christine A. Jhabvala**, NASA Goddard Space Flight Ctr. (USA); **Woo-Gwang Jung**, Kookmin Univ. (Korea, Republic of); **Tsukuru Katsuyama**, Sumitomo Electric Industries, Ltd. (Japan); **Shigeyuki Kuboya**, The Univ. of Tokyo (Japan); **Armin Lambrecht**, Fraunhofer-Institut für Physikalische Messtechnik (Germany); **Tariq Manzur**, Naval Undersea Warfare Ctr. (USA); **Jerry R. Meyer**, U.S. Naval Research Lab. (USA); **Vaidya Nathan**, Air Force Research Lab. (USA); **Joseph G. Pellegrino**, U.S. Army Night Vision & Electronic Sensors Directorate (USA); **Nicolas Péré-Laperne**, Ctr. National de la Recherche Scientifique (France); **Ramesh K. Shori**, Naval Air Warfare Ctr. Weapons Div. (USA); **Donald J. Silversmith**, Defense Threat Reduction Agency (USA); **Marija Strojnik**, Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Rengarajan Sudharsanan**, Spectrolab, Inc. (USA); **Ferechteh Hosseini Teherani**, Nanovation (France); **Meimei Z. Tidrow**, U.S. Army Night Vision & Electronic Sensors Directorate (USA); **Miriam S. Vitiello**, Consiglio Nazionale delle Ricerche (Italy); **Nakita Vodjdani**, Agence Nationale de la Recherche (France); **Sheng Wu**, California Institute of Technology (USA); **Franco Zappa**, Politecnico di Milano (Italy); **John M. Zavada**, National Science Foundation (USA)

Sunday 22 January

Introduction and Opening Remarks

Room: 114 (Exhibit Level) Sun. 8:00 to 8:10 am

Manijeh Razeghi, Northwestern Univ. (USA)

Keynote Session

Room: 114 (Exhibit Level) Sun. 8:10 to 8:40 am

Session Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

8:10 am: **High power infrared QCLs: advances and applications (Keynote Presentation)**, C. Kumar N. Patel, Pranalytica, Inc. (USA) [8268-01]

SESSION 1

Room: 114 (Exhibit Level) Sun. 8:40 to 10:00 am

Plasmonics/Metamaterials I

Session Chairs: **Jean-Michel Gérard**, Commissariat à l'Énergie Atomique (France); **Joseph G. Pellegrino**, U.S. Army Night Vision & Electronic Sensors Directorate (USA)

8:40 am: **Mid-infrared field concentration of electrically-generated surface plasmons polaritons (Invited Paper)**, Adel Bousseksou, Jean-Phillipe Tétienne, Raffaele Colombelli, Univ. Paris-Sud 11 (France); Arthur Babuty, Yannick De Wilde, L'Institut Langevin (Algeria); Grégoire Beaudoin, Isabelle Sagnes, Ctr. National de la Recherche Scientifique (France) [8268-02]

9:00 am: **Analytic calculation for scattering of electromagnetic waves by linear slot array (Invited Paper)**, Danhong Huang, David Wellems, Air Force Research Lab. (USA) [8268-03]

9:20 am: **Binary nanoparticle dispersed metamaterial implementation and characterization (Invited Paper)**, Partha P. Banerjee, Rola Aylo, George T. Nehmetallah, Han Li, Andrew M. Sarangan, Peter E. Powers, Univ. of Dayton (USA) [8268-04]

9:40 am: **Localized surface plasmon resonant photosensors for nano-spectroscopy (Invited Paper)**, Zuki Tanaka, Univ. of California, Santa Cruz (USA) [8268-05]

Coffee Break 10:00 to 10:20 am

SESSION 2

Room: 114 (Exhibit Level) Sun. 10:20 am to 12:00 pm

Plasmonics/Metamaterials II

Session Chairs: **Emmanuel Rosencher**, ONERA (France); **Vincenzo Spagnolo**, Politecnico di Bari (Italy)

10:20 am: **Spectral filtering with subwavelength gratings: overview and latest advances (Invited Paper)**, Grégory Vincent, ONERA (France); Emilie Sakat, ONERA (France) and Lab. de Photonique et de Nanostructures, CNRS (France); Petru Ghenuche, Stéphane Collin, Nathalie Bardou, Lab. de Photonique et de Nanostructures, CNRS (France); Sylvain Rommelouère, Jérôme Primot, Joel R. Deschamps, ONERA (France); Fabrice Pardo, Jean-Luc Pelouard, Lab. de Photonique et de Nanostructures, CNRS (France); Riad

Haïdar, ONERA (France) [8268-06]

10:40 am: **Plasmonic nanocavities for photovoltaics devices and biosensing (Invited Paper)**, Stéphane S. Collin, Andrea Cattoni, Clément Colin, Inès Massiot, Petru V. Ghenuche, Nathalie Bardou, Dominique Decanini, Anne-Marie Haghiri-Gosnet, Jean-Luc Pelouard, Ctr. National de la Recherche Scientifique (France) [8268-07]

11:00 am: **enhanced infrared detection using plasmonic mode-converters (Invited Paper)**, Hooman Mohseni, Northwestern Univ. (USA) [8268-08]

11:20 am: **Semiconductor nanostructures towards optoelectronic device applications (Invited Paper)**, Jae Su Yu, Kyung Hee Univ. (Korea, Republic of); Jung Woo Leem, Kyung Hee Univ (Korea, Republic of); Yeong Hwan Ko, Hee Kwan Lee, Kyung Hee Univ. (Korea, Republic of) [8268-09]

11:40 am: **Metamaterials and nanophotonic devices for energy and sensing (Invited Paper)**, Koray Aydin, Northwestern Univ. (USA) [8268-10]

Lunch Break 12:00 to 1:20 pm

SESSION 3

Room: 114 (Exhibit Level) Sun. 1:20 to 2:40 pm

New Spectroscopy Approaches

Session Chairs: **Armin Lambrecht**, Fraunhofer-Institut für Physikalische Messtechnik (Germany); **Ryan P. McClinton**, Northwestern Univ. (USA)

1:20 pm: **Photonic crystal nanophotonic open sensor platform for highly sensitive highly specific high-throughput chip-integrated sensing and spectroscopy (Invited Paper)**, Ray T. Chen, The Univ. of Texas at Austin (USA); Swapnajt Chakravarty, Omega Optics, Inc. (USA); Wei-Cheng Lai, The Univ. of Texas at Austin (USA); Xiaolong A. Wang, Omega Optics, Inc. (USA); Cheyun Lin, The Univ. of Texas at Austin (USA) [8268-11]

1:40 pm: **Quantum cascade laser enabled nano-liter polymer waveguide sensor**, Sheng Wu, Andrei Deev, California Institute of Technology (USA) [8268-12]

1:55 pm: **Long wave infrared on-chip absorption spectroscopy with photonic crystal slot waveguides**, Yi Zou, The Univ. of Texas at Austin (USA); Swapnajt Chakravarty, Omega Optics, Inc. (USA); Wei-Cheng Lai, Ray T. Chen, The Univ. of Texas at Austin (USA) [8268-13]

2:10 pm: **Sensitive detection of nitric oxide using a 5.26 μm external cavity quantum cascade laser based QEPAS sensor**, Frank K. Tittel, Lei Dong, Rafal Lewicki, Adjani Peralta, George Lee, Rice Univ. (USA); Vincenzo Spagnolo, Politecnico di Bari (Italy) [8268-14]

2:25 pm: **Spectral selective absorption enhancement from stacked ultra-thin InGaAs/Si Fano resonance membranes**, Arvinder Chadha, Wei-quan Yang, Tapas K. Saha, Santhad Chuwongin, Yichen Shuai, Weidong Zhou, The Univ. of Texas at Arlington (USA); Zhenqiang Ma, Univ. of Wisconsin-Madison (USA); Gail J. Brown, Air Force Research Lab. (USA) [8268-15]

SESSION 4

Room: 114 (Exhibit Level) Sun. 2:40 to 3:35 pm

New IR Materials

Session Chairs: **Hiroshi Inada**, Sumitomo Electric Industries, Ltd. (Japan); **David J. Smith**, Arizona State Univ. (USA)

2:40 pm: **III-V-N alloys grown by MOVPE in H₂ and N₂ mixed carrier gases** (*Invited Paper*), Shigeyuki Kuboya, Q. T. Thieu, The Univ. of Tokyo (Japan); Sanorpim Sakuntam, Chulalongkorn Univ. (Thailand); Ryuji Katayama, Tohoku Univ. (Japan); Kentaro Onabe, The Univ. of Tokyo (Japan) [8268-17]

3:00 pm: **MBE growth of Sb-based type-2 quantum dots for the application to long wavelength sensors** (*Invited Paper*), Jin Dong Song, E. H. Lee, Sang Hyuck Kim, M. H. Bae, I. K. Han, Jung Il Lee, Korea Institute of Science and Technology (Korea, Republic of); Qin Wang, A. Karim, Jan Y. Andersson, Acreo AB (Sweden) [8268-18]

3:20 pm: **Study of the valence band offsets between InAs and InAs_{1-x}Sb_x alloys**, Elizabeth H. Steenbergen, Oray O. Celtek, Yong-Hang Zhang, Arizona State Univ. (USA); Dmitri Lubyshev, Yueming Qiu, Joel M. Fastenau, Amy W. Liu, IQE Inc. (USA) [8268-19]

Coffee Break 3:35 to 3:50 pm

SESSION 5

Room: 114 (Exhibit Level) Sun. 3:50 to 5:05 pm

Quantum Cascade Lasers

Session Chairs: **Rui Q. Yang**, The Univ. of Oklahoma (USA); **Jean-Pierre Huignard**, Consultant (France)

3:50 pm: **Nonlinear GaInAs/AlInAs/InP quantum cascade laser sources for wavelength generation in the 2.7-70µm wavelength range** (*Invited Paper*), Augustinas Vizbaras, Walter Schottky Institut (Germany); Robert W. Adams, The Univ. of Texas at Austin (USA); Christian Grasse, Walter Schottky Institut (Germany); Min Jang, The Univ. of Texas at Austin (USA); Ralf Meyer, Walter Schottky Institut (Germany); Mikhail A. Belkin, The Univ. of Texas at Austin (USA); Markus-Christian Amann, Walter Schottky Institut (Germany) . . . [8268-20]

4:10 pm: **Linewidth broadening caused by intrinsic temperature fluctuations in quantum cascade lasers** (*Invited Paper*), Qijie Wang, Tao Liu, Nanyang Technological Univ. (Singapore) [8268-21]

4:30 pm: **Substrate emission quantum cascade ring lasers with room temperature continuous wave operation** (*Invited Paper*), Yanbo Bai, Quanyong Lu, Neelanjan Bandyopadhyay, Stanley Tsao, Steven Slivken, Manijeh Razeghi, Northwestern Univ. (USA) [8268-22]

4:45 pm: **Active layer design and power calculation of nitride-based THz quantum cascade lasers** (*Invited Paper*), A. F. Mehdi Anwar, Hung Chi Chou, Univ. of Connecticut (USA); Tariq Manzur, Naval Undersea Warfare Ctr. (USA) [8268-23]

SESSION 6

Room: 114 (Exhibit Level) Sun. 5:05 to 6:25 pm

Nanowires Applications

Session Chairs: **Stéphane S. Collin**, Ctr. National de la Recherche Scientifique (France);

Miriam Serena Vitiello, Consiglio Nazionale delle Ricerche (Italy)

5:05 pm: **GaN-based nanowire photodetectors** (*Invited Paper*), Eva Monroy, Commissariat à l'Énergie Atomique (France); Fernando Gonzalez-Posada, Commissariat à l'Énergie Atomique (France); Martien Den Hertog, Rudeesun Songmuang, Institut NEEL (France) [8268-24]

5:25 pm: **III-V nanowires by self-assembly MOVPE technology for novel and efficient opto-electronic and photovoltaic devices** (*Invited Paper*), Nico Lovergine, Univ. del Salento (Italy); Paola Prete, Istituto per la Microelettronica e Microsistemi (Italy) [8268-25]

5:45 pm: **III-V nanowires in photonic crystal microcavities: toward vertical emitting nanolasers** (*Invited Paper*), Alexandre Larrue, Christophe Wilhelm, Gwenaelle Vest, Nanyang Technological Univ. (Singapore); Sylvain Combrie, Alfredo De Rossi, Thales Research & Technology (France); Cesare Soci, Nanyang Technological Univ. (Singapore) [8268-26]

6:05 pm: **Photovoltaic devices based on quantum dot functionalized nanowire arrays embedded in an organic matrix** (*Invited Paper*), Patrick Kung, Nicholas A. Harris, Gang Shen, David Wilbert, William Baughman, Soner Balci, Nabil F. Dawahre, Lee A. Butler, Elmer Rivera, David E. Nikles, Seongsin M. Kim, The Univ. of Alabama (USA) [8268-27]

Monday 23 January

SESSION 7

Room: 114 (Exhibit Level) Mon. 8:00 to 10:40 am

Type II Superlattices

Session Chairs: **Gail J. Brown**, Air Force Research Lab. (USA); **Philippe F. Bois**, Thales Research & Technology (France)

8:00 am: **Optimization of InAs/GaSb superlattice pin photodiode design for the high temperature operation in the midwave infrared range** (*Invited Paper*), Philippe Christol, Rachid Taalat, Charlotte Maingue-Wilson, Cyril Cervera, Hocine Ait-Kaci, Jean-Baptiste Rodriguez, Univ. Montpellier 2 (France); Isabelle Ribet-Mohamed, ONERA (France) [8268-28]

8:20 am: **High operating temperature X_{Bn}-InAsSb barodiode detectors** (*Invited Paper*), Philip Klipstein, Olga Klin, Steven Grossman, Noam Snapi, Inna Lukomsky, Michael Yassen, Daniel Aronov, Eyal Berkowitz, Alex Glozman, Osnat Magen, Itay Shtrichman, Rami Frenkel, Eliezer Weiss, SCD Semiconductor Devices (Israel) [8268-29]

8:40 am: **Thermal distribution in high power optical devices with power-law thermal conductivity**, Matthew Grayson, Chuanle Zhou, Northwestern Univ. (USA) [8268-30]

8:55 am: **Barrier engineering in quantum dots in a well detector** (*Invited Paper*), Sanjay Krishna, Ctr. for High Technology Materials (USA) [8268-31]

9:15 am: **Low frequency noise in 1024x1024 long wavelength infrared focal plane array based on type-II InAs/GaSb superlattice**, Abbas Haddadi, Shaban R. Darvish, Guanxi A. Chen, Anh Minh Hoang, Binh Minh Nguyen, Manijeh Razeghi, Northwestern Univ. (USA) [8268-32]

9:30 am: **High-performance LWIR superlattice detectors and FPA based on CBIIRD design**, Alexander Soibel, Jean Nguyen, Sir Don B. Rafol, Anna Liao, Linda Hoeglund, Arezou Khoshakhlagh, Sam A. Keo, Jason M. Mumolo, John K. Liu, David Z. Ting, Sarath D. Gunapala, Jet Propulsion Lab. (USA) . . . [8268-33]

9:45 am: **World's first demonstration of type-II superlattice dual band 640 x 512 LWIR focal plane array** (*Invited Paper*), Edward K. W. Huang, Manijeh Razeghi, Northwestern Univ. (USA) [8268-34]

10:05 am: **Free-space optical communication using mid-infrared or solar-blind ultraviolet sources and detectors** (*Invited Paper*), Ryan P. McClintock, Abbas Haddadi, Manijeh Razeghi, Northwestern Univ. (USA) [8268-35]

10:25 am: **Suppression of surface leakage in gate controlled type-II InAs/GaSb mid-infrared photodetectors**, Guanxi A. Chen, Binh-Minh Nguyen, Anh Minh Hoang, Edward K. W. Huang, Shaban R. Darvish, Manijeh Razeghi, Northwestern Univ. (USA) [8268-36]

Coffee Break 10:40 to 11:00 am

SESSION 8

Room: 114 (Exhibit Level) Mon. 11:00 am to 12:40 pm

GaN Fundamentals

Session Chairs: **Paul Voisin**, Ctr. National de la Recherche Scientifique (France); **Shigeyuki Kuboya**, The Univ. of Tokyo (Japan)

11:00 am: **Physical properties of heteroepitaxial and homoepitaxial wurtzitic heterostructures grown along arbitrary orientation: III-nitrides and II-oxides** (*Invited Paper*), Bernard Gil, Univ. Montpellier 2 (France); Pierre Bigenwald, Univ. Blaise Pascal (France); Alexey V. Kavokine, Thierry Bretagnon, Thierry Guillet, Christelle Brimont, Univ. Montpellier 2 (France) [8268-37]

11:20 am: **Magneto-optical spectroscopy of MOVPE grown narrow gap III-Mn-V ferromagnetic semiconductors** (*Invited Paper*), Giti A. Khodaparast, Mithun Bhowmick, Travis Merritt, Virginia Polytechnic Institute and State Univ. (USA); Caitlin Feeser, Bruce W. Wessels, Northwestern Univ. (USA); Stephen A. McGill, National High Magnetic Field Lab. (USA); Dipta Saha, Xinguan Pan, Gary D. Sanders, Christopher J. Stanton, Univ. of Florida (USA) [8268-38]

11:40 am: **Optical properties of the periodic polarity-inverted GaN waveguides** (*Invited Paper*), Ryuji Katayama, Tohoku Univ. (Japan) and Japan Science and Technology Agency (Japan); Yujiro Fukuhara, Masahiro Kakuda, Shigeyuki Kuboya, Kentaro Onabe, The Univ. of Tokyo (Japan); Syusai Kurokawa, Naoto Fujii, Takashi Matsuoka, Tohoku Univ. (Japan) [8268-39]

12:00 pm: **Growth and applications of ammonothermal bulk GaN substrates** (*Invited Paper*), Robert Dwilinski, Roman Doradzinski, Robert Kucharski, Marcin Zajac, Ammono Sp. z o.o. (Poland) [8268-40]

12:20 pm: **Lasing in GaN microcavities** (*Invited Paper*), Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8268-41]

Lunch Break 12:40 to 1:40 pm

SESSION 9

Room: 114 (Exhibit Level) Mon. 1:40 to 3:00 pm

Large Area GaSb Wafers and Epitaxy

Session Chairs: **Eric Tournie**, Univ. Montpellier 2 (France);
Jerry R. Meyer, U.S. Naval Research Lab. (USA)

1:40 pm: **Manufacturing of 100mm diameter GaSb substrates for advanced space based applications** (*Invited Paper*), Lisa P. Allen, J. Patrick Flint, Gregory Meshew, John Trevethan, Gordon Dallas, Galaxy Compound Semiconductors, Inc. (USA); Arezou Khoshakhlagh, Cory J. Hill, Jet Propulsion Lab. (USA) [8268-42]

2:00 pm: **Multifuwafer production of epitaxy ready 4" GaSb substrates: requirements for epitaxially growth infrared detectors** (*Invited Paper*), Mark J. Furlong, Rebecca J. Martinez, Sasson Amirhaghi, Andrew Mowbray, Brian Smith, Wafer Technology Ltd. (United Kingdom) [8268-43]

2:20 pm: **Surface chemistry improvement of 100mm GaSb for advanced space based applications** (*Invited Paper*), Lisa P. Allen, J. Patrick Flint, Gregory Meshew, John Trevethan, Galaxy Compound Semiconductors, Inc. (USA); Mark J. Furlong, Rebecca J. Martinez, Andrew Mowbray, Wafer Technology Ltd. (United Kingdom) [8268-44]

2:40 pm: **Manufacturable MBE growth process for Sb-based photodetector materials on large diameter substrates** (*Invited Paper*), Dmitri Lubyshev, Yueming Qiu, IQE Inc. (USA); Joel M. Fastenau, IQE, Inc. (USA); Amy W. Liu, IQE Inc. (USA); Edwin J. Koerperick, Jonathon T. Olesberg, Dennis T. Norton, Jr., ASL Analytical, Inc. (USA) [8268-45]

SESSION 10

Room: 114 (Exhibit Level) Mon. 3:00 to 3:50 pm

Avalanche Photodiodes

Session Chairs: **Christine A. Jhabvala**, NASA Goddard Space Flight Ctr. (USA); **Vincent Berger**, Univ. Paris 7-Denis Diderot (France)

3:00 pm: **Arrays of Geiger-mode avalanche photodiodes** (*Invited Paper*), Erik K. Duerr, MIT Lincoln Lab. (USA) [8268-46]

3:20 pm: **Indirect Time-of-Flight 3D ranging based on SPADs**, Simone Bellisai, Federica A. Villa, Danilo Bronzi, Simone Tisa, Franco Zappa, Politecnico di Milano (Italy) [8268-47]

3:35 pm: **Planar technologies for SPAD arrays with improved performances**, Angelo Gulinnati, Francesco Panzeri, Ivan Rech, Politecnico di Milano (Italy); Piera Maccagnani, Istituto per la Microelettronica e Microsistemi (Italy); Massimo Ghioni, Sergio Cova, Politecnico di Milano (Italy) and Micro Photon Devices s.r.l. (Italy) [8268-48]

Coffee Break 3:50 to 4:10 pm

SESSION 11

Room: 114 (Exhibit Level) Mon. 4:10 to 5:45 pm

Interband IR Lasers

Session Chairs: **Lisa P. Allen**,
 Galaxy Compound Semiconductors, Inc. (USA); **Jin Dong Song**,
 Korea Institute of Science and Technology (Korea, Republic of)

4:10 pm: **Quantum well lasers emitting between 3.0 and 3.4 μm for gas spectroscopy** (*Invited Paper*), Yves Rouillard, Sofiane Belahsene, Mohammed Jahjah, Guilhem Boissier, Pierre Grech, Grégoire Narcy, Aurore Vicet, Univ. Montpellier 2 (France); Lars Naehle, Michael von Edlinger, Marc O. Fischer, Johannes Koeth, nanoplus GmbH (Germany) [8268-49]

4:30 pm: **Physics of interband cascade lasers** (*Invited Paper*), Igor Vurgaftman, William W. Bewley, Charles D. Merritt, Chadwick L. Canedy, Chul Soo Kim, Joshua Abell, Mijin Kim, Jerry R. Meyer, U.S. Naval Research Lab. (USA) [8268-50]

4:50 pm: **Silicon emission in and out resonant coupling with high Q optical mode** (*Invited Paper*), Jimmy Xu, Lyuba Kuznetsova, Gustavo Fernandes, Brown Univ. (USA) [8268-51]

5:10 pm: **Coherent integration of photonics on silicon through the growth of nanostructures on GaP/Si**, Tra Nguyen Thanh, Cédric Robert, Charles Cornet, W. Guo, Antoine Letoublon, Mathieu Perrin, Nicolas Bertru, Jacky Even, Nicolas Chevalier, Herve Folliot, S. Loualiche, Univ. Européenne de Bretagne (France); Anne Ponchet, Georges Elias, CNRS, CEMES, UPR (France); J. S. Micha, CNRS-CEA-UJF, INAC (France); Olivier Durand, Alain Le Corre, Univ. Européenne de Bretagne (France) [8268-52]

5:25 pm: **GaSb-based laser monolithically grown on Si substrate by molecular beam epitaxy** (*Invited Paper*), Jean-Baptiste Rodriguez, Laurent Cerutti, Jean-Remy Reboul, Eric Tournié, Univ. Montpellier 2 (France) . [8268-53]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany);
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 12

Room: 114 (Exhibit Level) Tues. 10:30 to 11:45 am

Quantum Optics I

Session Chairs: **Qijie Wang**, Nanyang Technological Univ. (Singapore);
Jimmy Xu, Brown Univ. (USA)

10:30 am: **Quantum optics with quantum dots in photonic nanowires** (*Invited Paper*), Julien Claudon, Mathieu Munsch, Joel Bleuse, Commissariat à l'Énergie Atomique (France); Philippe Lalanne, Lab. Charles Fabry (France); Niels Gregersen, Technical Univ. of Denmark (Denmark); Jean-Michel Gérard, Commissariat à l'Énergie Atomique (France) [8268-54]

10:50 am: **Quantum sensing in integrated photonic devices** (*Invited Paper*), Jonathan C. F. Matthews, Alberto Politi, Damien Bonneau, Jeremy L. O'Brien, Univ. of Bristol (United Kingdom) [8268-55]

11:10 am: **Cavity solitons and nonlinear dynamical regimes in semiconductor microcavities** (*Invited Paper*), Robert Kuszelewicz, Sylvain Barbay, Tiffany Elsass, Ctr. National de la Recherche Scientifique (France) [8268-56]

11:30 am: **Anomalous evolution of quantum systems in the ultrastrong coupling regime**, Abbas Arab, Univ. of Dayton (USA); Sina Khorasani, Georgia Institute of Technology (USA) [8268-57]

Lunch/Exhibition Break 11:45 am to 1:00 pm

SESSION 13

Room: 114 (Exhibit Level) Tues. 1:00 to 2:35 pm

Spectroscopy and Security Applications

Session Chairs: **Alexander Soibel**, Jet Propulsion Lab. (USA);
Gerard Wysocki, Princeton Univ. (USA)

1:00 pm: **Standoff detection of explosives with broad band tunable external cavity quantum cascade lasers** (*Invited Paper*), Frank Fuchs, Stefan Hugger, Michel Kinzer, Quankui K. Yang, Wolfgang Bronner, Rolf Aidam, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Kai A. Degreif, Sven Rademacher, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Frank H. Schnürer, Wenka Schweikert, Fraunhofer-Institut für Chemische Technologie (Germany) [8268-58]

1:20 pm: **Angle-resolved scattering spectroscopy of explosives using an external cavity quantum cascade laser** (*Invited Paper*), Jonathan D. Suter, Mark C. Phillips, Bruce E. Bernacki, Pacific Northwest National Lab. (USA) [8268-59]

1:40 pm: **Detecting contamination with a QCL spectrometer** (*Invited Paper*), Frederick G. Haibach, Alex Mazurenko, Erik Deutsch, Block Engineering, LLC (USA) [8268-60]

2:00 pm: **Hollow fiber based quantum cascade laser spectrometer for fast and sensitive drug identification**, Johannes Herbst, Benjamin Scherer, Alexander Ruf, Jochen Erb, Armin Lambrecht, Fraunhofer-Institut für Physikalische Messtechnik (Germany) [8268-61]

2:15 pm: **Hyperspectral microscopy using an external cavity quantum cascade laser and its applications for explosives detection** (*Invited Paper*), Mark C. Phillips, Jonathan D. Suter, Bruce E. Bernacki, Pacific Northwest National Lab. (USA) [8268-62]

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SESSION 14

Room: 114 (Exhibit Level) Tues. 2:35 to 3:40 pm

Single Photon Detection

Session Chairs: **Sheng Wu**, California Institute of Technology (USA);
Marco Genovese, Istituto Nazionale di Ricerca Metrologica (Italy)

2:35 pm: **InGaAs/InP single-photon counting module running up to 133 MHz**, Alberto Tosi, Adriano Della Frera, Andrea Bahgat Shehata, Carmelo Scarcella, Fabio Acerbi, Franco Zappa, Politecnico di Milano (Italy) . . . [8268-63]

2:50 pm: **Detecting single photons with superconducting nanowires**, Sander N. Dorenbos, Iman E. Zadeh, Valery Zwiller, Technische Univ. Delft (Netherlands) [8268-64]

3:05 pm: **Fast-gated single-photon detection module with 200 ps transitions running up to 50 MHz with 30 ps resolution**, Gianluca Boso, Alberto Dalla Mora, Alberto Tosi, Adriano Della Frera, Franco Zappa, Politecnico di Milano (Italy) [8268-65]

3:20 pm: **Spectral dependence of ultra-low dark count superconducting single photon detector for the evaluation of broadband parametric fluorescence** (*Invited Paper*), Shanthi Subashchandran, Ryo Okamoto, Akira Tanaka, Masayuki Okano, Hokkaido Univ. (Japan) and Osaka Univ. (Japan); Labao Zhang, Lin Kang, Jian Chen, Peiheng Wu, Nanjing Univ. (China); Shigeki Takeuchi, Hokkaido Univ. (Japan) and Osaka Univ. (Japan) [8268-66]

Coffee Break 3:40 to 4:10 pm

SESSION 15

Room: 114 (Exhibit Level) Tues. 4:10 to 5:30 pm

GaN LEDs

Session Chairs: **Nicolas Grandjean**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **A. F. Mehdi Anwar**, Univ. of Connecticut (USA)

4:10 pm: **Electroluminescence from p-type thin film/n-type nanostructures aligned by non-uniform electric field** (*Invited Paper*), Jihyun Kim, Korea Univ. (Korea, Republic of) [8268-67]

4:30 pm: **Full-scale self-emissive blue and green microdisplays based on GaN micro-LED arrays** (*Invited Paper*), Jacob Day, Texas Tech Univ. (USA); Jing Li, III-N Technology, Inc. (USA); Donald Lie, Texas Tech Univ. (USA); Charles E. Bradford, U.S. Army Night Vision & Electronic Sensors Directorate (USA); Jingyu Lin, Hongxing Jiang, Texas Tech Univ. (USA) [8268-68]

4:50 pm: **Flexible GaN LED on a polyimide substrate for display applications** (*Invited Paper*), Hyeon Gyun Yoo, Kwi-II Park, Min Koo, Seungjun Kim, Sangyong Lee, Seung Hyun Lee, Keon Jae Lee, KAIST (Korea, Republic of) [8268-69]

5:10 pm: **Light emitting diodes: the future lighting source with high efficiency** (*Invited Paper*), Ho Ki Kwon, LG Electronics Inc. (Korea, Republic of) [8268-70]

Wednesday 25 January

SESSION 16

Room: 114 (Exhibit Level) Wed. 8:00 to 8:55 am

Graphene

Session Chairs: **Jingyu Lin**, Texas Tech Univ. (USA);
Jae Su Yu, Kyung Hee Univ. (Korea, Republic of)

8:00 am: **Nanoscale metrology of graphene** (*Invited Paper*), Kevin F. Kelly, Rice Univ. (USA) [8268-71]

8:20 am: **Direct graphene growth on dielectric substrates: enabling technology for industrial development of graphene electronics and spintronics** (*Invited Paper*), Jeffrey Kelber, Mi Zhou, Frank L. Pasquale, Univ. of North Texas (USA); Peter A. Dowben, Univ. of Nebraska-Lincoln (USA) [8268-72]

8:40 am: **Oxygen sensors made by monolayer graphene**, Sheng Chun Hung, Chung Wei Chen, National Central Univ. (Taiwan); M. D. Yang, C. W. Yeh, C. H. Wu, Institute of Nuclear Energy Research (Taiwan); Gou-Chung Chi, National Chiao Tung Univ. (Taiwan); F. Ren, Univ. of Central Florida (USA); Stephen J. Pearton, Univ. of Florida (USA) [8268-73]

SESSION 17

Room: 114 (Exhibit Level) Wed. 8:55 to 9:55 am

Quantum Optics II

Session Chairs: **Bernard Gil**, Univ. Montpellier 2 (France);
Jonathan C. F. Matthews, Univ. of Bristol (United Kingdom)

8:55 am: **Two-photon conductivity in semiconductors: a new tool for the study of the quantum properties of light** (*Invited Paper*), Emmanuel Rosencher, ONERA (France) and Ecole Polytechnique (France); Fabien Boitier, Antoine Godard, ONERA (France); Claude Fabre, Univ. Pierre et Marie Curie (France) [8268-75]

9:15 am: **Semiconductor sources of two-photon states at room temperature in the telecom range** (*Invited Paper*), Adeline Orioux, Marc Savanier, Carlos Eduardo Rodrigues de Souza, Alessio Andronico, Univ. Paris 7-Denis Diderot (France); Aristide Lemaître, Ctr. National de la Recherche Scientifique (France); Pascal Filloux, Christophe Manquest, Ivan Favero, Giuseppe Leo, Sara Ducci, Univ. Paris 7-Denis Diderot (France) [8268-76]

9:35 am: **Laterally confined photonic Tamm states: a new approach for single photon sources and cavity-enhanced photodetectors** (*Invited Paper*), Paul Voisin, Olivier Gazzano, Steffen Michaelis de Vasconcellos, Karine Gauthron, Ctr. National de la Recherche Scientifique (France); Clementine Symonds, Univ. Claude Bernard Lyon 1 (France); Jacqueline Bloch, Ctr. National de la Recherche Scientifique (France); Joel Belessa, Univ. Claude Bernard Lyon 1 (France); Aristide Lemaître, Pascale Senellart, Ctr. National de la Recherche Scientifique (France) [8268-77]

Coffee Break 9:55 to 10:20 am

SESSION 18

Room: 114 (Exhibit Level) Wed. 10:20 am to 12:40 pm

THz Emission And Detection

Session Chairs: **Robert Kuszelewicz**,
Ctr. National de la Recherche Scientifique (France);
Zuki Tanaka, Univ. of California, Santa Cruz (USA)

10:20 am: **Generation and amplification of ultrafast THz pulses using gain switching in quantum cascade lasers** (*Invited Paper*), J. Maysonnave, K. Maussang, Nathan Jukam, Rakchanok Rungsawang, Julien Madeo, P. Cavalie, Sukhdeep S. Dhillon, Jerome Tignon, Ecole Normale Supérieure (France) [8268-114]

10:40 am: **Reliable GaN-based resonant tunneling diodes with reproducible room-temperature negative differential resistance** (*Invited Paper*), Can Bayram, Devendra K. Sadana, IBM Thomas J. Watson Research Ctr. (USA); Zahra Vashaei, Manijeh Razeghi, Northwestern Univ. (USA) [8268-78]

11:00 am: **Tunable surface emitting THz quantum cascade structure based on cyclotron emission** (*Invited Paper*), Francois-Regis Jasnot, Louis-Anne de Vaulchier, Yves Guldner, Gerald Bastard, Ecole Normale Supérieure (France); Angela Vasanelli, Christophe Manquest, Carlo Sirtori, Univ. Paris 7-Denis Diderot (France); Mattias Beck, Jerome Faist, ETH Zurich (Switzerland) [8268-79]

11:20 am: **Room temperature terahertz detectors based on semiconductor nanowire field effect transistors** (*Invited Paper*), Miriam S. Vitiello, NEST, CNR, Istituto Nanoscienze and Scuola Normale Superiore (Italy); Dominique Coquillat, CNRS, TERALAB-GIS, Univ. Montpellier 2 (France); Leonardo Viti, Daniele Ercolani, NEST, CNR, Istituto Nanoscienze and Scuola Normale Superiore (Italy); Frédéric Teppe, CNRS, TERALAB-GIS, Univ. Montpellier 2 (France); Alessandro Pitanti, Fabio Beltram, Lucia Sorba, NEST, CNR, Istituto Nanoscienze and Scuola Normale Superiore (Italy); Wojciech Knap, CNRS, TERALAB-GIS, Univ. Montpellier 2 (France); Alessandro Tredicucci, NEST, CNR, Istituto Nanoscienze and Scuola Normale Superiore (Italy) [8268-80]

11:40 am: **Surface phonon polaritons for active THz devices** (*Invited Paper*), Jean-Jacques Greffet, Simon Vassant, Alexandre Archambault, François Marquier, Lab. Charles Fabry (France); Fabrice Pardo, Ulf Gennser, Antonella Cavanna, Jean-Luc Pelouard, Ctr. National de la Recherche Scientifique (France) [8268-81]

12:00 pm: **Phase-locking of a 2.5THz quantum cascade laser to a frequency comb using a GaAs photo-mixer** (*Invited Paper*), Marco Ravano, Christophe Manquest, Carlo Sirtori, Univ. Paris 7-Denis Diderot (France); Giorgio Santarelli, Observatoire de Paris (France); Jean-Francois Lampin, Univ. des Sciences et Technologies de Lille (France); Edmund Linfield, Suraj Khanna, Univ. of Leeds (United Kingdom); Stefano Barbieri, Univ. Paris 7-Denis Diderot (France) [8268-82]

12:20 pm: **LT GaAs nanophotoswitches for microwave sampling** (*Invited Paper*), Didier J. Decoster, Antoine Pagies, Jean Francois Lampin, Xavier Wallart, Vincent Magnin, Joseph Harari, Univ. des Sciences et Technologies de Lille (France); Charlotte Tripon-Canseliet, Salim Faci, Univ. Pierre et Marie Curie (France); Stephane Formont, Loic Menager, Jean Chazelas, Thales Optronique S.A. (France); Gay Justin, La Délégation Générale pour l'Armement (France) [8268-83]
Lunch/Exhibition Break 12:40 to 2:00 pm

SESSION 19

Room: 114 (Exhibit Level) Wed. 2:00 to 3:45 pm

Mid-IR Spectroscopy

Session Chairs: **Partha P. Banerjee**, Univ. of Dayton (USA);
Frank Fuchs, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany)

2:00 pm: **Optical heterodyne detection in the mid-infrared: capabilities and new molecular sensing applications** (*Invited Paper*), Gerard Wysocki, Michal Nikodem, Tracy R. Tsai, Princeton Univ. (USA); Damien Weidmann, Rutherford Appleton Lab. (United Kingdom); Yin Wang, Princeton Univ. (USA) [8268-84]

2:20 pm: **Spectroscopic measurements of isotopic water composition using a new modulation cancellation method**, Vincenzo Spagnolo, Politecnico di Bari (Italy); Lei Dong, Anatoliy A. Kosterev, Frank K. Tittel, Rice Univ. (USA) [8268-85]

2:35 pm: **Heterodyne-enhanced Faraday rotation spectrometer**, Yin Wang, Michal Nikodem, Princeton Univ. (USA); Jake Hoyne, Washington Univ. in St. Louis (USA); Gerard Wysocki, Princeton Univ. (USA) [8268-86]

2:50 pm: **A modular architecture for multi-channel external cavity quantum cascade laser-based chemical sensors: a systems approach** (*Invited Paper*), Matthew S. Taubman, Bruce E. Bernacki, John T. Schiffern, Bret D. Cannon, Robert D. Stahl, Tanya L. Myers, Mark C. Phillips, Pacific Northwest National Lab. (USA) [8268-87]

3:10 pm: **Sub-ppb detection of nitrogen dioxide with an external cavity quantum cascade laser**, Rafal Lewicki, Kun Liu, Rice Univ. (USA); Timothy Day, Daylight Solutions Inc. (USA); Frank K. Tittel, Rice Univ. (USA) [8268-88]

3:25 pm: **Progress towards compact broadly tunable laser modules for high-resolution mid-IR spectroscopy and commercial applications** (*Invited Paper*), Miles J. Weida, Edeline Fotheringham, Timothy Day, Daylight Solutions Inc. (USA) [8268-89]

Coffee Break 3:45 to 4:10 pm

SESSION 20

Room: 114 (Exhibit Level) Wed. 4:10 to 5:10 pm

Imaging

Session Chairs: **David A. Cardimona**, Air Force Research Lab. (USA);
Philip Klipstein, SCD Semiconductor Devices (Israel)

4:10 pm: **Realisation of innovative quantum imaging protocols at INRIM** (*Invited Paper*), Marco Genovese, Giorgio Brida, Giulia Alice Fornaro, Alice Meda, Ivano R. Berchera, Istituto Nazionale di Ricerca Metrologica (Italy) [8268-90]

4:30 pm: **Recent advances in quantum cascade lasers in the InAs/AISb material system** (*Invited Paper*), Alexei N. Baranov, Roland Teissier, Pierre Laffaille, Michael Bahriz, Jean-Christophe Moreno, Univ. Montpellier 2 (France) [8268-91]

4:50 pm: **Infrared imaging with quantum wells and strained layer superlattices** (*Invited Paper*), Mani Sundaram, Axel Reisinger, Richard Dennis, Kelly Patnaude, Douglas Burrows, Jason Bundas, Kim Beech, Ross Faska, QmagIQ, LLC (USA) [8268-92]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Graphene-based quantum hall effect infrared photodetectors, Nikolai G. Kalugin, New Mexico Tech (USA); Lei Jing, Wenzhong Bao, Univ. of California, Riverside (USA); Lee Wickey, Christopher Del Barga, Mekan Ovezmyradov, New Mexico Tech (USA); Eric A. Shaner, Ctr. for Integrated Nanotechnologies (USA) and Sandia National Labs. (USA); Chun Ning Lau, Univ. of California, Riverside (USA) [8268-113]

Thursday 26 January

SESSION 21

Room: 114 (Exhibit Level) Thurs. 8:30 to 10:00 am

QWIPS

Session Chairs: **Sanjay Krishna**, Ctr. for High Technology Materials (USA); **Hooman Mohseni**, Northwestern Univ. (USA)

8:30 am: **QWIP status and future trends at Thales** (*Invited Paper*), Philippe F. Bois, Vincent Guériaux, Nadia Brère de l'Isle, Alcatel-Thales III-V Lab. (France); Alain Manissadjian, SOFRADIR (France); Hugues Facoetti, Xavier Marcadet, Eric M. Costard, Alexandru Nedelcu, Alcatel-Thales III-V Lab. (France) [8268-93]

8:50 am: **Optically-addressed multiband photodetector for infrared imaging applications**, Oray Orkun Celtek, Yong-Hang Zhang, Arizona State Univ. (USA) [8268-94]

9:05 am: **Electromagnetic design of resonator-QWIPs** (*Invited Paper*), Kwong-Kit Choi, U.S. Army Research Lab. (USA); Merzy D. Jhabvala, NASA Goddard Space Flight Ctr. (USA); David P. Forrai, L-3 Communications Cincinnati Electronics (USA); Augustyn Waczynski, NASA Goddard Space Flight Ctr. (USA); Jason Sun, U.S. Army Research Lab. (USA); Robert A. Jones, L-3 Communications Cincinnati Electronics (USA) [8268-95]

9:25 am: **Evolution of QWIP focal plane development at the NASA/Goddard Space Flight Center** (*Invited Paper*), Murzy D. Jhabvala, NASA Goddard Space Flight Ctr. (USA); Kwong-Kit Choi, U.S. Army Research Lab. (USA) [8268-96]

9:45 am: **Responsivity enhancement of QWIPs by photonic crystal slabs**, Roman Gansch, Stefan Kalchmair, Peter Reiningger, Hermann Detz, Aaron M. Andrews, Pavel Klang, Werner Schrenk, Gottfried Strasser, Technische Univ. Wien (Austria) [8268-97]

Coffee Break 10:00 to 10:30 am

SESSION 22

Room: 114 (Exhibit Level) Thurs. 10:30 am to 12:10 pm

New Wide Bandgap Materials

Session Chairs: **Eva Monroy**, Commissariat à l'Énergie Atomique (France); **Ferechteh Hosseini Teherani**, Nanovation (France)

10:30 am: **Semiconducting hexagonal boron nitride for deep ultraviolet photonics** (*Invited Paper*), Sashikanth Majety, Xiangke Cao, Rajendra P. Dahal, Bed N. Pantha, Jing Li, Jingyu Lin, Hongxing Jiang, Texas Tech Univ. (USA) [8268-98]

10:50 am: **Tuning of internal gain, dark current and cutoff wavelength of UV photodetectors using quasi-alloy of BGaN-GaN and BGaN-AIN superlattices** (*Invited Paper*), Abdallah Ougazzaden, Georgia Tech-Lorraine (France); Jean-Paul Salvestrini, Hussein Srour, Ali Ahaitouf, Simon Gautier, Univ. de Metz (France); Tarik Moudakir, Supélec (France); Badreddine Assouar, Georgia Tech-Lorraine (France) [8268-99]

11:10 am: **The electrical properties of transparent conducting- and semiconducting oxides** (*Invited Paper*), Oliver Bierwagen, Paul-Drude-Institut für Festkörperelektronik (Germany) and Univ. of California, Santa Barbara (USA); Takahiro Nagata, National Institute for Materials Science (Japan); Mark E. White, Min-Ying Tsai, James S. Speck, Univ. of California, Santa Barbara (USA) [8268-100]

OPTO

Conference 8268 · Room: 114 (Exhibit Level)

11:30 am: **Nanophotonics devices based on magnetic materials** (*Invited Paper*), Jean-Yves Bigot, Mircea Vomir, Marie Barthelemy, Michele Albrecht, Abdelghani Lararoui, Institut de Physique et Chimie des Matériaux de Strasbourg (France) [8268-101]

11:50 am: **Practical rules for spin-orbit engineering of [110]-oriented III-V heterostructures** (*Invited Paper*), Henri-Jean Drouhin, Federico Bottegoni, Ecole Polytechnique (France); Guy Fishman, Institut d'Electronique Fondamentale (France); Jean-Eric Wegrowe, Ecole Polytechnique (France) [8268-102]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 23

Room: 114 (Exhibit Level) Thurs. 1:30 to 2:50 pm

CMT Photodetectors

Session Chairs: **Manijeh Razeghi**, Northwestern Univ. (USA);
Ray T. Chen, The Univ. of Texas at Austin (USA)

1:30 pm: **HgCdTe photon trapping detectors for mid-wavelength infrared (MWIR) high operating temperature (HOT) focal plane arrays** (*Invited Paper*), Justin Wehner, Kasey D. Smith, Borys Kolasa, Aaron Ramirez, Edward Smith, Raytheon Vision Systems (USA) [8268-103]

1:50 pm: **Theoretical and experimental investigation of MWIR HgCdTe nBn detectors** (*Invited Paper*), Silviu Velicu, Jun Zhao, Michael L. Morley, EPIR Technologies, Inc. (USA); Anne M. Itsuno, Jamie D. Phillips, Univ. of Michigan (USA) [8268-104]

2:10 pm: **Wide-area SWIR arrays and active illuminators** (*Invited Paper*), Michael H. MacDougal, Andrew D. Hood, Jonathan C. Geske, Chad Wang, Daniel S. Renner, David Follman, Paula Heu, FLIR Electro-Optical Components (USA) [8268-105]

2:30 pm: **Colloidal quantum dots for mid-infrared detection** (*Invited Paper*), Philippe Guyot-Sionnest, Sean Keuleyan, Emmanuel Lhuillier, Heng Liu, The Univ. of Chicago (USA) [8268-106]

Coffee Break 2:50 to 3:20 pm

SESSION 24

Room: 114 (Exhibit Level) Thurs. 3:20 to 5:15 pm

Type II Superlattices and Quantum Cascade Detectors

Session Chairs: **Philippe Christol**, Univ. Montpellier 2 (France);
Franco Zappa, Politecnico di Milano (Italy)

3:20 pm: **Structural properties of InAs/InAs_{1-x}Sb_x type-II superlattices** (*Invited Paper*), David J. Smith, Lu Ouyang, Elizabeth Steenbergen, Orkun Cellek, Yong-Hang Zhang, Arizona State Univ. (USA) [8268-107]

3:40 pm: **Quantitative strain analysis of interfaces in InAs/GaSb superlattices by aberration-corrected HAADF-STEM**, Krishnamurthy Mahalingam, UES Inc. (USA) and Air Force Research Lab. (USA); Heather J. Haugan, Universal Technology Corp. (USA) and Air Force Research Lab. (USA); Gail J. Brown, Kurt G. Eyink, Air Force Research Lab. (USA); Bin Jiang, Lawrence Berkeley National Lab. (USA) and FEI Co. (USA) [8268-108]

3:55 pm: **MOVPE grown InGaAs/GaAsSb type II quantum well photodiode for SWIR focal plane array** (*Invited Paper*), Hiroshi Inada, Hiroki Mori, Youichi Nagai, Yasuhiro Iguchi, Fuminori Mitsuhashi, Kei Fujii, Takashi Ishizuka, Katsushi Akita, Sumitomo Electric Industries, Ltd. (Japan) [8268-109]

4:15 pm: **Comparison of the electro-optical performances of symmetrical and asymmetrical MWIR InAs/GaSb superlattice pin photodiodes** (*Invited Paper*), Isabelle Ribet-Mohamed, Michel Tauvy, ONERA (France); Rachid Taalat, Cyril Cervera, Jean-Baptiste Rodriguez, Philippe Christol, Univ. Montpellier 2 (France) [8268-110]

4:35 pm: **Progress in the development of interband cascade infrared photodetectors** (*Invited Paper*), Rui Q. Yang, The Univ. of Oklahoma (USA) [8268-111]

4:55 pm: **Reduction of noise in very long wave infrared quantum cascade detectors** (*Invited Paper*), Laetitia Doyennette, Alexandre Delga, Univ. Paris 7-Denis Diderot (France); Mathieu Carras, Virginie Trinite, Alexandru Nedelcu, Alcatel-Thales III-V Lab. (France); Vincent Berger, Univ. Paris 7-Denis Diderot (France) [8268-112]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Don't miss the free Photonics West Exhibition

24-26 January 2012
South Hall ABC and North Hall D
Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm
Thursday · 10:00 am to 4:00 pm

Photonic and Phononic Properties of Engineered Nanostructures II

Conference Chairs: **Ali Adibi**, Georgia Institute of Technology (USA); **Shawn-Yu Lin**, Rensselaer Polytechnic Institute (USA); **Axel Scherer**, California Institute of Technology (USA)

Program Committee: **Shanhui Fan**, Stanford Univ. (USA); **Abdelkrim Khelif**, CNRS-Georgia Tech Lorraine (France); **Maryanne C. J. Large**, The Univ. of Sydney (Australia); **Susumu Noda**, Kyoto Univ. (Japan); **Masaya Notomi**, NTT Basic Research Labs. (Japan); **Ekmel Ozbay**, Bilkent Univ. (Turkey); **Domenico Pacifici**, California Institute of Technology (USA); **Dennis W. Prather**, Univ. of Delaware (USA); **William J. Wadsworth**, Univ. of Bath (United Kingdom); **Yong Xu**, Virginia Polytechnic Institute and State Univ. (USA); **Eli Yablonovitch**, Univ. of California, Berkeley (USA)

Monday 23 January

SESSION 1

Room: 125 (Exhibit Level) Mon. 8:00 to 10:00 am

Recent Advances in Engineered Nanostructures

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

8:00 am: **Photonic crystal light trapping for solar energy harvesting** (*Invited Paper*), Sajeev John, Univ. of Toronto (Canada) [8269-01]

8:30 am: **Passive and active nanophotonics** (*Invited Paper*), Yeshiahu Fainman, Univ. of California, San Diego (USA) [8269-02]

9:00 am: **Molding light propagation with phase discontinuities** (*Invited Paper*), Zeno Gaburro, Harvard Univ. (USA) and Univ. degli Studi di Trento (Italy); Nanfang Yu, Patrice Genevet, Mikhail Kats, Francesco Aieta, Jean-Philippe Tetienne, Federico Capasso, Harvard Univ. (USA) [8269-03]

9:30 am: **Applications of the circuit model for plasmonics** (*Invited Paper*), Eli Yablonovitch, Univ. of California, Berkeley (USA) [8269-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 125 (Exhibit Level) Mon. 10:30 am to 12:00 pm

Photonic Crystal Waveguides and Fibers

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

10:30 am: **Design and fabrication of HC-PCF for high-power fast laser beam transportation** (*Invited Paper*), Yingying Wang, Meshaal Alharbi, Coralie Fourcade-Dutin, Thomas D. Bradley, Fetah Benabid, Univ. of Bath (United Kingdom) and Xlim Research institute, CNRS, Univ. of Limoges (France); Xiang Peng, Michael M. Mielke, Timothy J. Booth, Raydiance, Inc. (USA) [8269-05]

11:00 am: **Design of silica fibers for supercontinuum generation**, Steven Carneiro, Margarida M. V. Facão, Sofia C. Latas, Mário F. S. Ferreira, Univ. de Aveiro (Portugal) [8269-06]

11:20 am: **Slow light loss due to roughness in photonic crystal waveguides: insights on loss reduction from an analytic theory**, Weiwei Song, Ryan A. Integlia, Wei Jiang, Rutgers, The State Univ. of New Jersey (USA) [8269-07]

11:40 am: **Broadband optical resonator based on coupled positive and negative-index waveguides**, Max Bethune-Waddell, Kenneth J. Chau, The Univ. of British Columbia (Canada) [8269-08]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: 125 (Exhibit Level) Mon. 1:30 to 3:00 pm

Novel Phenomena in Photonic Crystals

Session Chair: **Masaya Notomi**, NTT Basic Research Labs. (Japan)

1:30 pm: **First steps towards nanophotonic particle accelerators on a chip** (*Invited Paper*), Isabelle Staude, Karlsruhe Institut für Technologie (Germany); Christopher McGuinness, SLAC National Accelerator Lab. (USA); Andreas M. Frölich, Karlsruhe Institut für Technologie (Germany); Robert L. Byer, Stanford Univ. (USA); Eric R. Colby, SLAC National Accelerator Lab. (USA); Martin Wegener, Karlsruhe Institut für Technologie (Germany) [8269-09]

2:00 pm: **Electro-optic lithium niobate photonic crystal nanowire: towards a new generation of lithium niobate integrated optics devices**, Maria-Pilar Bernal Artajona, Huihui Lu, Benattou Sadani, Fadi Issam Baida, Univ. de Franche-Comté (France) [8269-10]

2:20 pm: **Nanopatterned metallo-dielectric photonic crystal to enhance nonlinear conversion: theory and experiment**, Elsie Barakat, Maria-Pilar Bernal, Roland Salut, Fadi Issam Baida, Univ. de Franche-Comté (France) [8269-11]

2:40 pm: **Broadband perfect light absorber using a multiplexed metal-dielectric structure**, Joshua Hendrickson, Air Force Research Lab. (USA); Junpeng Guo, Boyang Zhang, The Univ. of Alabama in Huntsville (USA); Walter Buchwald, Richard Soref, Air Force Research Lab. (USA) [8269-12]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: 125 (Exhibit Level) Mon. 3:30 to 5:00 pm

Photonic Crystal Resonators and Light Emitters

Session Chair: **Martin Wegener**,
Karlsruher Institut für Technologie (Germany)

3:30 pm: **fJ/bit integrated nanophotonics toward dense photonic network on chip** (*Invited Paper*), Masaya Notomi, NTT Basic Research Labs. (Japan) [8269-98]

4:00 pm: **Control of the Purcell effect of quantum dots embedded in photonic crystal nanocavity by manipulating Q-factor**, Tatsuya Nakamura, Takashi Asano, Kazunobu Kojima, Takanori Kojima, Susumu Noda, Kyoto Univ. (Japan) [8269-13]

4:20 pm: **One-dimensional linear chain photonic crystal laser**, Sihan Kim, Sungmo Ahn, Heonsu Jeon, Seoul National Univ. (Korea, Republic of) . [8269-14]

4:40 pm: **Anderson localized modes in random photonic crystal lasers with two-dimensional glassy perturbation**, Seiji Takeda, Keio Univ. (Japan); Romain Peretti, Pierre Viktorovitch, Ecole Centrale de Lyon (France); Minoru Obara, Keio Univ. (Japan) [8269-15]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

Conference 8269 · Room: 125 (Exhibit Level)

SESSION 5

Room: 125 (Exhibit Level) Tues. 10:30 am to 12:00 pm

Photonic Metamaterials I

Session Chair: Hatice Altug, Boston Univ. (USA)

10:30 am: **Recent progresses in optical metamaterials** (*Invited Paper*), Xiang Zhang, Univ. of California, Berkeley (USA) [8269-16]

11:00 am: **Enhanced nonlinear effects in metamaterials and plasmonic materials** (*Invited Paper*), Andrea Alu, The Univ. of Texas at Austin (USA) [8269-17]

11:30 am: **Science meets magic: photonic metamaterials** (*Invited Paper*), Ekmel Ozbay, Bilkent Univ. (Turkey) [8269-18]

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

SESSION 6

Room: 125 (Exhibit Level) Tues. 1:00 to 3:00 pm

Photonic Metamaterials II

Session Chair: Andrea Alu, The Univ. of Texas at Austin (USA)

1:00 pm: **Controlling flow of photons with extreme metamaterials** (*Invited Paper*), Nader Engheta, Univ. of Pennsylvania (USA) [8269-19]

1:30 pm: **Flexible and stretchable plasmonics and metamaterials** (*Invited Paper*), Hatice Altug, Boston Univ. (USA) [8269-20]

2:00 pm: **Invisibility cloaking for the light phase at visible frequencies**, Tolga Ergin, Joachim Fischer, Martin Wegener, Karlsruher Institut für Technologie (Germany) [8269-21]

2:20 pm: **Microscroll invisibility cloak**, Philip A. Munoz, Harvard Univ. (USA); Ryan Iutzi, Massachusetts Institute of Technology (USA); Eric Mazur, Harvard Univ. (USA) [8269-22]

2:40 pm: **Design of metamaterials with predetermined optical properties for broadband applications**, Kuan-Ren Chen, Anatoliy V. Goncharenko, National Cheng Kung Univ. (Taiwan); Vladimir U. Nazarov, Research Ctr. for Applied Sciences (Taiwan) [8269-23]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: 125 (Exhibit Level) Tues. 3:30 to 6:00 pm

Modeling and Simulation of Photonic Crystal Structures

Session Chair: Ekmel Ozbay, Bilkent Univ. (Turkey)

3:30 pm: **Dynamic and aperiodic nanophotonic structures** (*Invited Paper*), Shanhui Fan, Stanford Univ. (USA) [8269-24]

4:00 pm: **Photon localization in randomly mixed photonic crystals**, Jeongukg Lee, Seoul National Univ. (Korea, Republic of); Sunghwan Kim, Tufts Univ. (USA); Heonsu Jeon, Seoul National Univ. (Korea, Republic of) [8269-25]

4:20 pm: **Fourier-Bessel expansions of localized light in disorder dielectric lattices**, Scott R. Newman, Robert C. Gauthier, Carleton Univ. (Canada) [8269-26]

4:40 pm: **Titanium dioxide square spiral photonic crystals: numerical analysis and experimental realization**, Joshua D. Krabbe, Viktor A. Leontyev, Michael T. Taschuk, Univ. of Alberta (Canada); Andriy Kovalenko, National Research Council Canada (Canada); Michael Brett, Univ. of Alberta (Canada) [8269-27]

5:00 pm: **A parametric study of extraordinary transmission through metallic photonic crystals targeting infrared photodetectors**, Reyhaneh Soltanmoradi, Royal Institute of Technology (Sweden); Qin Wang, Jan Y. Andersson, Acreo AB (Sweden); Min Qiu, Royal Institute of Technology (Sweden) [8269-28]

5:20 pm: **Photonic band gaps of increasingly isotropic crystals at high and low dielectric contrasts**, Michael Pollard, Greg Parker, Martin Charlton, Univ. of Southampton (United Kingdom) [8269-29]

5:40 pm: **From electromagnetically induced transparency to superscattering with a single structure: a coupled-mode theory for doubly resonant objects**, Lieven Verslegers, Zongfu Yu, Zhichao Ruan, Peter B. Catrysse, Shanhui Fan, Stanford Univ. (USA) [8269-30]

Wednesday 25 January

SESSION 8

Room: 125 (Exhibit Level) Wed. 8:00 to 10:00 am

Phononic Crystal Structures I

Session Chair: Jin-Chen Hsu,

National Yunlin Univ. of Science and Technology (Taiwan)

8:00 am: **Homogenized dynamic constitutive relation for Bloch-wave propagation in periodic composites: structure and symmetries** (*Invited Paper*), Sia Nemat-Nasser, Ankit Srivastava, Univ. of California, San Diego (USA) [8269-31]

8:30 am: **Nanostructured phononic materials for thermal management** (*Invited Paper*), Krishna Muralidharan, Pierre A. Deymier, The Univ. of Arizona (USA) [8269-32]

9:00 am: **Microfabricated GHz phononic crystals** (*Invited Paper*), Gianluca Piazza, Univ. of Pennsylvania (USA) [8269-33]

9:30 am: **Topologically evolved phononic materials: breaking the world record in band gap size** (*Invited Paper*), O. R. Bilal, Mahmoud I. Hussein, Univ. of Colorado at Boulder (USA) [8269-34]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 125 (Exhibit Level) Wed. 10:30 am to 12:10 pm

Phononic Crystal Structures II

Session Chair: Gianluca Piazza, Univ. of Pennsylvania (USA)

10:30 am: **Phononic crystal strips for engineering micromechanical resonators** (*Invited Paper*), Jin-Chen Hsu, National Yunlin Univ. of Science and Technology (Taiwan); Feng-Chia Hsu, Pin Chang, Industrial Technology Research Institute South (Taiwan) [8269-35]

11:00 am: **Bending and directing of lamb waves using phononic crystal slabs**, Saeed Mohammadi, Ali Adibi, Georgia Institute of Technology (USA) [8269-36]

11:20 am: **Effect of Bragg and local resonance on the formation of phononic band gaps in a silicon plate with metallic pillars**, Reza Pourabolghasem, Georgia Institute of Technology (USA); Abdelkrim Khelif, Georgia Tech-Lorraine (France); Ali Adibi, Georgia Institute of Technology (USA) [8269-37]

11:40 am: **Anisotropic acoustic metamaterials: from transmission lines to pentamodes** (*Invited Paper*), Gregory Orris, U.S. Naval Research Lab. (USA) [8269-38]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 10

Room: 125 (Exhibit Level) Wed. 1:30 to 3:10 pm

Optomechanical Structures

Session Chair: Mahmoud I. Hussein,

Univ. of Colorado at Boulder (USA)

1:30 pm: **Classical and quantum applications of optomechanical crystals** (*Invited Paper*), Oskar J. Painter, California Institute of Technology (USA) [8269-39]

2:00 pm: **Optomechanical cooling, amplification, and bistability in coupled-mode suspended waveguide geometries**, David N. Woolf, Pui-Chuen Hui, Eiji Iwase, Alejandro Rodriguez, Mughees Khan, Harvard Univ. (USA); Steven Johnson, Massachusetts Institute of Technology (USA); Marko Loncar, Federico Capasso, Harvard Univ. (USA) [8269-40]

2:20 pm: **Photonic and phononic properties of engineered nanostructures** (*Invited Paper*), Yan Pennec, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France) [8269-41]

2:50 pm: **Multiphonon acousto-optic interactions in normal and oblique incidence inside a 1D phononic cavity**, Gaetan Lévêque, Univ. des Sciences et Technologies de Lille (France); E. H. El Boudouti, Abdellatif Akjouj, Yan Pennec, Bahram Djafari-Rouhani, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France); Ioannis E. Psarobas, Nikos Papanikolaou, National Ctr. for Scientific Research Demokritos (Greece); Nikolaos Stefanou, Univ. of Athens (Greece); Vincent Laude, FEMTO-ST (France) [8269-42]

Coffee Break 3:10 to 3:40 pm

SESSION 11

Room: 125 (Exhibit Level) Wed. 3:40 to 6:00 pm

Plasmonic Metamaterials

Session Chair: **Yan Pennec**, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France)

- 3:40 pm: **Orienting emission: quantifying and controlling excitons in layered materials** (*Invited Paper*), Rashid Zia, Brown Univ. (USA) [8269-43]
- 4:10 pm: **Multipolar effects and strong coupling in hybrid plasmonic metamaterials**, Arash Farhang, Ecole Polytechnique Fédérale de Lausanne (Switzerland); S. Anantha Ramakrishna, Indian Institute of Technology Kanpur (India); Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8269-44]
- 4:30 pm: **Plasmonic nanoparticles for a bottom-up approach to fabricate optical metamaterials**, José Dintinger, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Stefan Mühlig, Tobias Kienzler, Carsten Rockstuhl, Friedrich-Schiller-Univ. Jena (Germany); Toralf Scharf, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8269-45]
- 4:50 pm: **Optimal arrangement of meta-atoms composing metamaterials**, Yi-Chen Chuang, Nanyang Technological Univ. (Singapore); Michael A. Fiddy, The Univ. of North Carolina at Charlotte (USA) [8269-46]
- 5:10 pm: **Loss-compensation in metamaterials based on plasmonic nanoparticles**, Salvatore Campione, Filippo Capolino, Univ. of California, Irvine (USA) [8269-47]
- 5:30 pm: **Infrared plasmonic metamaterials for energy and life sciences applications** (*Invited Paper*), Gennady B. Shvets, The Univ. of Texas at Austin (USA) [8269-48]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

- Resonant mode mapping in photonic crystal nanocavity by atomic force microscope nano-oxidation**, Wen-Yen Chen, Min-Zhi Chen, Chao-Chia Cheng, Chun-Jung Wang, Jen-Inn Chyi, Tzu-Min Hsu, National Central Univ. (Taiwan) [8269-70]
- Reflection of the circular polarizer with metallic helical metamaterials**, Yu Yang, Zhenyu Yang, Ming Zhao, Huazhong Univ. of Science and Technology (China) [8269-71]
- Surface plasmon propagation in novel multilayered metallic thin films**, Fabio A. Ferri, Victor A. G. Rivera, Sergio Paulo A. Osorio, Otavio B. Silva, Antonio R. Zanatta, Ben-Hur V. Borges, John Weiner, Euclides Marega, Univ. de São Paulo (Brazil) [8269-72]
- Theoretical analysis of the modal behavior of 2D random photonic crystals**, Shimpei Hamada, Seiji Takeda, Keio Univ. (Japan); Pierre Viktorovitch, Ecole Centrale de Lyon (France); Minoru Obara, Keio Univ. (Japan) [8269-73]
- Economic fabrication of photonic crystal nanostructure at selected area using nanospherical-lens lithography**, Jun-Sen Huang, Hsin-Chan Chung, Yun-Chong Chang, National Cheng Kung Univ. (Taiwan) [8269-74]
- Investigation of two-dimensional photonic crystal properties using approximate analytical methods**, Inna Nusinsky, Amos A. Hardy, Tel Aviv Univ. (Israel) [8269-75]
- Fractal complementary bowtie aperture for confining and enhancing optical magnetic field**, Yang Yang, Haitao Dai, Tianjin Univ. (China) [8269-76]
- Integrated plasmonic Moiré cavity in photonic crystal cavity for luminescence enhancement**, Sergio Paulo A. Osório, Otávio B. Silva, Fábio A. Ferri, Victor A. G. Rivera, Antonio R. Zanatta, Euclides Marega, Jr., Univ. de São Paulo (Brazil) [8269-77]
- Polarization splitter based on a porous silicon waveguide**, Yajun Liu, Zhenhong Jia, Xinjiang Univ. (China) [8269-78]
- Fabrication of nano-sized metamaterial by focused-ion-beam milling process and its optical characteristics**, Junghee Kim, Yeonui Lee, Boyoung Kang, J. H. Woo, E. Y. Choi, E. S. Kim, Minji Gwon, Dong-Wook Kim, Jeong-Weon Wu, Ewha Womans Univ. (Korea, Republic of) [8269-79]

- Demonstration of self-imaging effect without paraxial approximation**, Wangshi Zhao, Rochester Institute of Technology (USA); Xiaoyue Huang, Michigan Technological Univ. (USA); Zhaolin Lu, Rochester Institute of Technology (USA) [8269-80]
- The surface plasmon resonance sensor with the metallic nanostructure for biosensing**, Byeong-Hyeon Lee, Geum-Yoon Oh, Hong-Seung Kim, Tae-Kyeong Lee, Chung-Ang Univ. (Korea, Republic of); Seon-Hoon Kim, Hyun-Chul Ki, Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [8269-81]
- Dispersion engineering for surface waves on multilayer metal-insulator stacks**, Ruoxi Yang, Zhaolin Lu, Rochester Institute of Technology (USA) [8269-82]
- Design of a metallic wire media hyperlens**, Diana Strickland, Southwest Research Institute (USA); Ramakrishna Kotha, Arturo Ayon, The Univ. of Texas at San Antonio (USA); Jerome A. Hellfrich, Southwest Research Institute (USA) [8269-83]
- Negative refraction in the third photonic band of a two-dimensional elliptical rod photonic crystal in a centered rectangular lattice**, Jeffrey R. Lutkenhaus, Kris Ohlinger, Hualiang Zhang, Yuankun Lin, Univ. of North Texas (USA) [8269-84]
- Optimization of a localized surface plasmon resonance biosensor for heat shock protein 70**, Ryan C. Denomme, Zachary Young, Lindsay Brock, Patricia M. Nieva, Univ. of Waterloo (Canada) [8269-85]
- Luminescence enhancement of Er³⁺ ions from electric multipole nanostructure arrays**, Victor A. G. Rivera, Fabio A. Ferri, Sergio P. Osorio, Luiz A. Nunez, Euclides Marega, Jr., Univ. de São Paulo (Brazil) [8269-87]
- Focusing surface plasmons on Er³⁺ ions with convex/concave plasmonic lenses**, Victor A. G. Rivera, Fabio A. Ferri, Sergio P. Osorio, Luiz A. Nunez, Euclides Marega, Jr., Univ. de São Paulo (Brazil) [8269-88]
- Enhancement of black silicon beyond band edge E_g into NIR due to optical antenna 2D cone grating structure**, Hani E. Ahmar, The City College of New York (USA); Meng-Ju Sher, Eric Mazur, Harvard Univ. (USA); Robert Alfano, The City College of New York (USA) [8269-89]
- Subwavelength imaging achieved by indefinite metamaterial**, Saptarshi Banerjee, Wangshi Zhao, Rochester Institute of Technology (USA); Xiaoyue Huang, Michigan Technological Univ. (USA); Zhaolin Lu, Rochester Institute of Technology (USA) [8269-90]
- Optical funneling and enhanced absorption in plasmonic nanogrooves**, Haofei Shi, L. Jay Guo, Univ. of Michigan (USA) [8269-91]
- GaAs nanostructure arrays for III-V solar cell applications**, Dong Liang, Yijie Huo, Yangsen Kang, Anjia Gu, Xingze Wang, Meiyueh Tan, Jieyang Jia, Zongfu Yu, Shuang Li, Shuang Wang, Yi Cui, Shanhuai Fan, James Harris, Stanford Univ. (USA) [8269-92]
- Numerical study of helix photonic metamaterial**, Yu-Ray Li, Hsiang-Hung Huang, Yi-Chun Ling, Yu-Chueh Hung, National Tsing Hua Univ. (Taiwan) [8269-93]
- Characterization of guiding properties of metallic nanorod metamaterials**, Yi-Chun Ling, Lung-Yu Chang Chien, Yu-Chueh Hung, National Tsing Hua Univ. (Taiwan) [8269-94]
- Phase measurement interferometric microscopy of stacked fishnet metamaterials**, Takayuki Matsui, Atsushi Miura, Hisayoshi Fujikawa, Kazuo Sato, Toyota Central R&D Labs., Inc. (Japan); Hideki T. Miyazaki, Naoki Ikeda, Masayuki Ochiai, Yoshimasa Sugimoto, National Institute for Materials Science (Japan); Masanori Ozaki, Masanori Hangyo, Osaka Univ. (Japan); Kiyoshi Asakawa, Univ. of Tsukuba (Japan) [8269-95]
- Dual phononic and photonic strip waveguides**, Yan Pennec, Institut d'Electronique, de Microélectronique, et de Nanotechnologie (France) [8269-96]
- Colorimetric polarization sensing with single plasmonic gold nanorods**, Sushmita Biswas, Dhriti Nepal, Kyoungweon Park, Richard Vaia, Air Force Research Lab. (USA) [8269-97]

Thursday 26 January

SESSION 12

Room: 125 (Exhibit Level) Thurs. 8:00 to 10:00 am

Nanoplasmonic Structures and Devices

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

8:00 am: **Plasmonic interferometry: a versatile tool for high-throughput biochemical sensors and energy-efficient thin-film solar cells** (*Invited Paper*), Domenico Pacifici, California Institute of Technology (USA) [8269-49]

8:30 am: **Engineering photonic-plasmonic coupled resonances for optoelectronic device applications** (*Invited Paper*), Luca Dal Negro, Boston Univ. (USA) [8269-50]

9:00 am: **Highly efficient photon coupling into a plasmonic nanostructure using a fiber-coupled microspherical cavity**, Keiji Sasaki, Hideaki Takashima, Yoshito Tanaka, Hideki Fujiwara, Hokkaido Univ. (Japan) [8269-51]

9:20 am: **Multispectral plasmonic absorbers for broadband and multispectral absorption**, Sencer Ayas, Hasan Guner, Burak Turker, Okan O. Ekiz, Aykutlu Dana, Bilkent Univ. (Turkey) [8269-52]

9:40 am: **Control of the local SPP excitation with a magneto-optical nanoparticle**, Rémi Vincent, Univ. de Bourgogne (France); Hugues Marinchio, Ecole Supérieure de Physique et de Chimie Industrielles (France); Juan Jose Saenz, Univ. Autónoma de Madrid (Spain); Rémi Carminati, Ecole Supérieure de Physique et de Chimie Industrielles (France) [8269-53]

Coffee Break 10:00 to 10:30 am

SESSION 13

Room: 125 (Exhibit Level) Thurs. 10:30 am to 12:10 pm

Plasmonic Antennas and Apertures

Session Chair: Luca Dal Negro, Boston Univ. (USA)

10:30 am: **Widely tunable V-shaped plasmonic antennas for planar optics**, Mikhail A. Kats, Patrice Genevet, Nanfang Yu, Guillaume Aoust, Romain Blanchard, Zeno Gaburro, Federico Capasso, Harvard Univ. (USA) . . . [8269-54]

10:50 am: **Characterization of high order modes of plasmonic antenna formed by nanoparticle/thin film hybrid structures**, Shiuian-Yeh Chen, Yaroslav Urzhumov, David R. Smith, Anne A. Lazarides, Duke Univ. (USA) [8269-55]

11:10 am: **Fabrication of arbitrary small conical shape metal nano-apertures on optical fiber facets**, Junpeng Guo, Hai-Sheng Leong, Boyang Zhang, Robert G. Lindquist, The Univ. of Alabama in Huntsville (USA) . [8269-56]

11:30 am: **Cavity resonances of plasmonic patch nanoantennas**, Feng Wang, Ayan Chakrabarty, Fred Minkowski, Qi-Huo Wei, Kent State Univ. (USA) [8269-57]

11:50 am: **Near-field optical study of strong coupling effects in a chain of gold nanorods integrated on silicon waveguides**, Aniello Apuzzo, Univ. de Technologie Troyes (France) [8269-58]

Lunch/Exhibition Break 12:10 to 1:10 pm

SESSION 14

Room: 125 (Exhibit Level) Thurs. 1:10 to 3:00 pm

Design and Characterization of Plasmonic Structures

Session Chair: Domenico Pacifici, California Institute of Technology (USA)

1:10 pm: **Optical properties of plasmonic structures based on biological and synthetically fabricated templates** (*Invited Paper*), Joseph W. Perry, Georgia Institute of Technology (USA) [8269-59]

1:40 pm: **Holographic plasmonic quasi-crystal**, Weidong Mao, Michael R. Wang, Univ. of Miami (USA) [8269-60]

2:00 pm: **Self-assembled plasmonic nanoclusters**, Jonathan Fan, Yu He, Harvard Univ. (USA); Kui Bao, Rice Univ. (USA); Chihhui Wu, The Univ. of Texas at Austin (USA); Jiming Bao, Univ. of Houston (USA); Vinodhan N. Manoharan, Harvard Univ. (USA); Gennady B. Shvets, The Univ. of Texas at Austin (USA); Peter J. Nordlander, Rice Univ. (USA); David Liu, Federico Capasso, Harvard Univ. (USA) [8269-61]

2:20 pm: **Polarization controlled dipolar plasmon resonances in lithographically defined metal nanoparticle arrays**, Michael Kaniber, Benedikt Mayer, Sebastian Dietl, Jonathan J. Finley, Technische Univ. München (Germany) [8269-62]

2:40 pm: **Nano-optical characterization of plasmonic nanostructures and devices with single and multiprobe NSOM and apertureless NSOM**, Aaron Lewis, Hebrew Univ. of Jerusalem (Israel) [8269-63]

Coffee Break 3:00 to 3:30 pm

SESSION 15

Room: 125 (Exhibit Level) Thurs. 3:30 to 5:40 pm

Novel Phenomena in Plasmonic Structures

Session Chair: Joseph W. Perry, Georgia Institute of Technology (USA)

3:30 pm: **Photon confinement to the nanoscale: Potential applications to solar energy conversion and nanomedicine** (*Invited Paper*), Mostafa A. El-Sayed, Georgia Institute of Technology (USA) [8269-64]

4:00 pm: **On-chip hybrid photonic-plasmonic sensors: theoretical design and experimental demonstration**, Maysamreza Chamanzar, Ali Adibi, Georgia Institute of Technology (USA) [8269-65]

4:20 pm: **Tunable plasmonic nanostructures for light trapping and strong field enhancement at the metal surface**, Aleksandr Polyakov, Kevin F. Thompson, Howard A. Padmore, Stefano Cabrini, P. James Schuck, Lawrence Berkeley National Lab. (USA) [8269-66]

4:40 pm: **3D analysis of surface plasmon dispersion for SERS sensor based on inverted pyramid nanostructures**, Swe Z. Oo, Martin D. B. Charlton, Univ. of Southampton (United Kingdom) [8269-67]

5:00 pm: **Nonlinear plasmonics of metallic heptamers**, Krishnan Thyagarajan, Simon Rivier, Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8269-68]

5:20 pm: **Controlled coupling of guided surface plasmon polaritons to InGaAs quantum dots**, Gregor Bracher, Konrad Schraml, Johannes Zellmer, Clemens Jakubeit, Maex Blauth, Benedikt Mayer, Jonathan Finley, Michael Kaniber, Technische Univ. München (Germany) [8269-69]

Courses of Related Interest

- SC608 Photonic Crystals: A Crash Course, from Bandgaps to Fibers (Johnson) Sunday, 1:30 to 5:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

High Contrast Metastructures

Conference Chairs: **Connie J. Chang-Hasnain**, Univ. of California, Berkeley (USA); **Fumio Koyama**, Tokyo Institute of Technology (Japan); **Alan Eli Willner**, The Univ. of Southern California (USA); **Weimin Zhou**, U.S. Army Research Lab. (USA)

Program Committee: **Markus-Christian Amann**, Walter Schottky Institute (Germany); **David Fattal**, Hewlett-Packard Labs. (USA); **Weiwei Hu**, Peking Univ. (China); **Ernst Bernhard Kley**, Friedrich-Schiller-Univ. Jena (Germany); **Philippe Lalanne**, Lab. Charles Fabry (France); **Rainer F. Mahrt**, IBM Zürich Research Lab. (Switzerland); **Jesper Moerk**, Technical Univ. of Denmark (Denmark); **Pierre Viktorovitch**, Ecole Centrale de Lyon (France); **Ming C. Wu**, Univ. of California, Berkeley (USA)

Sunday 22 January

SESSION 1

Room: 113 (Exhibit Level) Sun. 9:00 to 10:20 am

Harnessing Light

Session Chair: **Alan Eli Willner**, The Univ. of Southern California (USA)

9:00 am: **High-contrast grating optoelectronics** (*Invited Paper*), Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8270-01]

9:30 am: **Surface addressable photonic crystal membrane resonators: generic enablers for 3D harnessing of light** (*Invited Paper*), Pierre Viktorovitch, Corrado Sciancalepore, Ecole Centrale de Lyon (France); Taha Benyattou, Institut National des Sciences Appliquées de Lyon (France); Badhise Ben Bakir, CEA-LETI (France); Xavier Letartre, Ecole Centrale de Lyon (France) . . [8270-02]

10:00 am: **Fabry-Perot phase selection rules for high-contrast gratings**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8270-03]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: 113 (Exhibit Level) Sun. 10:50 am to 12:30 pm

Novel Filters

Session Chair: **Weimin Zhou**, U.S. Army Research Lab. (USA)

10:50 am: **High contrast grating for spatial mode filtering and mode control of VCSELs** (*Invited Paper*), Fumio Koyama, Tokyo Institute of Technology (Japan) [8270-04]

11:20 am: **MEMS-actuated optical phased array with high contrast grating mirrors** (*Invited Paper*), Ming C. Wu, Univ. of California, Berkeley (USA) [8270-05]

11:50 am: **Novel direction selective filter elements based on high contrast gratings**, Stefan Steiner, Stefanie Kroker, Thomas Käsebier, Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8270-06]

12:10 pm: **Fabrication and characterization of Si/SiO₂ high contrast grating using nanoimprint lithography**, Yuuki Hashizume, Yasumitsu Miyake, Akihiro Matsutani, Tokyo Institute of Technology (Japan); Hideo Ohtsuki, SAMCO, Inc. (Japan); Fumio Koyama, Tokyo Institute of Technology (Japan) [8270-07]

Lunch Break 12:30 to 2:00 pm

SESSION 3

Room: 113 (Exhibit Level) Sun. 2:00 to 3:20 pm

Slow Light

Session Chair: **Ming C. Wu**, Univ. of California, Berkeley (USA)

2:00 pm: **Slow-light HCG metastructure hollow-core waveguides** (*Invited Paper*), Weimin Zhou, Gerard Dang, Monica Taysing-Lara, U.S. Army Research Lab. (USA); Vadim Karagodsky, Tianbo Sun, Connie Chang-Hasnain, Univ. of California, Berkeley (USA) [8270-08]

2:30 pm: **Low loss slow light in high contrast grating hollow core waveguide**, Tianbo Sun, Vadim Karagodsky, Univ. of California, Berkeley (USA); Weimin Zhou, U.S. Army Research Lab. (USA); Connie Chang-Hasnain, Univ. of California, Berkeley (USA) [8270-09]

2:50 pm: **Attenuation coefficient of periodic waveguides: fast to slow light transition** (*Invited Paper*), Philippe Lalanne, Lab. Charles Fabry (France) [8270-10]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: 113 (Exhibit Level) Sun. 3:50 to 5:30 pm

Reflectors and Resonators

Session Chair: **Pierre Viktorovitch**, Ecole Centrale de Lyon (France)

3:50 pm: **High contrast gratings: from DUV polarizer to low noise infrared-mirrors** (*Invited Paper*), Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany) [8270-11]

4:20 pm: **VCSELs and silicon light sources exploiting SOI grating mirrors** (*Invited Paper*), Il-Sug Chung, Jesper Moerk, Technical Univ. of Denmark (Denmark) [8270-12]

4:50 pm: **Wave-front-engineered grating mirror for VCSELs**, Luca Carletti, Jesper Mork, Il-Sug Chung, Radu Malureanu, Technical Univ. of Denmark (Denmark) [8270-13]

5:10 pm: **High frequency binary amorphous silicon grating working as wire grid polarizer for UV applications**, Thomas Weber, Thomas Käsebier, Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8270-14]

Monday 23 January

SESSION 5

Room: 113 (Exhibit Level) Mon. 9:00 to 10:20 am

Hollow Core Waveguide

Session Chair: **Fumio Koyama**, Tokyo Institute of Technology (Japan)

9:00 am: **Signal propagation effects in HCG hollow-core waveguides** (*Invited Paper*), Alan E. Willner, Yang Yue, Hao Huang, Lin Zhang, The Univ. of Southern California (USA) [8270-15]

9:30 am: **Optical phased array for far field beam steering with varied HCG** (*Invited Paper*), Weiwei Hu, Peking Univ. (China); Connie Chang-Hasnain, Univ. of California, Berkeley (USA) [8270-16]

10:00 am: **Low-loss hollow-core waveguide using high-contrast sub-wavelength grating**, James E. Ferrara, Jr., Weijian Yang, Anthony Yeh, Karen Grutter, Christopher Chase, Vadim Karagodsky, Devang Parekh, Yang Yue, Alan E. Willner, Ming C. Wu, Connie Chang-Hasnain, Univ. of California, Berkeley (USA) [8270-17]

Coffee Break 10:20 to 10:50 am

Photonics West maps:

Moscone Center Maps pp. 2–4

Walking Map p. 4

SESSION 6

Room: 113 (Exhibit Level) Mon. 10:50 am to 12:30 pm

Novel Functions

Session Chair: Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany)

10:50 am: **Planar ultracompact silicon/polymer laser for the visible** (*Invited Paper*), Thilo Stoeferle, Nikolaj Moll, IBM Zürich Research Lab. (Switzerland); Thorsten Wahlbrink, Jens Bolten, AMO GmbH (Germany); Thomas Mollenhauer, AMO GmbH (USA); Ullrich Scherf, Bergische Univ. Wuppertal (Germany); Rainer F. Mahrt, IBM Zürich Research Lab. (Switzerland) [8270-18]

11:20 am: **A planar silicon lens for integrated free space optics** (*Invited Paper*), David Fattal, Jingjing Li, Zhen Peng, Marco Fiorentino, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) [8270-19]

11:50 am: **Novel high efficiency vertical to in-plane optical coupler**, Li Zhu, Vadim Karagodsky, Connie Chang-Hasnain, Univ. of California, Berkeley (USA) [8270-20]

12:10 pm: **Design of second order grating couplers to detect the angle and polarization of the laser beam**, Tapas K. Saha, Mingyu Lu, Deyin Zhao, Weidong Zhou, The Univ. of Texas at Arlington (USA) [8270-21]

Lunch Break 12:30 to 2:00 pm

SESSION 7

Room: 113 (Exhibit Level) Mon. 2:00 to 3:30 pm

Optical Phase Engineering

Session Chair: Rainer F. Mahrt, IBM Zürich Research Lab. (Switzerland)

2:00 pm: **Optical phase shifting based on high contrast grating waveguide**, Yunjie Li, Peking Univ. (China); Tianbo Sun, Univ. of California, Berkeley (USA); Te Chen, Weiwei Hu, Peking Univ. (China); Connie Chang-Hasnain, Univ. of California, Berkeley (USA) [8270-22]

2:20 pm: **Sub-diffraction engineering with high contrast dielectrics**, Jingjing Li, Hewlett-Packard Labs. (USA) and The Univ. of Chicago at Illinois (USA); David Fattal, Marco Fiorentino, Raymond Beausoleil, Hewlett-Packard Labs. (USA) [8270-23]

2:40 pm: **Diffraction optical elements based on subwavelength high contrast gratings**, Stefanie Kroker, Thomas Käsebier, Stefan Steiner, Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8270-24]

3:00 pm: **High-contrast grating based planar light concentrators** (*Invited Paper*), Bala Pesala, CSIR-CEERI (India) [8270-29]

Coffee Break 3:30 to 4:00 pm

SESSION 8

Room: 113 (Exhibit Level) Mon. 4:00 to 5:10 pm

Metastructures

Session Chair: David Fattal, Hewlett-Packard Labs. (USA)

4:00 pm: **Acrobatics for thermal emission using metastructures** (*Invited Paper*), Erez Hasman, Technion-Israel Institute of Technology (Israel) [8270-25]

4:30 pm: **Low loss silica on silicon integrated waveguides**, Ashley J. Maker, Andrea M. Armani, The Univ. of Southern California (USA) [8270-26]

4:50 pm: **Suspended silica beam splitters on silicon with large core-clad index difference**, Xiaomin Zhang, Andrea Armani, The Univ. of Southern California (USA) [8270-27]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: Klaus P. Streubel, OSRAM GmbH (Germany); David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 pm

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Tuning the reflectivity of high contrast gratings based on silicon and silica by means of wet etching with hydrofluoric acid, Tassilo Jacobitz, Stefanie Kroker, Thomas Käsebier, Bernhard Kley, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [8270-28]

Courses of Related Interest

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- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See *Course Materials Desk* located near the SPIE Registration Area, North Lobby for course and workshop details.

Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling IX

Conference Chairs: **Kurt G. Eyink**, Air Force Research Lab. (USA); **Frank Szmulowicz**, Univ. of Dayton Research Institute (USA); **Diana L. Huffaker**, Univ. of California, Los Angeles (USA)

Program Committee: **Massimo De Vittorio**, Univ. del Salento (Italy); **Vinod M. Menon**, Queen's College (USA); **Philip J. Poole**, National Research Council Canada (Canada); **Jian Xu**, The Pennsylvania State Univ. (USA)

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

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8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 1

Room: 274 (Mezzanine) Tues. 1:00 to 3:00 pm

Hybrid Structures

Session Chairs: **Valery Zwiller**, Technische Univ. Delft (Netherlands); **Pavlos G. Lagoudakis**, Univ. of Southampton (United Kingdom)

1:00 pm: **Quantum optics with nanowire quantum dots** (*Invited Paper*), Valery Zwiller, Technische Univ. Delft (Netherlands) [8271-01]

1:30 pm: **Hybrid optoelectronics for light harvesting and light emitting applications** (*Invited Paper*), Pavlos G. Lagoudakis, Univ. of Southampton (United Kingdom) [8271-02]

2:00 pm: **Effect of silver nanoparticles on the spectral properties of rare-earth ions in a sodium borate glass**, Victor O. Obadina, Rami R. Bommarreddi, Alabama A&M Univ. (USA) [8271-03]

2:20 pm: **Seeded CdSe/CdS nanorods for multi-photon absorption applications**, Tze Chien Sum, Guichuan Xing, Nanyang Technological Univ. (Singapore); Sabyasachi Chakraborty, National Univ. of Singapore (Singapore); Cheng Hon Alfred Huan, Nanyang Technological Univ. (Singapore); Yin Thai Chan, National Univ. of Singapore (Singapore) [8271-04]

2:40 pm: **Optical properties of mesogen-coated gold nanoparticle self-assemblies**, José Dintinger, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Bai-Jia Tang, Georg H. Mehl, The Univ. of Hull (United Kingdom); Xianbing Zeng, Goran Ungar, The Univ. of Sheffield (United Kingdom); Tobias Kienzler, Carsten Rockstuhl, Friedrich-Schiller-Univ. Jena (Germany); Toralf Scharf, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8271-05]

Coffee Break 3:00 to 3:30 pm

SESSION 2

Room: 274 (Mezzanine) Tues. 3:30 to 5:30 pm

Colloidal Quantum Dots

Session Chair: **Mitra Dutta**, Univ. of Illinois at Chicago (USA)

3:30 pm: **Quantum dot enabling coherence barcoding technology** (*Invited Paper*), Jian Xu, The Pennsylvania State Univ. (USA) [8271-07]

4:00 pm: **Morphology, optical properties, charge transfer, and charge transport in nanocrystalline quantum dots** (*Invited Paper*), Mitra Dutta, Univ. of Illinois at Chicago (USA) [8271-08]

4:30 pm: **Transport properties of mid infrared colloidal quantum dot films**, Emmanuel P. Lhuillier, Sean Keuleyan, Philippe Guyot-Sionnest, The Univ. of Chicago (USA) [8271-09]

4:50 pm: **Fourier spectroscopy on PbS quantum dots**, Bruno Ullrich, Joanna Wang, Xiaoyin Xiao, Gail Brown, Air Force Research Lab. (USA) [8271-10]

5:10 pm: **Trap state lifetime analysis of single CdSe/ZnS quantum dots on a thin conductive film**, Hideki Fujiwara, Kun Sei, Hiroki Ohta, Takashi Chiba, Keiji Sasaki, Hokkaido Univ. (Japan) [8271-11]

Wednesday 25 January

SESSION 3

Room: 274 (Mezzanine) Wed. 8:00 to 10:20 am

Optical Devices I

Session Chairs: **Holger Eisele**, Technische Univ. Berlin (Germany); **Sven Hoefling**, Julius-Maximilians-Univ. Würzburg (Germany)

8:00 am: **Atomic structure of submonolayer InAs/GaAs depositions for high-speed direct electro-optical data transmission in VCSELs** (*Invited Paper*), Holger Eisele, Andrea Lenz, Jonas Becker, Konstantin Zak, Lena Ivanova, Ernst Lenz, Mario Daehne, Jan-Hindrik Schulze, Tim D. Germann, Andre Strittmatter, Udo W. Pohl, Dieter D. Bimberg, Technische Univ. Berlin (Germany) [8271-12]

8:30 am: **Single photon sources for quantum information applications** (*Invited Paper*), Sven Höfiling, Christian Schneider, Tobias Heindel, Matthias Lermer, Julius-Maximilians-Univ. Würzburg (Germany); T. B. Hoang, Technische Univ. Eindhoven (Netherlands); J. Beetz, Tristan Braun, Julius-Maximilians-Univ. Würzburg (Germany); Laurent Balet, Technische Univ. Eindhoven (Netherlands) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Nicolas Chauvin, Technische Univ. Eindhoven (Netherlands); Lianhe Li, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Stephan Reitzenstein, Julius-Maximilians-Univ. Würzburg (Germany); Andrea Fiore, Technische Univ. Eindhoven (Netherlands); Martin Kamp, Alfred W. B. Forchel, Julius-Maximilians-Univ. Würzburg (Germany) [8271-13]

9:00 am: **Reducing dephasing in coupled quantum dot-cavity systems by engineering the carrier wavefunctions**, Anders Nysteen, Per Kaer, Jesper Moerk, Technical Univ. of Denmark (Denmark) [8271-14]

9:20 am: **A room temperature single photon source based on self-organized quantum dots**, Tilmar Kümmell, Oleh Fedorych, Univ. Duisburg-Essen (Germany); Carsten Kruse, Detlef Hommel, Univ. Bremen (Germany); Gerd Bacher, Univ. Duisburg-Essen (Germany) [8271-15]

9:40 am: **Full characterization of an optical field from an InAs quantum dot**, Sergey Polyakov, Edward B. Flagg, Tim Thomay, Alan L. Migdall, Glenn S. Solomon, National Institute of Standards and Technology (USA) [8271-16]

10:00 am: **Telecom band single quantum dots and dot ensembles at elevated temperature**, Claus Hermannstaedter, Nahid A. Jahan, Jae-Hoon Huh, Hirotaka Sasakura, Hokkaido Univ. (Japan); Kouichi Akahane, Masahide Sasaki, National Institute of Information and Communications Technology (Japan); Ikuo Suemune, Hokkaido Univ. (Japan) [8271-17]

Coffee Break 10:20 to 10:40 am

Conference 8271 · Room: 274 (Mezzanine)

SESSION 4

Room: 274 (Mezzanine) Wed. 10:40 to 11:50 am

Novel Materials

Session Chair: Jian Xu, The Pennsylvania State Univ. (USA)

10:40 am: **Evolution of micro-spikes on silicon surface etched by femtosecond laser with different fabrication conditions** (*Invited Paper*), YiMing Zhu, Yan Peng, Univ. of Shanghai for Science and Technology (China) [8271-18]

11:10 am: **Supercontinuum laser for dense nanomaterials characterization and modeling**, Romain Ceolato, Nicolas Riviere, ONERA (France); Béatrice Biscans, Ecole Nationale Supérieure des Ingénieurs en Arts Chimique et Technologiques (France) [8271-19]

11:30 am: **Influence of impurities on the luminescence of erbium-doped barium titanate nanophosphors**, Geovana Webler, Maximiliano Zapata, Univ. Federal de Alagoas (Brazil); Glauco S. Maciel, Univ. Federal Fluminense (Brazil); Amitava Patra, Indian Association for the Cultivation of Science (India); Jandir M. Hickmann, Márcio A. R. C. Alencar, Univ. Federal de Alagoas (Brazil) [8271-20]

Lunch/Exhibition Break 11:50 am to 1:00 pm

SESSION 5

Room: 274 (Mezzanine) Wed. 1:00 to 3:40 pm

Growth and Characterization

Session Chair: Gregory J. Salamo, Univ. of Arkansas (USA)

1:00 pm: **Semiconductor quantum nanostructures by droplet epitaxy** (*Invited Paper*), Stefano Sanguinetti, Univ. degli Studi di Milano-Bicocca (Italy) [8271-21]

1:30 pm: **Self-running gallium droplets on GaAs surface** (*Invited Paper*), Gregory J. Salamo, Univ. of Arkansas (USA) [8271-22]

2:00 pm: **The impact of growth rate and barrier thickness on the thermal stability of photoluminescence for coupled InAs/GaAs quantum dot heterostructures with quaternary(InAlGaAs) capping**, Arjun Mandal, Indian Institute of Technology Bombay (India); Utkarsha Verma, Indian Institute of Technology Rajasthan (India); Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [8271-23]

2:20 pm: **Ground state energy trend in single and multilayered coupled InAs/GaAs QDs capped with InGaAs layers: effect of thickness of InGaAs layer and the RTA treatment**, Suhas Jejurikar, Alpana Misra, Prasad Bhat, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [8271-24]

2:40 pm: **III-Sb semiconductor nanopillars grown by selective-area epitaxy**, Andrew Lin, Ping-Show Wong, Joshua Shapiro, Baolai Liang, Diana Huffaker, Univ. of California, Los Angeles (USA) [8271-25]

3:00 pm: **Carrier dynamic in a hybrid nanostructure with GaSb quantum dots coupled to an InGaAs/GaAs quantum well**, Baolai Liang, Kalyan C. Nunna, Charles J. Reyner, Diana L. Huffaker, Univ. of California, Los Angeles (USA); Nicola Pavarelli, Kamil Gradkowski, Tomasz J. Ochalski, Guillaume Huyet, Tyndall National Institute (Ireland); Vitaliy G. Dorogan, Yuriy I. Mazur, Gregory J. Salamo, Univ. of Arkansas (USA) [8271-26]

3:20 pm: **Increase in photoluminescence intensity of InAs columnar quantum dots on InP(001) substrate by increasing indium and phosphorous composition in InGaAsP barrier layers**, Shigekazu Okumura, Nami Yasuoka, Kenichi Kawaguchi, Yu Tanaka, Mitsuru Ekawa, Fujitsu Labs., Ltd. (Japan) [8271-27]

Coffee Break 3:40 to 4:00 pm

SESSION 6

Room: 274 (Mezzanine) Wed. 4:00 to 5:00 pm

Optical Devices II

Session Chair: Baolai Liang, Univ. of California, Los Angeles (USA)

4:00 pm: **Improvement of temperature stability in columnar quantum dot by introducing side-barriers with lager bandgap energy for semiconductor optical amplifiers**, Nami Yasuoka, Shigekazu Okumura, Hiroji Ebe, Yu Tanaka, Mitsuru Ekawa, Yoshiaki Nakata, Fujitsu Labs., Ltd. (Japan); Mitsuru Sugawara, QD Laser Inc. (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan) . [8271-29]

4:20 pm: **1.55µm InAs/GaAs quantum dot semiconductor saturable absorber mirror**, Ziyang Zhang, The Univ. of Sheffield (United Kingdom); Andreas E. Oehler, Bojan Resan, Time-Bandwidth Products AG (Switzerland); Kejia Zhou, The Univ. of Sheffield (United Kingdom); Mario Mangold, Thomas Suedmeyer, Ursula Keller, ETH Zurich (Switzerland); Kurt J. Weingarten, Time-Bandwidth Products AG (Switzerland); Richard A. Hogg, The Univ. of Sheffield (United Kingdom) [8271-30]

4:40 pm: **Optical noise and alpha-factor in inhomogeneous quantum dot ensemble**, Artem V. Savelyev, Mikhail V. Maximov, Alexey E. Zhukov, Saint-Petersburg Academic Univ. (Russian Federation) [8271-31]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Computational analysis of the effects of gain material in engineered metal nanostructures, Jinsong Duan, Ruth Pachter, Air Force Research Lab. (USA) [8271-06]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Advances in Photonics of Quantum Computing, Memory, and Communication V

Conference Chairs: **Zameer Ul Hasan**, Temple Univ. (USA); **Philip R. Hemmer**, Texas A&M Univ. (USA); **Hwang Lee**, Louisiana State Univ. (USA); **Charles M. Santori**, Hewlett-Packard Labs. (USA)

Program Committee: **Dmitry Budker**, Univ. of California, Berkeley (USA); **Alan E. Craig**, Montana State Univ. (USA); **Jonathan P. Dowling**, Louisiana State Univ. (USA); **Gurudev Dutt**, Univ. of Pittsburgh (USA); **James D. Franson**, Univ. of Maryland, Baltimore County (USA); **David Hughes**, Air Force Research Lab. (USA); **Fedor Jelezko**, Univ. Stuttgart (Germany); **Seth Lloyd**, Massachusetts Institute of Technology (USA); **Aleksander K. Rebane**, Montana State Univ. (USA); **Selim M. Shahriar**, Northwestern Univ. (USA); **Alan Eli Willner**, The Univ. of Southern California (USA); **Jörg Wrachtrup**, Univ. Stuttgart (Germany); **Horace P. Yuen**, Northwestern Univ. (USA); **M. Suhail Zubairy**, Texas A&M Univ. (USA)

Monday 23 January

SESSION 1

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

Nonbleaching and Ultrasmall Fluorescent Tags I

Joint Session with Conference 8233

Session Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Philip Richard Hemmer**, Texas A&M Univ. (USA)

1:30 pm: **Bringing color to electron microscopy with cathodoluminescent nanoparticles** (*Invited Paper*), David Glenn, Huiliang Zhang, Harvard-Smithsonian Ctr. for Astrophysics (USA); Narayanan Kasthuri, Alexei Trifonov, Richard Schalek, Jeff W. Lichtman, Harvard Univ. (USA); Ronald L. Walsworth, Harvard-Smithsonian Ctr. for Astrophysics (USA) [8272-01]

2:00 pm: **Rare-earth doped YAG nanoparticles for high- and super-resolution upconversion imaging** (*Invited Paper*), Roman L. Kolesov, Rolf Reuter, Kangwei Xia, Rainer Stoehr, Andrea Zappe, Jörg Wrachtrup, Univ. Stuttgart (Germany) [8272-02]

2:30 pm: **Nanodiamonds pave the way for fluorescent quantum probes in biology** (*Invited Paper*), David A. Simpson, Liam P. McGuinness, Yan Yan, Alastair Stacey, Liam T. Hall, Dougal Maclaurin, Steven Prawer, Paul Mulvaney, The Univ. of Melbourne (Australia); Jörg Wrachtrup, Univ. Stuttgart (Germany); Frank Caruso, Robert E. Scholten, Lloyd Hollenberg, The Univ. of Melbourne (Australia) [8272-03]

Coffee Break 3:00 to 3:30 pm

SESSION 2

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

Nonbleaching and Ultrasmall Fluorescent Tags II

Joint Session with Conference 8233

Session Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Philip Richard Hemmer**, Texas A&M Univ. (USA)

3:30 pm: **In vitro and in vivo applications of fluorescent nanodiamonds** (*Invited Paper*), Huan-Cheng Chang, Institute of Atomic and Molecular Sciences (Taiwan) [8272-04]

4:00 pm: **Use of upconverting fluorescent nanoparticles for bioimaging** (*Invited Paper*), Yong Zhang, Niagara Muhammad Idris, Li-Ching Ong, Lei-Yin Ang, Sylvie Alonso, National Univ. of Singapore (Singapore) [8272-05]

4:30 pm: **Tailoring rare earth doped nano-particles for applications from biology to quantum computing**, Zameer U. Hasan, Aras Konjihodzic, Temple Univ. (USA) [8272-06]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 3

Room: 132 (Exhibit Level) Tues. 10:30 am to 12:30 pm

Quantum Optics and Sensing with Spins in Diamond

Session Chair: **Charles M. Santori**, Hewlett-Packard Labs. (USA)

10:30 am: **Electrical tunability and correlation spectroscopy of single-photon emission from chromium-based colour centres in diamond**, Tina Muller, Clemens Matthiesen, Univ. of Cambridge (United Kingdom); Igor Aharonovich, Harvard Univ. (USA) and The Univ. of Melbourne (Australia); Yury Alaverdyan, Anthony N. Vamivakas, Univ. of Cambridge (United Kingdom); Stefania A. Castelletto, Swinburne Univ. of Technology (Australia); Steven Prawer, The Univ. of Melbourne (Australia); Mete Atature, Univ. of Cambridge (United Kingdom) [8272-07]

10:45 am: **Near-field coupling of a single NV center to a tapered fiber**, Tim Schröder, Humboldt-Univ. zu Berlin (Germany); Masazumi Fujiwara, Tetsuya Noda, Hokkaido Univ. (Japan); Hong-Quan Zhao, Osaka Univ. (Japan); Oliver Benson, Humboldt-Univ. zu Berlin (Germany); Shigeki Takeuchi, Hokkaido Univ. (Japan) [8272-08]

11:00 am: **Magnetic sensing using NV centers in diamond** (*Invited Paper*), Amir Yacoby, Michael Grinolds, Sungkun Hong, Patrick Maletinsky, Harvard Univ. (USA) [8272-09]

11:30 am: **Coherent control and projective readout of a solid-state spin quantum register** (*Invited Paper*), Hannes Bernien, Lucio Robledo, Ronald Hanson, Technische Univ. Delft (Netherlands) [8272-10]

12:00 pm: **Single photon source by single NV center in diamond semiconductor** (*Invited Paper*), Norikazu Mizuocho, Osaka Univ. (Japan) [8272-11]

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

Conference 8272 · Room: 132 (Exhibit Level)

SESSION 4

Room: 305 (Esplanade) Tues. 1:30 to 3:00 pm

Ultrasound Modulated Optical Tomography I

Joint Session with Conference 8223

Session Chairs: **Lihong V. Wang**, Washington Univ. in St. Louis (USA);
Philip R. Hemmer, Texas A&M Univ. (USA)

1:30 pm: **Signals, noises, and detection schemes in ultrasonically modulated optical imaging** (*Invited Paper*), François Ramaz, Ecole Supérieure de Physique et de Chimie Industrielles (France); Michel Gross, Univ. Montpellier 2 (France); A. Claude Boccara, Ecole Supérieure de Physique et de Chimie Industrielles (France) [8223-73]

1:45 pm: **Ultrasound-modulated optical tomography of biological tissue using spectral-hole burning** (*Invited Paper*), Xiao Xu, Honglin Liu, Washington Univ. in St. Louis (USA); Sri-Rajasekhar Kothapalli, Stanford Univ. (USA); Puxiang Lai, Yuta Suzuki, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8223-74]

2:00 pm: **Creating filters for shot-noise-limited Ultrasound Optical Tomography (UOT)** (*Invited Paper*), Mahmood Sabooni, Lund Univ. (Sweden); Huiliang Zhang, Texas A&M Univ. (USA); Lars Rippe, Lund Univ. (Sweden); Chulhong Kim, Washington Univ. in St. Louis (USA); Stefan Kroll, Lund Univ. (Sweden); Philip Hemmer, Texas A&M Univ. (USA) [8272-12]

2:15 pm: **Rare-earth-doped materials with application to optical signal processing, quantum information science, and medical imaging technology** (*Invited Paper*), Rufus L. Cone, Charles W. Thiel, Montana State Univ. (USA); Yongchen Sun, The Univ. of South Dakota (USA); Thomas Böttger, Univ. of California, San Francisco (USA); Roger M. Macfarlane, Montana State Univ. (USA) [8272-13]

2:30 pm: **Recent progress in ultrasound-mediated fluorescence** (*Invited Paper*), Baohong Yuan, Yuan Liu, The Univ. of Texas at Arlington (USA) [8223-75]

2:45 pm: **The potential of ultrasound-modulated optical sensing in clinical monitoring** (*Invited Paper*), Terence S. Leung, Univ. College London (United Kingdom) [8223-76]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Room: 305 (Esplanade) Tues. 3:30 to 5:30 pm

Ultrasound Modulated Optical Tomography II

Joint Session with Conference 8223

Session Chairs: **Lihong V. Wang**, Washington Univ. in St. Louis (USA);
Philip R. Hemmer, Texas A&M Univ. (USA)

3:30 pm: **Atom like centers in solids for nanophotonic and quantum devices**, Zameer U. Hasan, Temple Univ. (USA) [8272-14]

3:45 pm: **Acoustic radiation force assisted ultrasound modulated optical tomography** (*Invited Paper*), Mengxing Tang, Rui Li, Yi Cheng, Christopher W. Dunsby, Robert J. Eckersley, Daniel S. Elson, Imperial College London (United Kingdom) [8223-77]

4:00 pm: **Improving signal-to-noise ratio and spatial resolution in ultrasound modulated optical tomography** (*Invited Paper*), Stephen P. Morgan, Haowen Ruan, Nam Trung Huynh, Melissa L. Mather, Diwei He, John Crowe, Felicity R. Rose, Barrie R. Hayes-Gill, The Univ. of Nottingham (United Kingdom) [8223-78]

4:15 pm: **Spectral-hole burning techniques for ultrasound-modulated optical tomography** (*Invited Paper*), Huiliang Zhang, Texas A&M Univ. (USA); Mahmood Sabooni, Lars Rippe, Lund Univ. (Sweden); Chulhong Kim, Washington Univ. in St. Louis (USA); Stefan Kroll, Lund Univ. (Sweden); Lihong V. Wang, Washington Univ. in St. Louis (USA); Philip R. Hemmer, Texas A&M Univ. (USA) [8272-15]

4:30 pm: **Organic materials for spectral hole burning and non-hole burning narrowband optical filters** (*Invited Paper*), Anshel Gorokhovskiy, College of Staten Island (USA) [8272-16]

4:45 pm: **Sound light: rendering photoacoustics fluence-independent by adding acousto-optic modulation** (*Invited Paper*), Wiendelt Steenbergen, Altaf Hussain, Khalid Daoudi, Univ. Twente (Netherlands) [8223-79]

5:00 pm: **Efficient high-extended four-wave mixing in a spectral hole-burning medium** (*Invited Paper*), Byoung S. Ham, Inha Univ. (Korea, Republic of); Philip R. Hemmer, Texas A&M Univ. (USA) [8272-17]

5:15 pm: **Non-invasive blood flow measurements using ultrasound modulated diffused light**, Noam Racheli, Avihai Ron, Coby Metzger M.D., Ilan Breskin, Michal Balberg, Revital Shechter, Ornim Medical Ltd. (Israel) . [8223-80]

Wednesday 25 January

SESSION 6

Room: 132 (Exhibit Level) Wed. 8:00 to 10:05 am

Quantum Computing with Photons and Coherent Effects

Session Chairs: **Charles M. Santori**, Hewlett-Packard Labs. (USA);
Hwang Lee, Louisiana State Univ. (USA)

8:00 am: **Realizing optimal physical approximation of the partial transpose** (*Invited Paper*), Hyang-Tag Lim, Yong-Su Kim, Young-Sik Ra, Pohang Univ. of Science and Technology (Korea, Republic of); Joonwoo Bae, Korea Institute for Advanced Study (Korea, Republic of); Yoon-Ho Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8272-18]

8:25 am: **Closing the detection loophole in EPR-steering experiments** (*Invited Paper*), Geoff J. Pryde, Griffith Univ. (Australia) [8272-19]

8:50 am: **New results in fault-tolerant quantum computing** (*Invited Paper*), Gerald N. Gilbert, Yaakov S. Weinstein, The MITRE Corp. (USA) [8272-20]

9:15 am: **Integrated quantum photonics** (*Invited Paper*), Jeremy L. O'Brien, Univ. of Bristol (United Kingdom) [8272-21]

9:40 am: **Coherent and squeezed vacuum light interferometry: parity detection hits the Heisenberg limit** (*Invited Paper*), Kaushik P. Seshadreesan, Petr M. Anisimov, Hwang Lee, Jonathan P. Dowling, Louisiana State Univ. (USA) [8272-22]

Coffee Break 10:05 to 10:35 am

SESSION 7

Room: 132 (Exhibit Level) Wed. 10:35 am to 12:20 pm

Quantum Memory and Other Quantum Phenomena

Session Chair: **Hwang Lee**, Louisiana State Univ. (USA)

10:35 am: **Dynamics of generation and retrieval of stored excitations in rare-earth ion-doped crystal** (*Invited Paper*), Elizabeth A. Goldschmidt, Joint Quantum Institute (USA); Sarah E. Beavan, The Australian National Univ. (Australia); Sergey V. Polyakov, Alan L. Migdall, Joint Quantum Institute (USA); Matthew J. Sellars, The Australian National Univ. (Australia) [8272-23]

11:00 am: **Electromagnetically controlled storage and retrieval of microwave pulses with superconducting artificial atoms** (*Invited Paper*), Patrick M. Leung, Barry C. Sanders, Univ. of Calgary (Canada) [8272-24]

11:25 am: **Four-wave mixing storage** (*Invited Paper*), John C. Howell, Univ. of Rochester (USA) [8272-25]

11:50 am: **Reliable and efficient control of spectral qubits using optoelectronic devices: progress and perspectives**, Jean-Marc Merolla, Luca Fufaro, Kien Phan Huy, Ismael Mbodji, Univ. de Franche-Comté (France); Serge Massar, Erik Woodhead, Laurent Olislager, Univ. Libre de Bruxelles (Belgium); Remo Giust, Univ. de Franche-Comté (France) [8272-26]

12:05 pm: **Anderson localization and co-localization of spatially entangled photons**, Ayman F. Abouraddy, Giovanni Di Giuseppe, Demetrios N. Christodoulides, Bahaa E. A. Saleh, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8272-27]

Lunch Break 12:20 to 1:30 pm

SESSION 8

Room: 132 (Exhibit Level) Wed. 1:30 to 3:10 pm

Quantum Spatial

Joint Session with Conference 8274

Session Chair: Enrique J. Galvez, Colgate Univ. (USA)

1:30 pm: **Realization of ultra-broadband entangled photons and application to quantum sensing** (*Invited Paper*), Shigeki Takeuchi, Ryo Okamoto, Masayuki Okano, Hokkaido Univ. (Japan); Akira Tanaka, Shanthi Subashchandran, Osaka Univ. (Japan); Sunao Kurimura, National Institute for Materials Science (Japan); Norihiko Nishizawa, Nagoya Univ. (Japan) [8272-28]

2:00 pm: **Parallel generation of 15 quadripartite cluster entangled states over the optical frequency comb of a single optical parametric oscillator** (*Invited Paper*), Olivier Pfister, Matthew Pysher, Univ. of Virginia (USA); Yoshichika Miwa, The Univ. of Tokyo (Japan); Reihaneh Shahrokshahi, Russell D. Bloomer, Univ. of Virginia (USA) [8272-29]

2:30 pm: **A compact source for quantum image processing with four-wave mixing in Rb85**, Ulrich Vogl, Ryan Glasser, Paul D. Lett, National Institute of Standards and Technology (USA) [8274-11]

2:50 pm: **Controlling the degree of polarization of a coherent beam through spatial-polarization correlations**, Kumel H. Kagalwala, Giovanni Di Giuseppe, Ayman F. Abouraddy, Bahaa E. A. Saleh, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8274-12]

Coffee Break 3:10 to 3:40 pm

SESSION 9

Room: 132 (Exhibit Level) Wed. 3:40 to 5:30 pm

Quantum Imaging

Joint Session with Conference 8274

Session Chair: Philip Richard Hemmer, Texas A&M Univ. (USA)

3:40 pm: **Information in a photon** (*Invited Paper*), Robert W. Boyd, Univ. of Ottawa (Canada) [8272-30]

4:10 pm: **Full-field quantum correlations in position, momentum, and intermediate bases** (*Invited Paper*), Miles J. Padgett, Jonathan Leach, David Ireland, Univ. of Glasgow (United Kingdom); Gerald S. Buller, Ryan E. Warburton, Frauke Izdebski, Heriot-Watt Univ. (United Kingdom); Stephen M. Barnett, Alison M. Yao, Univ. of Strathclyde (United Kingdom) [8274-13]

4:40 pm: **Fiber transport of spatially entangled photons** (*Invited Paper*), Wolfgang Löffler, Eric R. Eliel, Han P. Woerdman, Leiden Univ. (Netherlands); Tijmen G. Euser, Michael Scharrer, Philip J. Russell, Max Planck Institute for the Science of Light (Germany) [8274-14]

5:10 pm: **Two-photon cluster states using polarization and spatial modes**, Enrique J. Galvez, Matthew Novenstern, William H. Schubert, Colgate Univ. (USA) [8274-15]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

UV laser beam switching system for Yb trapped ion quantum information processing, David R. Scherer, Joel M. Hensley, Krishnan R. Parameswaran, Douglas J. Bamford, Physical Sciences Inc. (USA); Emily Mount, Stephen Crain, Jungsang Kim, Duke Univ. (USA) [8272-44]

Single-qubit quantum gates using magneto-optic Kerr effect, Pradeep Kumar, Indian Institute of Technology Kanpur (India) [8272-45]

Decoy-state method for frequency-coded implementation of B92 QKD protocol, Pradeep Kumar, Sudeshna Bhattacharya, Pratyush Pandey, Indian Institute of Technology Kanpur (India) [8272-46]

Coherent switching and signal processing of Stokes waves waveguide array, Igor V. Melnikov, E.L.S. Co. (Russian Federation) [8272-47]

Polarization based quantum information in femtosecond laser written photonic circuits, Andrea Crespi, Roberta Ramponi, Roberto Osellame, Politecnico di Milano (Italy); Linda Sansoni, Giuseppe Vallone, Fabio Sciarrino, Paolo Mataloni, Univ. degli Studi di Roma La Sapienza (Italy) [8272-48]

Thursday 26 January

SESSION 10

Room: 132 (Exhibit Level) Thurs. 8:00 to 10:20 am

Diamond Nanostructures and Photonics

Session Chairs: Zameer UI Hasan, Temple Univ. (USA); Charles M. Santori, Hewlett-Packard Labs. (USA)

8:00 am: **Suppression of phonon sidebands in the spectrum of nitrogen vacancy centers in diamond nano-crystals**, Hong-Quan Zhao, Masazumi Fujiwara, Shigeki Takeuchi, Hokkaido Univ. (Japan) [8272-31]

8:20 am: **Coupling color centers to optical cavities in single crystal diamond** (*Invited Paper*), Jonathan C. Lee, Andrew P. Magyar, Igor Aharonovich, Evelyn L. Hu, Harvard Univ. (USA) [8272-32]

8:50 am: **Towards integrated optical quantum networks in diamond** (*Invited Paper*), Andrei Faraon, Charles M. Santori, Zhihong Huang, Hewlett-Packard Labs. (USA); Paul E. Barclay, Univ. of Calgary (Canada); Kai-Mei C. Fu, Victor Acosta, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) [8272-33]

9:20 am: **Diamond nanophotonics and quantum optics** (*Invited Paper*), Marko Loncar, Thomas M. Babinec, Birgit M. Hausmann, Jennifer T. Choy, Irfan Bulu, Michael J. Burek, Harvard Univ. (USA) [8272-34]

9:50 am: **Tuning nitrogen-vacancy centers to indistinguishability with the DC Stark effect** (*Invited Paper*), Lee C. Bassett, F. Joseph Heremans, Christopher G. Yale, Bob B. Buckley, David D. Awschalom, Univ. of California, Santa Barbara (USA) [8272-35]

Coffee Break 10:20 to 10:50 am

OPTO

SESSION 11

Room: 132 (Exhibit Level) Thurs. 10:50 am to 12:30 pm

Quantum Optics with Artificial Atoms in Semiconductors

Session Chair: Charles M. Santori, Hewlett-Packard Labs. (USA)

10:50 am: **All optical preparation, storage, and readout of a single spin in an individual quantum dot**, Vase S. Jovanov, Florian Klotz, Stephan Kapfinger, Dominik Heiss, Daniel Rudolph, Max Bichler, Martin S. Brandt, Gerhard Abstreiter, Jonathan J. Finley, Technische Univ. München (Germany). . [8272-36]

11:10 am: **Cavity-QED with quantum dots in oxide-apertured micropillars**, Cristian Bonato, Morten Bakker, Jan Gudat, Leiden Univ. (Netherlands); Susanna M. Thon, Univ. of California, Santa Barbara (USA); Hyochul Kim, Univ. of Maryland, College Park (USA); Martin P. van Exter, Dirk Bouwmeester, Leiden Univ. (Netherlands) [8272-37]

11:30 am: **Single-photon emitters based on fluorine implanted ZnMgSe/ZnSe quantum-wells nanostructures**, Young Min Kim, Alexander Pawlis, Klaus Lischka, Univ. Paderborn (Germany); Jan A. Meijer, Ruhr-Univ. Bochum (Germany); Kaoru Sanaka, Darin Sleiter, Yoshi Yamamoto, Stanford Univ. (USA) [8272-38]

11:50 am: **Coherence properties of quantum dot resonance fluorescence**, Clemens Matthiesen, Anthony N. Vamivakas, Peter Humphreys, Mete Atatüre, Univ. of Cambridge (United Kingdom) [8272-39]

12:10 pm: **Telecommunication-wavelength quantum dot polarization entangled photon-pair source**, Martin B. Ward, Toshiba Research Europe Ltd. (United Kingdom); Matthew C. Dean, Toshiba Research Europe Ltd. (United Kingdom) and Univ. of Cambridge (United Kingdom); R. Mark Stevenson, Anthony J. Bennett, David J. P. Ellis, Toshiba Research Europe Ltd. (United Kingdom); Ken Cooper, Ian Farrer, Christine A. Nicoll, David A. Ritchie, Univ. of Cambridge (United Kingdom); Andrew J. Shields, Toshiba Research Europe Ltd. (United Kingdom). [8272-40]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 12

Room: 132 (Exhibit Level) Thurs. 2:00 to 3:10 pm

Quantum Optics with Atoms in Solids

Session Chair: Philip Richard Hemmer, Texas A&M Univ. (USA)

2:00 pm: **Single-atom absorption imaging**, Erik W. Streed, Ctr. for Quantum Dynamics, Griffith Univ. (Australia) [8272-49]

2:30 pm: **Quantum memory in warm Rb vapor with buffer gas**, Mark Bashkansky, Fredrik K. Fatemi, Igor Vurgaftman, U.S. Naval Research Lab. (USA) [8272-42]

2:50 pm: **Control of the exciton g-factor in InGaAs quantum dots by electrical and magnetic fields**, Vase S. Jovanov, Thomas Eissfeller, Stephan Kapfinger, Emily C. Clark, Florian Klotz, Max Bichler, Technische Univ. München (Germany); Joris G. Keizer, Paul M. Koenraad, Technische Univ. Eindhoven (Netherlands); Gerhard Abstreiter, Jonathan J. Finley, Technische Univ. München (Germany). [8272-43]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.



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Advances in Slow and Fast Light V

Conference Chairs: **Selim M. Shahriar**, Northwestern Univ. (USA); **Frank A. Narducci**, Naval Air Systems Command (USA)

Program Committee: **Tony Abi-Salloum**, Widener Univ. (USA); **Shanhui Fan**, Stanford Univ. (USA); **Daniel Joseph Gauthier**, Duke Univ. (USA); **Kohzo Hakuta**, The Univ. of Electro-Communications (Japan); **Ortwin Hess**, Imperial College London (United Kingdom); **John C. Howell**, Univ. of Rochester (USA); **Jacob B. Khurgin**, The Johns Hopkins Univ. (USA); **Uriel Levy**, The Hebrew Univ. of Jerusalem (Israel); **Gour S. Pati**, Delaware State Univ. (USA); **Jacob Scheuer**, Tel Aviv Univ. (Israel)

Sunday 22 January

SESSION 1

Room: 272 (Mezzanine) Sun. 8:30 to 9:50 am

Slow and Fast Light in Resonant Systems

Session Chair: **Uriel Levy**, The Hebrew Univ. of Jerusalem (Israel)

8:30 am: **Implementation and applications of quantum Hall physics with optical photons**, Mohammad Hafezi, Jun Chen, Joint Quantum Institute (USA); Mikhail D. Lukin, Eugene A. Demler, Harvard Univ. (USA); Alan L. Migdall, Jacob M. Taylor, Joint Quantum Institute (USA) [8273-01]

8:45 am: **Population oscillation induced slow light in a nonlinear photonic crystal microcavity** (*Invited Paper*), Patricio Grinberg, Juan Ariel Levenson, Alejandro M. Giacomotti, Kamel Bencheikh, Ctr. National de la Recherche Scientifique (France); Patrice Féron, Yannick Dumeige, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) [8273-02]

9:10 am: **Slow light enhancement of four-wave mixing in coupled silicon-insulator microrings** (*Invited Paper*), Jun Rong Ong, Shayan Mookherjee, Univ. of California, San Diego (USA) [8273-03]

9:35 am: **Dynamical trapping of light in coupled laser arrays: slow or fast?**, Yuval Yifat, Jacob Scheuer, Tel Aviv Univ. (Israel); Christopher Long, Eli Kapon, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8273-04]

Coffee Break 9:50 to 10:20 am

SESSION 2

Room: 272 (Mezzanine) Sun. 10:20 am to 12:00 pm

Slow and Fast Light in Atomic Vapor

Session Chair: **Jacob Scheuer**, Tel Aviv Univ. (Israel)

10:20 am: **Atomic prism** (*Invited Paper*), John C. Howell, Univ. of Rochester (USA) [8273-05]

10:45 am: **Slow and stored light with atom-based squeezed light** (*Invited Paper*), Irina Novikova, The College of William & Mary (USA) [8273-06]

11:10 am: **Light matter interactions on a chip: a new integrated platform for slow and fast light** (*Invited Paper*), Uriel Levy, The Hebrew Univ. of Jerusalem (Israel) [8273-07]

11:35 am: **Effect of Zeeman sublevels on light shifts in CPT-based Raman-Ramsey atomic clocks** (*Invited Paper*), Gour S. Pati, Delaware State Univ. (USA); Selim Shahriar, Northwestern Univ. (USA) [8273-08]

Lunch Break 12:00 to 1:00 pm

SESSION 3

Room: 272 (Mezzanine) Sun. 1:00 to 3:30 pm

Slow and Fast Light Using SOA, SBS, and NLO

Session Chair: **Mary Salit**, Honeywell Aerospace (USA)

1:00 pm: **Slow and fast light in SOAs for microwave photonics applications** (*Invited Paper*), Perrine Berger, Thales Research & Technology (France) [8273-09]

1:25 pm: **Sensitivity enhancement in a superluminal semiconductor optical amplifier ring laser** (*Invited Paper*), Sean Spillane, Los Gatos Research, Inc. (USA); Selim Shahriar, Northwestern Univ. (USA) [8273-10]

1:50 pm: **Variable delay and sensing using stationary and localized Brillouin dynamic gratings** (*Invited Paper*), Avi Zadok, Yair Antman, Bar-Ilan Univ. (Israel); Nikolay Primerov, Luc Thévenaz, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Juan Sancho-Dura, Univ. Politécnic de Valencia (Spain) [8273-11]

2:15 pm: **A Brillouin gain based fast light fiber laser for sensing applications** (*Invited Paper*), Jacob Scheuer, Tel Aviv Univ. (Israel); Selim Shahriar, Northwestern Univ. (USA) [8273-12]

2:40 pm: **Nonlinear wave-mixing processes via slow and fast light: recent developments** (*Invited Paper*), Yuri Rostovtsev, Univ. of North Texas (USA) [8273-13]

3:05 pm: **Nonlinear optics at the few-photon level in photonic crystal fibers** (*Invited Paper*), Vivek Venkataraman, Kasturi Saha, Pablo Londero, Alexander L. Gaeta, Cornell Univ. (USA) [8273-14]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 272 (Mezzanine) Sun. 4:00 to 6:05 pm

Slow and Fast Light in Spectral Hole Burning Media and Nanofiber

Session Chair: **Perrine Berger**, Thales Research & Technology (France)

4:00 pm: **Brillouin scattering for dynamic sensing** (*Invited Paper*), Moshe Tur, Yair Peled, Avi Motil, Lior Yaron, Tel Aviv Univ. (Israel) [8273-14]

4:25 pm: **Increasing the scale factor of a ring laser gyro via spectral hole burning** (*Invited Paper*), Mary Salit, Kenneth Salit, Paul E. Bauhahn, Honeywell Aerospace Advanced Technology (USA) [8273-15]

4:50 pm: **Toward deep tissue biomedical imaging with slow light and ultrasound** (*Invited Paper*), Philip R. Hemmer, Texas A&M Univ. (USA); Stefan Kroll, Lund Univ. (Sweden); Lihong V. Wang, Washington Univ. in St. Louis (USA); Huiliang Zhang, Harvard Univ. (USA); Mahmood Sabooni, Lars Rippe, Lund Univ. (Sweden); Chulhong Kim, Univ. at Buffalo (USA) [8273-17]

5:15 pm: **Various applications of slow light in a rare-earth doped crystal** (*Invited Paper*), Byoung Seung Ham, Inha Univ. (Korea, Republic of) [8273-18]

5:40 pm: **Manipulation of light propagation using optical-nanofiber cavities** (*Invited Paper*), Kali P. Nayak, Kohzo Hakuta, The Univ. of Electro-Communications (Japan) [8273-19]

Monday 23 January

SESSION 5

Room: 272 (Mezzanine) Mon. 8:00 to 10:30 am

Slow and Fast Light Using Photonic Crystal Structures

Session Chair: **David D. Smith**, NASA Marshall Space Flight Ctr. (USA)

8:00 am: **Slow-light in photonic crystal waveguides/fibers: dispersion tailoring schemes for obtaining a high group index with wide band and low GVD** (*Invited Paper*), Liyong Ren, Jian Liang, Xi'an Institute of Optics and Precision Mechanics (China); Maojin Yun, Qingdao Univ. (China); Chengju Ma, Xu Han, Yu Liu, Xi'an Institute of Optics and Precision Mechanics (China); Yasuo Tomita, The Univ. of Electro-Communications (Japan) [8273-20]

8:25 am: **The role of slow wave propagation in nonlinear photonic crystal waveguides** (*Invited Paper*), Gadi Eisenstein, Isabelle Cestier, Vardit Eckhouse, Amnon Willinger, Technion-Israel Institute of Technology (Israel); Sylvain Combré, Gaëlle Lehoucq, Alfredo De Rossi, Thales Research & Technology (France); Sourabh Roy, Marco Santagiustina, Univ. degli Studi di Padova (Italy) [8273-21]

8:50 am: **Ultra high Q photonic structures on silicon** (*Invited Paper*), Michal F. Lipson, Cornell Univ. (USA) [8273-22]

9:15 am: **Progress in hollow-core photonic crystal fibre for atomic vapour based coherent optics** (*Invited Paper*), Thomas D. Bradley, Yingying Wang, Meshaal Alharbi, Coralie Fourcade-Dutin, Brian J. Mangan, Natalie V. Wheeler, Fetah Benabid, Univ. of Bath (United Kingdom) and Xlim Research institute, CNRS, Univ. of Limoges (France) [8273-23]

Conference 8273 · Room: 272 (Mezzanine)

9:40 am: **Slow and fast light in dispersion engineered photonic crystal cavities** (*Invited Paper*), Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) [8273-24]
10:05 am: **Dark resonances in all-optical analogue to EIT: lossless intensity modulation, force enhancement, and optical antennas** (*Invited Paper*), Shanhui Fan, Stanford Univ. (USA) [8273-25]
Coffee Break 10:30 to 11:00 am

SESSION 6

Room: 272 (Mezzanine) Mon. 11:00 am to 12:30 pm

Sensors Using Slow and Fast Light I

Session Chair: **Gour S. Pati**, Delaware State Univ. (USA)

11:00 am: **Dispersion in a four level n-scheme atomic system with co- and counter-propagating fields** (*Invited Paper*), Frank A. Narducci, Jon P. Davis, Naval Air Systems Command (USA) [8273-26]
11:25 am: **Effect of inhomogeneous broadening and buffer-gas collisions on a DPAL based superluminal laser for precision sensing** (*Invited Paper*), Tony Abi-Salloum, Widener Univ. (USA); Selim Shahriar, Northwestern Univ. (USA) [8273-27]
11:50 am: **Tuning the sensitivity of an optical cavity using slow and fast light** (*Invited Paper*), David D. Smith, NASA Marshall Space Flight Ctr. (USA) [8273-28]
12:15 pm: **Rb-based superluminal DPAL laser: properties and applications to sensing**, Joshua Yablon, Shih Tseng, Selim Shahriar, Northwestern Univ. (USA) [8273-29]
Lunch Break 12:30 to 1:30 pm

SESSION 7

Room: 272 (Mezzanine) Mon. 1:30 to 2:45 pm

Sensors Using Slow and Fast Light II

Session Chair: **Shanhui Fan**, Stanford Univ. (USA)

1:30 pm: **Slow-light through wave-mixing in liquid crystal light-valves and interferometric applications** (*Invited Paper*), Stefania Residori, Institut Non Linéaire de Nice Sophia Antipolis (France) [8273-30]
1:55 pm: **Slow light in fiber sensors** (*Invited Paper*), Michel J. F. Digonnet, He Wen, Matthew A. Terrel, Shanhui Fan, Stanford Univ. (USA) [8273-31]
2:20 pm: **Improved spectral performance of Fourier transform interferometer utilizing slow light medium** (*Invited Paper*), Yundong Zhang, Harbin Institute of Technology (China) [8273-32]
Coffee Break 2:45 to 3:15 pm

SESSION 8

Room: 272 (Mezzanine) Mon. 3:15 to 6:00 pm

Theoretical Studies in Slow and Fast Light

Session Chair: **Thomas F. Krauss**, Univ. of St. Andrews (United Kingdom)

3:15 pm: **New physics and new applications with slow light** (*Invited Paper*), Robert W. Boyd, Univ. of Rochester (USA) [8273-33]
3:40 pm: **Microscopic and macroscopic descriptions of electromagnetic-field propagation in nonlinear dispersive and absorbing media** (*Invited Paper*), Verne L. Jacobs, U.S. Naval Research Lab. (USA) [8273-34]
4:05 pm: **Kerr effect in structured superluminal media** (*Invited Paper*), Xabier Angulo-Vinuesa, Consejo Superior de Investigaciones Científicas (Spain) and Univ. de Alcalá (Spain); Sonia Martín-López, Consejo Superior de Investigaciones Científicas (Spain); Christophe Caucheteur, Damien Kinet, Marc Wuilpart, Univ. de Mons (Belgium); Andrey Denisov, Sanghoon Chin, Luc Thévenaz, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Miguel González-Herráez, Univ. de Alcalá (Spain) [8273-35]

4:30 pm: **Raman-active photonic crystal: dual wavelength slow light, optical memory, and signal processing**, Igor V. Melnikov, E.L.S. Co. (Russian Federation) [8273-36]
4:45 pm: **Slow light: Where does the energy hide?** (*Invited Paper*), Jacob B. Khurgin, The Johns Hopkins Univ. (USA) [8273-37]
5:10 pm: **Propagation of slow whispering gallery modes along the optical fiber** (*Invited Paper*), Misha Sumetsky, OFS (USA) [8273-38]
5:35 pm: **Universality in slow light spectra** (*Invited Paper*), Nir Davidson, Rami Pugatch, Weizmann Institute of Science (Israel); Dipankar Bhattacharyya, Santipur College (India); Ofer Firstenberg, Technion-Israel Institute of Technology (Israel) [8273-39]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)
8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)
8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)
9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 9

Room: 272 (Mezzanine) Tues. 10:30 am to 12:00 pm

Slow and Fast Light for Optical Communication, Optomechanics, and Microwave Photonics

Session Chair: **Stefania Residori**, Institut Non Linéaire de Nice Sophia Antipolis (France)

10:30 am: **Tunable optical tapped-delay-lines for signal processing applications** (*Invited Paper*), Alan E. Willner, The Univ. of Southern California (USA) [8273-40]
10:55 am: **Constant- and variable-chirp gratings for a broadband white light cavity for data buffering**, Xue Liu, Honam Yum, Northwestern Univ. (USA); Philip R. Hemmer, Texas A&M Univ. (USA); Selim Shahriar, Northwestern Univ. (USA) [8273-41]
11:10 am: **Slow-light enhanced optomechanical interactions** (*Invited Paper*), Andrey A. Sukhorukov, The Australian National Univ. (Australia) [8273-42]
11:35 am: **Optomechanical light storage in a silica resonator** (*Invited Paper*), Hailin Wang, Univ. of Oregon (USA) [8273-43]
Lunch/Exhibition Break 12:00 to 1:15 pm

SESSION 10

Room: 272 (Mezzanine) Tues. 1:15 to 2:55 pm

New Directions in Slow and Fast Light I*Session Chair: Jacob B. Khurgin, The Johns Hopkins Univ. (USA)*

- 1:15 pm: **Recent progress in on-chip slow light devices** (*Invited Paper*), Toshihiko Baba, Yokohama National Univ. (Japan) [8273-45]
- 1:40 pm: **Slow-light enhancement of gain in active photonic crystal waveguides** (*Invited Paper*), Jesper Moerk, S. Ek, Yaohui Chen, P. Lunnemann, F. Wang, Kresten Yvind, Technical Univ. of Denmark (Denmark) [8273-44]
- 2:05 pm: **Light buckets: stopping light in light capacitors** (*Invited Paper*), Meir Orenstein, Technion-Israel Institute of Technology (Israel) [8273-46]
- 2:30 pm: **EIT and quantum memory in nanomechanical systems** (*Invited Paper*), Girish S. Agarwal, Oklahoma State Univ. (USA) [8273-47]
- Coffee Break 2:55 to 3:25 pm

SESSION 11

Room: 272 (Mezzanine) Tues. 3:25 to 5:55 pm

New Directions in Slow and Fast Light II*Session Chair: Girish Saran Agarwal, Oklahoma State Univ. (USA)*

- 3:25 pm: **Enhancing the light-atom interactions using slow light: towards the concept of dense light** (*Invited Paper*), Luc Thévenaz, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8273-48]
- 3:50 pm: **Control of transparency: slow and fast light in room-temperature metastable helium-4** (*Invited Paper*), Rupamanjari Ghosh, Jawaharlal Nehru Univ. (India) [8273-49]
- 4:15 pm: **Recent development in slow light with topological electromagnetic modes** (*Invited Paper*), Zheng Wang, The Univ. of Texas at Austin (USA) [8273-50]
- 4:40 pm: **Amplified stopped light in metamaterial waveguides** (*Invited Paper*), Kosmas L. Tsakmakidis, Imperial College London (United Kingdom); Edmund I. Kirby, Univ. of Surrey (United Kingdom); Tim Pickering, Ortwin Hess, Imperial College London (United Kingdom) [8273-51]
- 5:05 pm: **Slow light in a symmetrically-pumped DFB fiber laser with a variable phase shift** (*Invited Paper*), Igor V. Melnikov, E.L.S. Co. (Russian Federation) [8273-52]
- 5:30 pm: **Deterministic optical rogue waves** (*Invited Paper*), C. Bonatto, Univ. Politècnica de Catalunya (Spain); M. Feyereisen, Stephane Barland, Massimo Giudici, Institut Non Linéaire de Nice Sophia Antipolis (France); Cristina Masoller, Univ. Politècnica de Catalunya (Spain); J. R. Rios Leite, Univ. Federal de Pernambuco (Brazil); Jorge R. Tredicce, Institut Non Linéaire de Nice Sophia Antipolis (France) [8273-53]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

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 Tuesday · 10:00 am to 5:00 pm
 Wednesday · 10:00 am to 5:00 pm
 Thursday · 10:00 am to 4:00 pm

Conference 8274 · Room: 252 (Mezzanine)

Wednesday-Thursday 25-26 January 2012 • Proceedings of SPIE Vol. 8274

Complex Light and Optical Forces VI

Conference Chairs: **Enrique J. Galvez**, Colgate Univ. (USA); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Jesper Glückstad**, Technical Univ. of Denmark (Denmark)

Conference Co-Chair: **Marat S. Soskin**, Institute of Physics (Ukraine)

Program Committee: **Nicholas P. Bigelow**, Univ. of Rochester (USA); **Shu-Chun Chu**, National Cheng Kung Univ. (Taiwan); **Kishan Dholakia**, Univ. of St. Andrews (United Kingdom); **Wolfgang A. Erntmer**, Leibniz Univ. Hannover (Germany); **Jean-Marc R. Fournier**, Ecole Polytechnique Fédérale de Lausanne (France); **David G. Grier**, New York Univ. (USA); **Ruediger Grunwald**, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); **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); **Grover A. Swartzlander, Jr.**, Rochester Institute of Technology (USA); **Juan P. Torres**, ICFO - Instituto de Ciencias Fotónicas (Spain); **Ewan M. Wright**, College of Optical Sciences, The Univ. of Arizona (USA)

Wednesday 25 January

SESSION 1

Room: 252 (Mezzanine) Wed. 8:00 to 10:10 am

Fundamental OAM

Session Chair: **Enrique J. Galvez**, Colgate Univ. (USA)

8:00 am: **Light's orbital angular momentum: diffraction and applications** (*Invited Paper*), Jandir M. Hickmann M.D., Optics and Materials Group (Brazil) [8274-01]

8:30 am: **Mechanically induced image rotation: analogy of the Faraday effect for orbital angular momentum**, Miles J. Padgett, Sonja Franke-Arnold, Graham M. Gibson, Univ. of Glasgow (United Kingdom); Robert W. Boyd, Univ. of Ottawa (Canada) [8274-02]

8:50 am: **Cholesteric polymers and the orbital angular momentum of light**, Wolfgang Löffler, Han P. Woerdman, Leiden Univ. (Netherlands) [8274-03]

9:10 am: **Optical superchirality and electromagnetic angular momentum**, David L. Andrews, Matt M. Coles, Univ. of East Anglia Norwich (United Kingdom) [8274-04]

9:30 am: **Measuring the orbital angular momentum density for a superposition of Bessel beams**, Angela Dudley, Igor Litvin, Andrew Forbes, CSIR National Laser Ctr. (South Africa) [8274-05]

9:50 am: **A higher order Poincare sphere representation**, Giovanni Milione, Robert R. Alfano, The City College of New York (USA) [8274-06]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 252 (Mezzanine) Wed. 10:40 am to 12:10 pm

Optical Forces

Session Chair: **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

10:40 am: **Current reversals in a deterministic optical rocking ratchet** (*Invited Paper*), Karen P. Volke-Sepúlveda, Alejandro V. Arzola, Jose L. Mateos, Univ. Nacional Autónoma de México (Mexico) [8274-07]

11:10 am: **Picolitre rheology of gaseous media using a rotating optically trapped birefringent microparticle**, Yoshihiko Arita, Andrew McKinley, Michael Mazilu, Univ. of St. Andrews (United Kingdom); Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia); Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8274-08]

11:30 am: **Optical recoil of electromagnetic radiators with asymmetric radiation pattern**, Jung-Hwan Song, Jonghwa Shin, Yong-Hee Lee, KAIST (Korea, Republic of) [8274-09]

11:50 am: **Optical negative force: tractor beam and beyond**, Cheng-Wei Qiu, National Univ. of Singapore (Singapore); Andrey Novitsky, Technical Univ. of Denmark (Denmark) [8274-10]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 3

Room: 132 (Exhibit Level) Wed. 1:30 to 3:10 pm

Quantum Spatial

Joint Session with Conference 8272

Session Chair: **Enrique J. Galvez**, Colgate Univ. (USA)

1:30 pm: **Realization of ultra-broadband entangled photons and application to quantum sensing** (*Invited Paper*), Shigeki Takeuchi, Ryo Okamoto, Masayuki Okano, Hokkaido Univ. (Japan); Akira Tanaka, Shanthi Subashchandran, Osaka Univ. (Japan); Sunao Kurimura, National Institute for Materials Science (Japan); Norihiko Nishizawa, Nagoya Univ. (Japan) [8272-28]

2:00 pm: **Parallel generation of 15 quadripartite cluster entangled states over the optical frequency comb of a single optical parametric oscillator** (*Invited Paper*), Olivier Pfister, Matthew Pysker, Univ. of Virginia (USA); Yoshichika Miwa, The Univ. of Tokyo (Japan); Reihaneh Shahrokhsahi, Russell D. Bloomer, Univ. of Virginia (USA) [8272-29]

2:30 pm: **A compact source for quantum image processing with four-wave mixing in Rb85**, Ulrich Vogl, Ryan Glasser, Paul D. Lett, National Institute of Standards and Technology (USA) [8274-11]

2:50 pm: **Controlling the degree of polarization of a coherent beam through spatial-polarization correlations**, Kumel H. Kagalwala, Giovanni Di Giuseppe, Ayman F. Abouraddy, Bahaa E. A. Saleh, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8274-12]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: 132 (Exhibit Level) Wed. 3:40 to 5:30 pm

Quantum Imaging

Joint Session with Conference 8272

Session Chair: **Philip Richard Hemmer**, Texas A&M Univ. (USA)

3:40 pm: **Information in a photon** (*Invited Paper*), Robert W. Boyd, Univ. of Ottawa (Canada) [8272-30]

4:10 pm: **Full-field quantum correlations in position, momentum, and intermediate bases** (*Invited Paper*), Miles J. Padgett, Jonathan Leach, David Ireland, Univ. of Glasgow (United Kingdom); Gerald S. Buller, Ryan E. Warburton, Frauke Izdebski, Heriot-Watt Univ. (United Kingdom); Stephen M. Barnett, Alison M. Yao, Univ. of Strathclyde (United Kingdom) [8274-13]

4:40 pm: **Fiber transport of spatially entangled photons** (*Invited Paper*), Wolfgang Löffler, Eric R. Eliel, Han P. Woerdman, Leiden Univ. (Netherlands); Tijmen G. Euser, Michael Scharrer, Philip J. Russell, Max Planck Institute for the Science of Light (Germany) [8274-14]

5:10 pm: **Two-photon cluster states using polarization and spatial modes**, Enrique J. Galvez, Matthew Novenstern, William H. Schubert, Colgate Univ. (USA) [8274-15]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Enhanced near-field properties of a gap of TiO₂ nanosphere pairs for photocatalysis optical trap, Toshiyuki Honda, Mitsuhiro Terakawa, Minoru Obara, Keio Univ. (Japan) [8274-34]

Tracking phase singularities in optical fields, Julia Borchardt, Michael Duparré, Stefan Skupin, Friedrich-Schiller-Univ. Jena (Germany) [8274-35]

Laser guidance-based cell sorting in a microfluidic biochip, Wan Qin, Lucas Schmidt, Zhen Ma, Hai Yao, Clemson Univ. (USA); Xiang Peng, Shenzhen Univ. (China); Xiacong Yuan, Nankai Univ. (China); Bruce Gao, Clemson Univ. (USA) [8274-36]

Observation of speckle instability in Kerr random media, Stefania Residori, Umberto Bortolozzo, Institut Non Linéaire de Nice Sophia Antipolis (France); Patrick Sebbah, L'Institut Langevin (France) [8274-37]

Structural features of the diffraction field, Javier Muñoz-Lopez, Gabriel Martinez-Niconoff, Patricia Martinez-Vara, Gerardo Diaz-Gonzalez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [8274-38]

Diffraction characteristics of optical and polarization vortices generated by an axially-symmetric polarizer, Moritsugu Sakamoto, Kazuhiko Oka, Ryuji Morita, Hokkaido Univ. (Japan) [8274-39]

Broadband orbital angular momentum manipulation using liquid crystal thin films, Yanming Li, Jihwan Kim, Michael J. Escuti, North Carolina State Univ. (USA) [8274-41]

Thursday 26 January

SESSION 5

Room: 252 (Mezzanine) Thurs. 8:00 to 10:10 am

New Developments in Optical Trapping

Session Chair: Miles J. Padgett, Univ. of Glasgow (United Kingdom)

8:00 am: **Formation of optical flux lattices for ultra cold atoms** (*Invited Paper*), Gediminas Juzeliunas, Vilnius Univ. (Lithuania) [8274-16]

8:30 am: **Optical eigenmodes for imaging applications**, Sebastian Kosmeier, Michael Mazilu, Anna Chiara De Luca, Jörg Baumgartl, Tom Vettenburg, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8274-17]

8:50 am: **Bio-optofluidics cell sorter**, Jesper Glückstad, Technical Univ. of Denmark (Denmark) [8274-18]

9:10 am: **Combined acoustic and optical trapping**, Gregor Thalhammer, Ruth Steiger, Stefan Bernet, Monika Ritsch-Marte, Innsbruck Medical Univ. (Austria) [8274-19]

9:30 am: **Laser trapping-induced phase transition of individual smectic liquid crystal micro-droplet showing size-dependent dynamics**, Anwar Usman, Wei-Yi Chiang, Takayuki Uwada, Hiroshi Masuhara, National Chiao Tung Univ. (Taiwan) [8274-20]

9:50 am: **Enhanced near field properties of gold nanoparticle pairs for size selective trap**, Kodai Hirano, Mitsuhiro Terakawa, Minoru Obara, Keio Univ. (Japan) [8274-21]

Coffee Break 10:10 to 10:40 am

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

SESSION 6

Room: 252 (Mezzanine) Thurs. 10:40 to 11:40 am

Novel Aspects of Manipulation

Session Chair: Marat S. Soskin, Institute of Physics (Ukraine)

10:40 am: **Machine vision for a compact biophotonics workstation**, Jesper Glückstad, Technical Univ. of Denmark (Denmark) [8274-22]

11:00 am: **The Bessel beam random access trap**, Tobias Paprotta, Bweh Esembeson, Ludwig Eichner, Jens Schumacher, Thorlabs Inc. (USA); Steve C. Wasserman D.V.M., Massachusetts Institute of Technology (USA); Alex E. Cable, Thorlabs Inc. (USA) [8274-23]

11:20 am: **Molecular interactions between carbon nanotubes and DNA**, Tu Hong, Yunhao Cao, Yaqiong Xu, Vanderbilt Univ. (USA) [8274-24]

SESSION 7

Room: 252 (Mezzanine) Thurs. 11:40 am to 12:10 pm

Complex Light I: Knots and Vortices

Session Chair: Marat S. Soskin, Institute of Physics (Ukraine)

11:40 am: **Optical vortex lines in self-focusing nonlinear media: loops, links, and knots** (*Invited Paper*), Anton S. Desyatnikov, Daniel Buccoliero, The Australian National Univ. (Australia); Mark R. Dennis, Univ. of Bristol (United Kingdom); Yuri S. Kivshar, The Australian National Univ. (Australia) . . . [8274-25]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 8

Room: 252 (Mezzanine) Thurs. 1:40 to 3:30 pm

Complex Light II: Generation and Propagation

Session Chair: Monika A. Ritsch-Marte, Innsbruck Medical Univ. (Austria)

1:40 pm: **Tailored light fields for complex optical structuring and organisation** (*Invited Paper*), Cornelia Denz, Mike Wördemann, Christina Alpmann, Westfälische Wilhelms-Univ. Münster (Germany) [8274-26]

2:10 pm: **Fine topological structure of coherent complex light created by carbon nanocomposites in LC**, Vladislav V. Ponevchinsky, Institute of Physics (Ukraine); Andrey I. Goncharuk, F. D. Ovcharenko Institute of Biocolloidal Chemistry (Ukraine); Serguey S. Minenko, Longin N. Lisetskii, Institute for Scintillation Materials (Ukraine); Nikolai I. Lebovka, F. D. Ovcharenko Institute of Biocolloidal Chemistry (Ukraine); Marat S. Soskin, Institute of Physics (Ukraine) [8274-27]

2:30 pm: **Nonlinear mixing of optical vortices**, Stefania Residori, Umberto Bortolozzo, Institut Non Linéaire de Nice Sophia Antipolis (France); Francesco Lenzini, Tito Arecchi, Univ. degli Studi di Firenze (Italy) [8274-28]

2:50 pm: **Generation of highly confined optical bottle beams by photonic nanojet effect**, Myun-Sik Kim, Toralf Scharf, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Stefan Mühlig, Carsten Rockstuhl, Friedrich-Schiller-Univ. Jena (Germany); Hans Peter Herzig, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8274-29]

3:10 pm: **Experimental control over soliton interaction in optical fiber by pre-shaped input field**, Esben R. Andresen, Institut Fresnel (France); John M. Dudley, Univ. de Franche-Comté (France); Dan Oron, Weizmann Institute of Science (Israel); Christophe Finot, Univ. de Bourgogne (France); Hervé Rigneault, Institut Fresnel (France) [8274-30]

Coffee Break 3:30 to 4:00 pm

SESSION 9

Room: 252 (Mezzanine) Thurs. 4:00 to 5:10 pm

Polarization Singularities and Vector Beams

Session Chair: Jesper Glückstad, Technical Univ. of Denmark (Denmark)

4:00 pm: **Tangled nonlinear driven chain reactions of all optical singularities** (*Invited Paper*), Marat S. Soskin, Vasilii Vasil'ev, Institute of Physics (Ukraine) [8274-31]

4:30 pm: **Twisted longitudinally polarized field in focal region**, Sunil Vyas, Yuichi Kozawa, Shunichi Sato, Tohoku Univ. (Japan) [8274-32]

4:50 pm: **Polarization singularities in optical Gaussian beams**, Enrique J. Galvez, Shreeya Khadka, William H. Schubert, Sean Nomoto, Colgate Univ. (USA) [8274-33]

Conference 8275 · Room: 270 (Mezzanine)

Wednesday-Thursday 25-26 January 2012 • Proceedings of SPIE Vol. 8275

Laser Refrigeration of Solids V

Conference Chairs: **Richard I. Epstein**, The Univ. of New Mexico (USA); **Mansoor Sheik-Bahae**, The Univ. of New Mexico (USA)

Program Committee: **Rudolf Binder**, College of Optical Sciences, The Univ. of Arizona (USA); **Steven R. Bowman**, U.S. Naval Research Lab. (USA); **Joaquín Fernández**, Univ. del País Vasco (Spain); **Zameer Ul Hasan**, Temple Univ. (USA); **Jacob B. Khurgin**, The Johns Hopkins Univ. (USA); **Roberto Onofrio**, Dartmouth College (USA); **Mauro Tonelli**, Univ. di Pisa (Italy)

Wednesday 25 January

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Thermal imaging with high spatial and temperature resolution, Denis V. Seletskiy, The Univ. of New Mexico (USA) and Air Force Research Lab. (USA); Seth D. Melgaard, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8275-11]

Novel photon blockade schemes for thermal link applications, Denis V. Seletskiy, The Univ. of New Mexico (USA) and Air Force Research Lab. (USA); Juanita Trevino, Seth D. Melgaard, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8275-17]

Polarization-resolved optical metrology for noncontact thermometry, Mohammadreza Ghasemkhani, Denis V. Seletskiy, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8275-18]

Thursday 26 January

SESSION 1

Room: 270 (Mezzanine) Thurs. 8:00 to 10:00 am

Optical Refrigeration in Rare-Earth Doped Systems

Session Chair: **Raman Kashyap**, Ecole Polytechnique de Montréal (Canada)

8:00 am: **Optical cooling of Nd-doped solids** (*Invited Paper*), Angel J. Garcia-Adeva, Rolindes Balda, Sara Garcia-Revilla, Mohammad Al Saleh, Joaquin Fernandez, Univ. del País Vasco (Spain) [8275-01]

8:25 am: **Emission dynamics of holmium-doped potassium lead chloride** (*Invited Paper*), Nicholas J. Condon, Steven R. Bowman, Shawn P. O'Connor, U.S. Naval Research Lab. (USA); Richard S. Quimby, Worcester Polytechnic Institute (USA) [8275-02]

8:50 am: **High sensitivity spectroscopic and thermal characterization of cooling efficiency for optical refrigeration materials**, Seth Melgaard, Denis Seletskiy, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA); Mauro Tonelli, Alberto Di Lieto, Univ. di Pisa (Italy) [8275-03]

9:10 am: **Intracavity laser cooling using a VECSEL** (*Invited Paper*), Alexander R. Albrecht, The Univ. of New Mexico (USA) and Ctr. for High Technology Materials, The Univ. of New Mexico (USA); Denis V. Seletskiy, The Univ. of New Mexico (USA) and Air Force Research Lab. (USA); Jeffrey G. Cederberg, Sandia National Labs. (USA); Alberto Di Lieto, Mauro Tonelli, Univ. di Pisa (Italy); Jerome V. Moloney, The Univ. of Arizona (USA); Ganesh Balakrishnan, Ctr. for High Technology Materials, The Univ. of New Mexico (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8275-04]

9:35 am: **All fiber approach to solid-state laser cooling** (*Invited Paper*), Dan T. Nguyen, Jie Zong, Dan L. Rhonehouse, Zhidong Yao, Andy Miller, Arturo Chavez-Pirson, NP Photonics, Inc. (USA); Christopher M. Shanor, Baijie Gu, Rolf Binder, Garrett Hardesty, Nai-Hang Kwong, College of Optical Sciences, The Univ. of Arizona (USA) [8275-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 270 (Mezzanine) Thurs. 10:30 am to 12:10 pm

Novel Approaches in Laser Cooling

Session Chair: **Steven R. Bowman**, U.S. Naval Research Lab. (USA)

10:30 am: **Optical filtering of Stokes lines for cooling** (*Invited Paper*), Gaurav Bahl, Matthew Tomes, Tal Carmon, Univ. of Michigan (USA) [8275-06]

10:55 am: **Laser cooling of atoms by collisional redistribution of fluorescence** (*Invited Paper*), Ulrich Vogl, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA); Anne Sass, Martin Weitz, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) [8275-07]

11:20 am: **Laser cooling of solids by stimulated Raman scattering and fluorescence** (*Invited Paper*), Stephen C. Rand, Univ. of Michigan (USA) [8275-08]

11:45 am: **Pulsed laser cooling for cavity-optomechanical resonators** (*Invited Paper*), Alex Retzker, Shai Machnes, Martin B. Plenio, Javier Moreno, Univ. Ulm (Germany); Markus Aspelmeyer, Witlef Wieczorek, Univ. Wien (Austria) [8275-09]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 3

Room: 270 (Mezzanine) Thurs. 1:40 to 3:05 pm

Advances in Solid-State Laser Refrigeration I

Session Chair: **Angel J. Garcia-Adeva**, Univ. del País Vasco (Spain)

1:40 pm: **Laser cooling with lead-salt colloidal quantum dots doped in a glass host** (*Invited Paper*), Galina A. Nemova, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) [8275-10]

2:05 pm: **Development of highly doped passivation in the GaInP/GaAs double heterostructure for use in laser cooling**, Daniel Bender, Jeffrey Cederberg, Sandia National Labs. (USA); Chengao Wang, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8275-16]

2:25 pm: **Indium fluoride glass fiber**, Mohammed Saad, IRPhotonics Inc. (Canada) [8275-12]

2:45 pm: **Peculiarities of optical cooling effect in ytterbium-doped ferroelectric lithium niobate crystal**, Vahan G. Babajanyan, Institute for Physical Research (Armenia) [8275-13]

Coffee Break 3:05 to 3:35 pm

SESSION 4

Room: 270 (Mezzanine) Thurs. 3:35 to 4:25 pm

Advances in Solid-State Laser Refrigeration II

Session Chair: **Denis Seletskiy**, The Univ. of New Mexico (USA)

3:35 pm: **Heat removal technologies for use with optical refrigerators** (*Invited Paper*), Richard I. Epstein, Kevin J. Malloy, The Univ. of New Mexico (USA) [8275-14]

4:00 pm: **Laser cooling and upconversion processes in crystals and glasses with high erbium concentrations** (*Invited Paper*), Zameer U. Hasan, Jonathan W. Lynch, Temple Univ. (USA) [8275-15]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Vertical-Cavity Surface-Emitting Lasers XVI

Conference Chairs: **Chun Lei**, EMCORE Corp. (USA); **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign (USA)

Program Committee: **Kent M. Geib**, Sandia National Labs. (USA); **Martin Grabherr**, Philips Technologie GmbH U-L-M Photonics (Germany); **James K. Guenter**, Finisar Corp. (USA); **Karlheinz H. Guldén**, Oclaro, Inc. (Switzerland); **Jeong-Ki Hwang**, Avago Technologies Singapore (Singapore); **Fumio Koyama**, Tokyo Institute of Technology (Japan); **Kevin L. Lear**, Colorado State Univ. (USA); **James A. Lott**, VI Systems GmbH (Germany) and Technische Univ. Berlin (Germany); **Krassimir Panajotov**, Vrije Univ. Brussel (Belgium); **Jean-Francois Seurin**, Princeton Optronics, Inc. (USA); **Noriyuki Yokouchi**, The Furukawa Electric Co., Ltd. (Japan)

Wednesday 25 January

SESSION 1

Room: 308 (Esplanade) Wed. 8:20 to 10:00 am

20Gb/s VCSEL Modulation and Beyond

Session Chair: **Chun Lei**, EMCORE Corp. (USA)

8:20 am: **The next generation of high speed VCSELs at Finisar** (*Invited Paper*), Luke A. Graham, Ralph Johnson, Gary D. Landry, Deepa Gazula, Hao Chen, Jim A. Tatum, James K. Guenter, Andrew N. MacInnes, Bobby Hawkins, Finisar Corp. (USA) [8276-01]

8:50 am: **Emcore's 1 to 25 Gb/s VCSELs**, Neinyi Li, Chuan Xie, Wenlin Luo, Chris J. Helms, Chiyu Liu, Qi Sun, Li Wang, Chun Lei, Rich Carson, EMCORE Corp. (USA) [8276-02]

9:10 am: **Reliability study of 1060nm 25Gbps vcsel in terms of high speed modulation**, Toshihito Suzuki, Suguru Imai, Shinichi Kamiya, Koji Hiraiwa, Masaki Funabashi, Yasumasa Kawakita, Hitoshi Shimizu, Takuya Ishikawa, Akihiko Kasukawa, Furukawa Electric Co., Ltd. (Japan) [8276-03]

9:30 am: **980-nm VCSELs for optical interconnects at bandwidths beyond 40 Gb/s** (*Invited Paper*), Werner H. Hofmann, Technische Univ. Berlin (Germany) [8276-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 308 (Esplanade) Wed. 10:30 am to 12:30 pm

Novel VCSEL Structures

Session Chair: **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign (USA)

10:30 am: **VCSEL-based slow light photonics: switching, modulation, amplification, and beam steering** (*Invited Paper*), Fumio Koyama, Tokyo Institute of Technology (Japan) [8276-05]

11:00 am: **Recent advances on CW current injection blue VCSELs** (*Invited Paper*), Shing-Chung Wang, Tien-Chang Lu, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan) [8276-06]

11:30 am: **Long-wavelength high-contrast grating VCSEL** (*Invited Paper*), Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8276-07]

12:00 pm: **High-power vertical-cavity surface-emitting lasers for solid-state laser pumping** (*Invited Paper*), Jean-Francois Seurin, Guoyang Xu, Alexander Miglo, Qing Wang, Robert Van Leeuwen, Yihan Xiong, Wei-Xiong Zou, Daizong Li, James D. Wynn, Viktor Khalfin, Chuni Ghosh, Princeton Optronics, Inc. (USA) [8276-08]

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

SESSION 3

Room: Wed. 1:30 to 3:30 pm

Emerging VCSEL Applications

Session Chair: **Jean-Francois Seurin**, Princeton Optronics, Inc. (USA)

1:30 pm: **Long-wavelength VCSELs for sensing applications** (*Invited Paper*), Markus Ortsiefer, Vertilas GmbH (Germany) [8276-09]

2:00 pm: **Design of high power VCSEL arrays**, Holger Moench, Johanna Kolb, Pavel Pekarski, Jens Pollmann-Retsch, Martin Stroesser, Philips Research (Germany); Michael Miller, Philips Technologie GmbH U-L-M Photonics (Germany); Gero Heusler, Raimond Dumoulin, Xi Gu, Armand Pruijboom, Philips Lighting B.V. (Netherlands) [8276-10]

2:20 pm: **Surface topography and optical performance measurement of microlenses used in high power VCSEL systems**, Iris Erichsen, Stefan Krey, TRIOPTICS GmbH (Germany) [8276-11]

2:40 pm: **Broadly tunable high repetition rate amplified 1310nm VCSELs for optical coherence tomography** (*Invited Paper*), Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); James Jiang, Thorlabs Inc. (USA); Benjamin Potsaid, Massachusetts Institute of Technology (USA); Garrett Cole, Advanced Optical Microsystems (USA); James Fujimoto, Massachusetts Institute of Technology (USA); Alex Cable, Thorlabs Inc. (USA) [8276-12]

3:10 pm: **A compact, portable, and low cost generic interrogation strain sensor system using an embedded VCSEL, detector, and fibre Bragg grating**, Graham C. B. Lee, Aston Univ. (United Kingdom); Bram Van Hoe, Univ. Gent (Belgium); Zhijun Yan, Kate Sugden, David Webb, Oliver Maskery, Aston Univ. (United Kingdom); Geert Van Steenberge, Univ. Gent (Belgium) . . . [8276-13]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: 308 (Esplanade) Wed. 4:00 to 6:20 pm

VCSEL Optical Interconnects

Session Chair: **James A. Lott**, VI Systems GmbH (Germany)

4:00 pm: **1060nm VCSEL development at Furukawa for parallel optical interconnect** (*Invited Paper*), Masaki Funabashi, Suguru Imai, Keishi Takaki, Shinichi Kamiya, Hitoshi Shimizu, Yasumasa Kawakita, Koji Hiraiwa, Junji Yoshida, Toshihito Suzuki, Takuya Ishikawa, Naoki Tsukiji, Akihiko Kasukawa, Furukawa Electric Co., Ltd. (Japan) [8276-14]

4:30 pm: **Commercial VCSELs and VCSEL arrays designed for FDR (14 Gbps) optical links** (*Invited Paper*), Roger King, Steffan Intemann, Stefan Wabra, Philips Technologie GmbH U-L-M Photonics (Germany) [8276-15]

5:00 pm: **High speed tunable and fixed wavelength VCSELs for short reach optical links and interconnects** (*Invited Paper*), Anders Larsson, Johan Gustavsson, Åsa Haglund, Benjamin Kögel, Petter Westbergh, Erik Haglund, Chalmers Univ. of Technology (Sweden) [8276-16]

5:30 pm: **Bidirectional multimode fiber interconnection** (*Invited Paper*), Rainer Michalzik, Alexander Kern, Dietmar Wahl, Univ. Ulm (Germany). [8276-17]

6:00 pm: **Energy-efficient VCSELs for "green" data and computer communication**, Philip Moser, Technische Univ. Berlin (Germany); James A. Lott, VI Systems GmbH (Germany); Philip Wolf, Gunter Larisch, Alexey Payusov, Gerrit Fiol, Technische Univ. Berlin (Germany); Nikolay N. Ledentsov, VI Systems GmbH (Germany); Werner Hofmann, Dieter Bimberg, Technische Univ. Berlin (Germany) [8276-18]

Thursday 26 January

SESSION 5

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

VCSEL Modal Properties

Session Chair: Anders Larsson, Chalmers Univ. of Technology (Sweden)

8:00 am: **Progress on single mode VCSELs for data- and tele-communications** (*Invited Paper*), Nikolay N. Ledentsov, James A. Lott, VI Systems GmbH (Germany) [8276-19]

8:30 am: **Reducing the spectral width of high speed oxide confined VCSELs using an integrated mode filter**, Erik Haglund, Åsa Haglund, Johan Gustavsson, Benjamin Kögel, Petter Westbergh, Anders Larsson, Chalmers Univ. of Technology (Sweden) [8276-20]

8:50 am: **Planar single mode photonic crystal VCSELs**, Kent D. Choquette, Meng Peun Tan, Ansas Matthias Kasten, Joshua Sulkin, Univ. of Illinois at Urbana-Champaign (USA) [8276-21]

9:10 am: **Mode suppression in metal filled photonic crystal vertical cavity lasers** (*Invited Paper*), Benjamin G. Griffin, Amir Arbabi, Lynford L. Goddard, Univ. of Illinois at Urbana-Champaign (USA) [8276-22]

9:40 am: **Thermal characteristic of polarization switching in vertical-cavity surface-emitting lasers**, Yu-Heng Wu, Yueh-Chen Li, Wang-Chuang Kuo, Tsu-Chiang Yen, National Sun Yat-Sen Univ. (Taiwan) [8276-23]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: 308 (Esplanade) Thurs. 10:30 am to 12:10 pm

Tunable VCSELs

Session Chair: Lynford Goddard, Univ. of Illinois at Urbana-Champaign (USA)

10:30 am: **Surface micromachined MEMS tunable VCSEL at 1550 nm with >60 nm single mode tuning**, Christian Gierl, Technische Univ. Darmstadt (Germany); Tobias Gruendl, Technische Univ. München (Germany); Pierluigi Debernardi, Politecnico di Torino (Italy); Karolina Zogal, Hooman Davani, Technische Univ. Darmstadt (Germany); Christian Grasse, Gerhard Böhm, Walter Schottky Institut (Germany); Franko Küppers, Peter Meissner, Technische Univ. Darmstadt (Germany); Markus-Christian Amann, Walter Schottky Institut (Germany) [8276-24]

10:50 am: **Integrated MEMS-tunable VCSELs for reconfigurable optical interconnects**, Benjamin W. Kögel, Chalmers Univ. of Technology (Sweden); Pierluigi Debernardi, Politecnico di Torino (Italy); Petter Westbergh, Johan S. Gustavsson, Åsa Haglund, Erik Haglund, Jörgen Bengtsson, Anders Larsson, Chalmers Univ. of Technology (Sweden) [8276-25]

11:10 am: **1.55-µm high-speed MEMS-tunable VCSEL**, Karolina Zogal, Technische Univ. Darmstadt (Germany); Tobias Gruendl, Technische Univ. München (Germany); Christian Gierl, Hooman A. Davani, Technische Univ. Darmstadt (Germany); Christian Grasse, Markus-Christian Amann, Walter Schottky Institut (Germany); Franko Kueppers, Peter Meissner, Technische Univ. Darmstadt (Germany) [8276-26]

11:30 am: **850-nm VCSELs optimized for cryogenic data transmission**, Darwin K. Serkland, Kent M. Geib, Gregory M. Peake, Gordon A. Keeler, Alan Y. Hsu, Sandia National Labs. (USA) [8276-27]

11:50 am: **Polarization investigation of a widely tunable high speed short-wavelength bulk-micromachined MEMS-VCSEL**, Hooman Davani, Technische Univ. Darmstadt (Germany); Christian Grasse, Walter Schottky Institut (Germany); Benjamin Kögel, Chalmers Univ. of Technology (Sweden) [8276-28]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 7

Room: 308 (Esplanade) Thurs. 1:30 to 3:20 pm

VCSEL Characterization

Session Chair: Darwin K. Serkland, Sandia National Labs. (USA)

1:30 pm: **VCSEL beam control with collective and self-aligned polymer technologies** (*Invited Paper*), Véronique Bardinal, Benjamin Reig, David Barat, Thierry Camps, Lab. d'Analyse et d'Architecture des Systèmes (France); Pierluigi Debernardi, Politecnico di Torino (Italy); Olivier Soppera, Univ. de Haute Alsace (France); Jean-Baptiste Doucet, Emmanuelle Daran, Lab. d'Analyse et d'Architecture des Systèmes (France) [8276-29]

2:00 pm: **Impact of photon lifetime on thermal rollover in 850-nm high-speed VCSELs**, Prashant P. Baveja, Univ. of Rochester (USA); Benjamin Kögel, Petter Westbergh, Johan S. Gustavsson, Åsa Haglund, Chalmers Univ. of Technology (Sweden); Drew N. Maywar, Rochester Institute of Technology (USA); Govind P. Agrawal, Univ. of Rochester (USA); Anders Larsson, Chalmers Univ. of Technology (Sweden) [8276-30]

2:20 pm: **Multi-mode to single-mode switching caused by self-heating in bottom-emitting intra-cavity contacted 960 nm VCSELs**, Sergey A. Blokhin, Connector Optics LLC (Russian Federation) and Ioffe Physico-Technical Institute (Russian Federation) and St. Petersburg Academic Univ. (Russian Federation); Nikolai A. Maleev, Alexander G. Kuzmenkov, Connector Optics LLC (Russian Federation) and Ioffe Physico-Technical Institute (Russian Federation); James A. Lott, VI Systems GmbH (Germany); Marina M. Kulagina, Yurii M. Zadiranov, Ioffe Physico-Technical Institute (Russian Federation); Andrey G. Gladyshev, Connector Optics LLC (Russian Federation) and Ioffe Physico-Technical Institute (Russian Federation); Alexey M. Nadtochiy, St. Petersburg Academic Univ. (Russian Federation) and Ioffe Physico-Technical Institute (Russian Federation); Ekaterina V. Nikitina, St. Petersburg Academic Univ. (Russian Federation); Vladimir G. Tikhomirov, Saint Petersburg Electrotechnical Univ. LETI (Russian Federation); Nikolai N. Ledentsov, VI Systems GmbH (Germany) and Ioffe Physico-Technical Institute (Russian Federation); Viktor M. Ustinov, Ioffe Physico-Technical Institute (Russian Federation) [8276-31]

2:40 pm: **Determination of optical loss in photonic crystal VCSELs**, Kent D. Choquette, Dominic Siriani, Hyejin Jeong, Univ. of Illinois at Urbana-Champaign (USA) [8276-32]

3:00 pm: **Implant confined 1850nm VCSELs**, Matthew M. Dummer, Klein Johnson, Mary Hibbs-Brenner, William Hogan, Vixar Inc. (USA) . . [8276-33]

Courses of Related Interest

- SC1012 Coherent Mid-Infrared Sources and Applications (Vodopyanov) Sunday, 1:30 to 5:30 pm
- SC818 Laser Beam Quality (Paschotta) Sunday, 8:30 am to 12:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Novel In-Plane Semiconductor Lasers XI

Conference Chairs: **Alexey A. Belyanin**, Texas A&M Univ. (USA); **Peter M. Smowton**, Cardiff Univ. (United Kingdom)

Program Committee: **Martin Achtenhagen**, Brightline Photonics (USA); **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan); **Dan Botez**, Univ. of Wisconsin-Madison (USA); **Federico Capasso**, Harvard School of Engineering and Applied Sciences (USA); **Claire F. Gmachl**, Princeton Univ. (USA); **Michael Kneissl**, Technische Univ. Berlin (Germany); **Hui Chun Liu**, National Research Council Canada (Canada); **Luke J. Mawst**, Univ. of Wisconsin-Madison (USA); **Jerry R. Meyer**, U.S. Naval Research Lab. (USA); **Jesper Moerk**, Technical Univ. of Denmark (Denmark); **Mario J. Paniccia**, Intel Corp. (USA); **Richard V. Pentyl**, Univ. of Cambridge (United Kingdom); **Johann Peter Reithmaier**, Univ. Kassel (Germany); **Nelson Tansu**, Lehigh Univ. (USA); **Shinji Tsuji**, Hitachi, Ltd. (Japan)

Monday 23 January

SESSION 1

Room: 310 (Esplanade) Mon. 8:00 to 10:00 am

New Material and Device Concepts I

Session Chair: **Peter M. Smowton**, Cardiff Univ. (United Kingdom)

8:00 am: **Photo-pumped GaAs_{1-x}Bi_x lasing operation with low-temperature-dependent oscillation wavelength** (*Invited Paper*), Yoriko Tominaga, Kunishige Oe, Masahiro Yoshimoto, Kyoto Institute of Technology (Japan) [8277-01]

8:30 am: **Stacking-layer-number dependence of highly stacked InAs quantum dot laser diodes fabricated using strain-compensation technique**, Kouichi Akahane, Naokatsu Yamamoto, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Sergio Bietti, Univ. degli Studi di Milano-Bicocca (Italy) [8277-69]

8:50 am: **Carrier recombination and band alignment of GaAs_{1-x}Bi_x emitters**, Nadir Hossain, Igor P. Marko, Shirong Jin, Konstanze Hild, Zahida Batool, Stephen Sweeney, Univ. of Surrey (United Kingdom); Ryan Lewis, Daniel Beaton, Xiangfeng Lu, Thomas Tiedje, Univ. of Victoria (Canada) [8277-03]

9:10 am: **Electrically driven photonic crystal nanocavity lasers, LEDs, and modulators** (*Invited Paper*), Gary Shambat, Bryan Ellis, Jan Petykiewicz, Arka Majumdar, Stanford Univ. (USA); Marie Mayer, Univ. of California, Berkeley (USA); Tomas Sarmiento, James S. Harris, Jr., Stanford Univ. (USA); Eugene E. Haller, Univ. of California, Berkeley (USA); Jelena Vuckovic, Stanford Univ. (USA) [8277-04]

9:40 am: **Lateral cavity photonic crystal surface emitting laser with ultralow threshold**, Wanhua Zheng, Wenjun Zhou, Yufei Wang, Feiya Fu, Hongwei Qu, Yejin Zhang, Bin Jiang, Institute of Semiconductors (China) [8277-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: 310 (Esplanade) Mon. 10:30 am to 12:30 pm

Pushing Performance Limits I

Session Chair: **Shinji Tsuji**, Hitachi, Ltd. (Japan)

10:30 am: **High-speed directly modulated buried heterostructure photonic crystal lasers** (*Invited Paper*), Shinji Matsuo, NTT Photonics Labs. (Japan) [8277-06]

11:00 am: **Red-emitting diode lasers with internal surface DBR gratings**, David Feise, Wilfred John, Gunnar Blume, Ferdinand-Braun-Institut (Germany); Christian Kaspari, LayTec AG (Germany); Jörg Fricke, Katrin Paschke, Götz Erbert, Ferdinand-Braun-Institut (Germany) [8277-07]

11:20 am: **Very narrow linewidth and low frequency noise reduction of high power DFB laser diode for Cs pumping**, Charles Cayron, Alcatel-Thales III-V Lab. (France); David Holleville, Observatoire de Paris (France); Michael Tran, Yannick Robert, Alain Enard, Eric Vinet, Michel Garcia, Michel Lecomte, Laurent Teisseire, Olivier Parillaud, Michel Krakowski, Alcatel-Thales III-V Lab. (France); Noel Dimarcq, Observatoire de Paris (France) [8277-08]

11:40 am: **830nm high power single mode DFB laser for high volume applications**, Pierre Doussiere, Mark Tashima, Hery S. Djie, Kong-Weng Lee, Vince Wong, Victor V. Rossin, Erik P. Zucker, JDSU (USA) [8277-09]

12:00 pm: **AlGaInAs semi-insulating buried-heterostructure distributed reflector lasers for low-driving-current high-speed direct modulation** (*Invited Paper*), Takasi Simoyama, Manabu Matsuda, Shigekazu Okumura, Ayahito Uetake, Mitsuru Ekawa, Tsuyoshi Yamamoto, Fujitsu Labs., Ltd. (Japan) [8277-10]

Lunch Break 12:30 to 1:40 pm

SESSION 3

Room: 310 (Esplanade) Mon. 1:40 to 3:20 pm

Pushing Performance Limits II

Session Chair: **Richard V. Pentyl**, Univ. of Cambridge (United Kingdom)

1:40 pm: **Long-wavelength quantum dot FP and DFB lasers for high temperature applications** (*Invited Paper*), Takeo Kageyama, QD Laser Inc. (Japan); Kan Takada, The Univ. of Tokyo (Japan); Kenichi Nishi, QD Laser Inc. (Japan) and The Univ. of Tokyo (Japan); Masaomi Yamaguchi, QD Laser Inc. (Japan); Reio Mochida, QD Laser Inc. (Japan) and The Univ. of Tokyo (Japan); Yasunari Maeda, Hayato Kondo, Keizo Takemasa, QD Laser Inc. (Japan); Yu Tanaka, QD Laser Inc. (Japan) and Fujitsu Labs., Ltd. (Japan); Tsuyoshi Yamamoto, QD Laser Inc. (Japan) and Fujitsu Labs., Ltd. (Japan) and The Univ. of Tokyo (Japan); Mitsuru Sugawara, QD Laser Inc. (Japan) and The Univ. of Tokyo (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [8277-11]

2:10 pm: **InAs/InP quantum dot based lasers and effect of optical feedback** (*Invited Paper*), Abderrahim Ramdane, Kamel Merghem, Ricardo Rosales, Sheherazade Azoougui, Ctr. National de la Recherche Scientifique (France); Qin Zou, TELECOM & Management SudParis (France); Anthony Martinez, Ctr. National de la Recherche Scientifique (France); Alain Accard, Francois Lelarge, III-V Lab. (France) [8277-12]

2:40 pm: **Generation of picosecond pulses and optical frequency combs with multi-section 1065nm ridge waveguide diode lasers**, Andreas Klehr, Sven Schwertfeger, Armin Liero, Thomas Hoffmann, Jörg Fricke, Hans Wenzel, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) [8277-13]

3:00 pm: **Mode-locked tapered multi-section quantum-dot laser for high peak power and sub-picosecond pulse generation**, Myke Ruiz, Michael Tran, Yannick Robert, Eric Vinet, Michel Krakowski, Alcatel-Thales III-V Lab. (France); Lukas Drzewietzki, Stefan Breuer, Wolfgang E. Elsaesser, Technische Univ. Darmstadt (Germany); Mattia Rossetti, Paolo Bardella, Tianhong Xu, Ivo Montrosset, Politecnico di Torino (Italy); Igor Krestnikov, Daniil A. Livshits, Innlume GmbH (Germany) [8277-14]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: 310 (Esplanade) Mon. 3:50 to 5:50 pm

Nitrides

Session Chair: **Michael Kneissl**, Technische Univ. Berlin (Germany)

3:50 pm: **Sub-300 nm AlGaIn lasers on bulk AlN substrates** (*Invited Paper*), Thomas Wunderer, Christopher L. Chua, Zhihong Yang, John E. Northrup, Palo Alto Research Center, Inc. (USA); Michael Kneissl, Technische Univ. Berlin (Germany); Gregory A. Garrett, Paul H. Shen, Michael Wraback, U.S. Army Research Lab. (USA); Baxter Moody, H. Spalding Craft, Raoul Schlessler, Rafael F. Dalmau, Zlatko Sitar, HexaTech, Inc. (USA); Noble M. Johnson, Palo Alto Research Center, Inc. (USA) [8277-15]

4:20 pm: **(Al,In)GaIn laser diodes with optimized ridge structures**, Katarzyna A. Holc, Klaus Koehler, Wilfried Pletschen, Joachim Wagner, Ulrich Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8277-16]

4:40 pm: **Recent development of green and blue InGaIn-based laser diodes on nonpolar/semipolar substrates** (*Invited Paper*), Mathew C. Schmidt, Christiane Poblenz, You-Da Lin, Bryan Ellis, Chendong Bai, Paul Rudy, Michael R. Krames, James W. Raring, Soraa, Inc. (USA) [8277-17]

5:10 pm: **Engineering of AlGaIn-Delta-GaN quantum wells gain media for mid- and deep-ultraviolet lasers**, Jing Zhang, Lehigh Univ. (USA); Hongping Zhao, Case Western Reserve Univ. (USA); Nelson Tansu, Lehigh Univ. (USA) [8277-18]

5:30 pm: **Beyond blue pico laser: development of high power blue and low power direct green**, Clemens Vierheilig, Christoph Eichler, Alfred Lell, Jens Müller, Fabian Kopp, Sönke Tautz, Bernhard Stojetz, Georg Brüderl, Adrian Avramescu, Teresa Lermer, Jelena Ristic, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) [8277-77]

Tuesday 24 January

OPTO Plenary Session
Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am
Session Chairs: Klaus P. Streubel, OSRAM GmbH (Germany); David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)
 8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)
 8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
 8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)
 8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)
 9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)
 See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 5

Room: 310 (Esplanade) Tues. 10:30 am to 12:10 pm

Quantum Cascade Lasers

Session Chair: Alexey A. Belyanin, Texas A&M Univ. (USA)

- 10:30 am: **Quantum cascade lasers as mid-IR frequency combs** (*Invited Paper*), Jérôme Faist, Andreas Hugi, Sabine Riedi, Matthias Beck, ETH Zurich (Switzerland); H. C. Liu, Shanghai Jiao Tong Univ. (China); Stephane Blaser, Alpes Lasers SA (Switzerland) [8277-20]
 11:00 am: **Terahertz quantum cascade lasers based on symmetric InGaAs/GaAsSb active regions**, Christoph Deutsch, Hermann Detz, Alexander Benz, Aaron M. Andrews, Pavel Klang, Werner Schrenk, Karl Unterrainer, Gottfried Strasser, Technische Univ. Wien (Austria) [8277-21]
 11:20 am: **Terahertz intersubband polariton electroluminescence at room temperature**, Markus Geiser, Giacomo Scalari, Fabrizio Castellano, Matthias Beck, Jerome Faist, ETH Zurich (Switzerland) [8277-22]
 11:40 am: **Emergence of free carrier absorption in heterostructure devices** (*Invited Paper*), Andreas Wacker, Lund Univ. (Sweden) [8277-23]
 Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 6

Room: 310 (Esplanade) Tues. 1:40 to 3:10 pm

Multi-wavelength, Tunable, and DFB QCLs

Session Chair: Dan Botez, Univ. of Wisconsin-Madison (USA)

- 1:40 pm: **Multi-wavelength operation of quantum cascade lasers using gratings with an aperiodic basis** (*Invited Paper*), Romain Blanchard, Stefan Menzel, Harvard Univ. (USA); Christian J. Pflügl, Laurent Diehl, EOS Photonics (USA); Yong Huang, Jae-Hyun Ryou, Russell D. Dupuis, Georgia Institute of Technology (USA); Luca Dal Negro, Boston Univ. (USA); Federico Capasso, Harvard Univ. (USA) [8277-24]
 2:10 pm: **Quantum cascade laser external cavity tuning solution for 1660 to 720 wavenumbers operation with only three gain blocks**, Antoine Muller, Tobias Gresch, Stephane Blaser, Alpes Lasers SA (Switzerland) [8277-25]
 2:30 pm: **Dual-wavelength homogeneous mid-infrared quantum cascade laser**, Mohammed I. Hossain, Purdue Univ. (USA); Alexey A. Belyanin, Yongrui Wang, Texas A&M Univ. (USA); Deborah L. Sivco, A. Michael Sergent, Alcatel-Lucent Bell Labs. (USA); Oana Malis, Purdue Univ. (USA) [8277-32]
 2:50 pm: **Continuous wave operation of distributed feedback quantum cascade lasers with low threshold voltage and small divergent angle for CO₂ isotope sensor**, Feng Xie, Catherine G. Caneau, Herve P. LeBlanc, Nick J. Visovsky, Sean Coleman, Lawrence C. Hughes, Jr., Chung-En Zah, Corning Incorporated (USA) [8277-78]
 Coffee Break 3:10 to 3:40 pm

SESSION 7

Room: 310 (Esplanade) Tues. 3:40 to 5:10 pm

Tunable QCLs and New Designs

Session Chair: Jerry R. Meyer, U.S. Naval Research Lab. (USA)

- 3:40 pm: **Key design-concepts for mid-infrared and THz quantum-cascade lasers: dual upper-states and indirect pumping** (*Invited Paper*), Masamichi Yamanishi, Tadataka Edamura, Kazuue Fujita, Tatsuo Dougakiuchi, Hamamatsu Photonics K.K. (Japan) [8277-28]
 4:10 pm: **Room-temperature watt-level emission at 3.3µm in Sb-free InGaAs-AlAs quantum-cascade lasers**, Alfredo Bismuto, Mattias Beck, Jerome Faist, ETH Zurich (Switzerland) [8277-29]
 4:30 pm: **Broadband continuous-wave tuning of external cavity anticrossed dual-upper-state quantum-cascade lasers**, Tatsuo Dougakiuchi, Kazuue Fujita, Tadataka Edamura, Masamichi Yamanishi, Shinichi Furuta, Atsushi Sugiyama, Hamamatsu Photonics K.K. (Japan) [8277-30]
 4:50 pm: **Tapered active-region mid-infrared quantum cascade lasers for complete suppression of carrier-leakage currents**, Dan Botez, Jeremy Kirch, Chun-Chieh Chang, Luke Mawst, Univ. of Wisconsin-Madison (USA) [8277-31]

Wednesday 25 January

SESSION 8

Room: 310 (Esplanade) Wed. 8:00 to 10:00 am

New Material and Device Concepts II

Session Chair: Luke J. Mawst, Univ. of Wisconsin-Madison (USA)

- 8:00 am: **1300-nm InAs/GaAs quantum-dot lasers monolithically grown on Ge and Si substrates for Si photonics** (*Invited Paper*), Hui-Yun Liu, Ting Wang, Andrew C. Lee, Frank Tutu, Francesca Pozzi, Alwyn J. Seeds, Univ. College London (United Kingdom) [8277-33]
 8:30 am: **Molecular beam epitaxy grown GaInAsSbBi alloys on GaSb substrates for mid-infrared laser diode applications**, Dongsheng Fan, Zhaoquan Zeng, Zhiming M. Wang, Univ. of Arkansas (USA); Shane R. Johnson, Arizona State Univ. (USA); Shui-Qing Yu, Gregory J. Salamo, Univ. of Arkansas (USA) [8277-34]
 8:50 am: **Temperature dependence of 2.3µm and 2.6µm GaInAsSb based BTJ-VCSELS and edge emitting lasers**, Barnabas A. Ikyo, Igor P. Marko, Konstanze Hild, Alfred R. Adams, Stephen J. Sweeney, Univ. of Surrey (United Kingdom); Shamsul Arafin, Marcus C. Amann, Technische Univ. München (Germany) [8277-35]
 9:10 am: **Recent progress in lattice-matched Ga(NAsP)-based laser structures monolithically integrated on (001) Si substrate** (*Invited Paper*), Wolfgang Stolz, NAsP III/V GmbH (Germany) [8277-36]
 9:40 am: **Strained confinement layers in InP quantum dot lasers**, Stella N. Elliott, Peter M. Smowton, Cardiff Univ. (United Kingdom); Andrey B. Krysa, The Univ. of Sheffield (United Kingdom) [8277-37]
 Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 310 (Esplanade) Wed. 10:30 am to 12:10 pm

External Cavity

Session Chair: Johann Peter Reithmaier, Univ. Kassel (Germany)

- 10:30 am: **Broadband modeless cw semiconductor laser: design and coherence properties**, Arnaud Garnache, Univ. Montpellier 2 (France) [8277-38]
 10:50 am: **All semiconductor high power fs laser system with variable repetition rate**, Jan C. Balzer, Tobias Schlauch, Ruhr-Univ. Bochum (Germany); Thomas Hoffmann, Andreas Klehr, Goetz Erbert, Ferdinand-Braun-Institut (Germany); Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) [8277-39]
 11:10 am: **Continuously current-tunable narrow line-width miniaturized external cavity diode laser at 633 nm**, Bernd Sumpf, Ahmad Bawamia, Gunnar Blume, Bernd Eppich, Arnim Ginolas, Stefan Spiessberger, Madlen Thomas, Götz Erbert, Ferdinand-Braun-Institut (Germany) [8277-40]
 11:30 am: **High power single mode InGaAsP/InP laser diode for pulse operation**, Evgenii Kotelnikov, Alexei Katsnelson, Igor Kudryashov, Princeton Lightwave, Inc. (USA) [8277-41]

11:50 am: **Single transverse mode wide stripe grating coupled surface emitting laser diodes with external volume Bragg grating cavity**, George B. Venus, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Oleg V. Smolski, The Univ. of North Carolina at Charlotte (USA); Ivan B. Divliansky, Daniel Ott, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim I. Smirnov, OptiGrate Corp. (USA); Eric G. Johnson, The Univ. of North Carolina at Charlotte (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8277-42]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 10

Room: 310 (Esplanade) Wed. 1:40 to 3:20 pm

QCL: Novel Cavities and Mode Coupling

Session Chair: Romain Blanchard, Harvard Univ. (USA)

1:40 pm: **Deformed microcavity for whispering gallery mode lasers with directional emissions** (*Invited Paper*), Qijie Wang, Nanyang Technological Univ. (Singapore) [8277-43]

2:10 pm: **Quantum cascade lasers with active photonic crystal structure for high-average-power operation in a single spatial mode**, Jeremy Kirch, Sangho Kim, Luke J. Mawst, Dan Botez, Univ. of Wisconsin-Madison (USA); Thomas Earles, Intraband, LLC (USA) [8277-44]

2:30 pm: **Mode locking and phase coherence in quantum cascade lasers** (*Invited Paper*), Alexey A. Belyanin, Aleksander K. Wojcik, Texas A&M Univ. (USA); Pietro Malara, Romain Blanchard, Federico Capasso, Harvard Univ. (USA) [8277-45]

3:00 pm: **Analysis of multiple lateral mode emission of quantum cascade lasers based on near field intensity profiles**, Michel Kinzer, Quankui Yang, Stefan Hugger, Marie Brunner, Frank Fuchs, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8277-46]

Coffee Break 3:20 to 3:50 pm

SESSION 11

Room: 310 (Esplanade) Wed. 3:50 to 5:50 pm

Mid-infrared Lasers

Session Chair: Gene Tsviid, AdTech Optics, Inc. (USA)

3:50 pm: **Room-temperature type-I GaSb-based lasers in the 3.0 - 3.7 μ m wavelength range** (*Invited Paper*), Kristijonas Vizbaras, Augustinas Vizbaras, Alexander Andrejew, Christian Grasse, Stephan Sprengel, Markus-Christian Amann, Walter Schottky Institut (Germany) [8277-47]

4:20 pm: **Optically pumped type-II Mid-IR tunable DFB laser**, Xiang He, Steven R. J. Brueck, The Univ. of New Mexico (USA); Ron Kaspi, Air Force Research Lab. (USA) [8277-48]

4:40 pm: **Mid-IR interband cascade lasers operating at very low input powers** (*Invited Paper*), Chul Soo Kim, Chadwick L. Canedy, William W. Bewley, Charles D. Merritt, Joshua Abell, Igor Vurgaftman, Jerry R. Meyer, Mijin Kim, U.S. Naval Research Lab. (USA) [8277-49]

5:10 pm: **High performance interband cascade lasers at 3.8 microns**, John D. Bruno, John L. Bradshaw, Kevin M. Lascola, Richard P. Leavitt, John T. Pham, Fredrick J. Towner, Maxion Technologies, Inc. (USA); Igor Vurgaftman, Chadwick L. Canedy, William W. Bewley, Chul Soo Kim, Mijin Kim, Charles D. Merritt, Jerry R. Meyer, U.S. Naval Research Lab. (USA) [8277-50]

5:30 pm: **Intersubband photoluminescence in InAs quantum wells**, Michael L. Tilton, Ron Kaspi, Andrew Ongstad, Gregory C. Dente, Chi Yang, Air Force Research Lab. (USA) [8277-51]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Optically pumped mid-infrared in-plane DBR laser, Chi Yang, Ron Kaspi, Michael L. Tilton, Gregory C. Dente, Joesph R. Chavez, Andrew P. Ongstad, Air Force Research Lab. (USA) [8277-68]

Modeling Distributed-Feedback GaAs-Based and InP-Based Lasers for Computing Coupling Coefficients, Meng-Mu Shih, Univ. of Florida (USA) [8277-71]

Direct intensity modulation of three-guide coupled rectangular ring laser having bidirectional lasing characteristics, Doo Gun Kim, Seon Hoon Kim, Hyun Chul Ki, Won-Gun Jang, Dong-Kil Lee, Hyo Jin Kim, Hwe Jong Kim, Korea Photonics Technology Institute (Korea, Republic of); Geum-Yoon Oh, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of); Nadir Dagli, Univ. of California, Santa Barbara (USA) [8277-72]

Measurement of differential carrier lifetime of undoped and modulation p-doped quantum dot lasers, Kejia Zhou, Siming C. Chen, David T. Childs, Richard A. Hogg, The Univ. of Sheffield (United Kingdom) [8277-73]

Antireflection coatings in semiconductor lasers: effects on power emission and external cavity lasing, Quamrul Huda, John Tulip, Wolfgang Jaeger, Univ. of Alberta (Canada) [8277-76]

Thursday 26 January

SESSION 12

Room: 310 (Esplanade) Thurs. 8:00 to 10:00 am

High Power I

Session Chair: Gary A. Evans, Photodigm, Inc. (USA)

8:00 am: **Numerical studies of thermal lensing effects on high-CW-power single-spatial-mode diode lasers** (*Invited Paper*), Anatoly P. Napartovich, Nikolay N. Elkin, Dmitry V. Vysotsky, Troitsk Institute for Innovation and Fusion Research (Russian Federation); Dan Botez, Luke J. Mawst, Univ. of Wisconsin-Madison (USA) [8277-52]

8:30 am: **Near-field evolution in strongly pumped broad area diode lasers**, Martin Hempel, Jens W. Tomm, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Martina Bäuml, Helmer Konstanzer, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Jayanta Mukherjee, Univ. of Surrey (United Kingdom); Thomas Elsässer, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) ... [8277-53]

8:50 am: **100,000 h estimated lifetime of 100- μ m-stripe width 650 nm broad area lasers at an output power of 1.2 W**, Bernd Sumpf, Jörg Fricke, Peter Ressel, Ferdinand-Braun-Institut (Germany); Martin Zorn, JENOPTIK Diode Lab GmbH (Germany); Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) [8277-54]

9:10 am: **Performance limitation and mitigation of longitudinal spatial hole burning in high-power diode lasers**, Zhigang Chen, Ling Bao, John Bai, Mike Grimshaw, Rob J. Martinsen, Mark A. DeVito, Jim Haden, nLIGHT Corp. (USA); Paul O. Leisher, Rose-Hulman Institute of Technology (USA) [8277-55]

9:30 am: **High-power operation of wide-striped InGaN laser diode array** (*Invited Paper*), Katsuya Samonji, Shinji Yoshida, Hiroyuki Hagino, Kazuhiko Yamanaka, Shinichi Takigawa, Panasonic Corp. (Japan) [8277-19]

Coffee Break 10:00 to 10:30 am

Conference 8277 · Room: 310 (Esplanade)

SESSION 13

Room: 310 (Esplanade) Thurs. 10:30 am to 12:00 pm

High Power II

Session Chair: Paul O. Leisher,
Rose-Hulman Institute of Technology (USA)

10:30 am: **Wavelength tunable high-power single-mode 1060-nm DBR Lasers** (*Invited Paper*), Jin Li, Dmitri V. Kuksekov, Wayne Liu, Yabo Li, Nick J. Visovsky, Dragan Pikula, Albert P. Heberle, Gordon C. Brown, Garrett A. Piech, Douglas L. Butler, Chung-En Zah, Corning Incorporated (USA) [8277-56]

11:00 am: **High efficiency laser sources usable for single mode fiber coupling and frequency doubling**, Patrick Friedmann, Jeanette Schleife, Marilena Herbstritt, Jürgen Gilly, Márc T. Kelemen, m2k-laser GmbH (Germany) [8277-57]

11:20 am: **Short pulse generation by Q-switching two section tapered lasers**, Pawel Adamiec, Antonio Consoli, Jose Manuel Garcia Tijero, Ignacio Esquivias, Univ. Politécnica de Madrid (Spain); Sven Schwertfeger, Andreas Klehr, Hans Wenzel, Götz Erbert, Ferdinand-Braun-Institut (Germany) . [8277-58]

11:40 am: **Laser diodes with distributed feedback for application as subnanosecond fiber laser seeder**, Evgeny A. Zibik, Wolfgang Kaiser, Oclaro, Inc. (Switzerland); Anthony Bertrand, Multitel A.S.B.L. (Belgium); Julien Boucart, Achim Thies, Oclaro, Inc. (Switzerland); Ian Davies, David C. Inder, Christopher Button, Oclaro, Inc. (United Kingdom); Yves Hernandez, Multitel A.S.B.L. (Belgium); Norbert Lichtenstein, Oclaro, Inc. (Switzerland) [8277-59]

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

SESSION 14

Room: 310 (Esplanade) Thurs. 1:30 to 3:00 pm

High-performance and High-power Mid-IR Lasers I

Session Chair: Qijie Wang, Nanyang Technological Univ. (Singapore)

1:30 pm: **Manufacture of high performance quantum cascade lasers with highly strained materials on InP** (*Invited Paper*), Xiaojun Wang, AdTech Optics, Inc. (USA) [8277-60]

2:00 pm: **Low-dissipation continuous-wave mid-infrared emitting DFB quantum cascade lasers**, Borislav Hinkov, Alfredo Bismuto, Romain Terazzi, Yargo Bonetti, Mattias Beck, ETH Zurich (Switzerland); Stéphane Blaser, Alpes Lasers SA (Switzerland); Jerome Faist, ETH Zurich (Switzerland) [8277-61]

2:20 pm: **High-power quantum-cascade-laser tapered oscillators at 9.6 microns**, Anish K. Goyal, Melissa Spencer, MIT Lincoln Lab. (USA); Stefan Menzel, Harvard School of Engineering and Applied Sciences (USA); Christine A. Wang, Michael K. Connors, Antonio Sanchez, George W. Turner, MIT Lincoln Lab. (USA); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) [8277-62]

2:40 pm: **Watt-level power from quantum cascade lasers in the second atmospheric window of 8-12 microns**, Gene Tsvid, Xiaojun Wang, Jenyu Fan, AdTech Optics, Inc. (USA); Claire F. Gmachl, Princeton Univ. (USA); Mariano Troccoli, AdTech Optics, Inc. (USA) [8277-63]

Coffee Break 3:00 to 3:30 pm

SESSION 15

Room: 310 (Esplanade) Thurs. 3:30 to 4:50 pm

High-performance and High-power Mid-IR Lasers II

Session Chair: Xiaojun Wang, AdTech Optics, Inc. (USA)

3:30 pm: **32 emitters quantum cascade laser phased array**, Guy-Mael De Naurois, Mathieu Carras, Bouzid Simozrag, Olivier Patard, Francois Alexandre, Xavier Marcadet, Alcatel-Thales III-V Lab. (France) [8277-64]

3:50 pm: **Passive coherent beam combining of quantum-cascade lasers with a Dammann grating**, Guillaume Bloom, Christian Larat, Eric Lallier, Gaëlle Lehoucq, Shailendra Bansropun, Mane-Si Laure Lee-Bouhours, Brigitte Loiseaux, Thales Research & Technology (France); Mathieu Carras, Xavier Marcadet, Alcatel-Thales III-V Lab. (France); Gaëlle Lucas-Leclin, Patrick Georges, Lab. Charles Fabry (France) [8277-65]

4:10 pm: **Ultra-low beam divergence and improved efficiency in optically pumped mid-IR lasers**, Ron Kaspi, Michael L. Tilton, Andrew P. Ongstad, Gregory C. Dente, Joseph R. Chavez, Chi Yang, Air Force Research Lab. (USA) [8277-66]

4:30 pm: **28-dB gain mid-infrared optical amplification using resonant quantum cascade laser optical amplifier**, Xing Chen, Dingkai Guo, David Shyu, Liwei Cheng, Fow-Sen Choa, Univ. of Maryland, Baltimore County (USA); Sudhir B. Trivedi, Brimrose Corp. of America (USA) [8277-67]

Courses of Related Interest

SC1012 Coherent Mid-Infrared Sources and Applications (Vodopyanov) Sunday, 1:30 to 5:30 pm

SC818 Laser Beam Quality (Pascotta) Sunday, 8:30 am to 12:30 pm

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

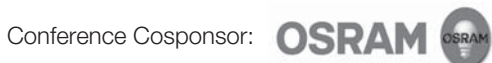
See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVI

Conference Chairs: **Klaus P. Streubel**, OSRAM 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); **Shoou-Jinn Chang**, National Cheng Kung Univ. (Taiwan); **Mitch M. C. Chou**, National Sun Yat-Sen Univ. (Taiwan); **Michael Heuken**, AIXTRON AG (Germany); **Satoshi Kamiyama**, Meijo Univ. (Japan); **Jong Kyu Kim**, Pohang Univ. of Science and Technology (Korea, Republic of); **Markus Klein**, OSRAM Opto Semiconductors GmbH (Germany); **Michael R. Krames**, Soraa, Inc. (USA); **Hao-Chung Kuo**, National Chiao Tung Univ. (Taiwan); **Kei May Lau**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Kurt J. Linden**, Spire Corp. (USA); **Hans Nikol**, Philips Lighting B.V. (Netherlands); **Joongseo Park**, LG Electronics Inc. (Korea, Republic of); **E. Fred Schubert**, Rensselaer Polytechnic Institute (USA); **Ross P. Stanley**, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland)



Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 1

Room: 304 (Esplanade) Tues. 10:30 to 11:45 am

Solid State Lighting and Human Life

Session Chair: **Klaus P. Streubel**, OSRAM GmbH (Germany)

10:30 am: **Spectral design flexibility of LED brings better life** (*Invited Paper*), Haiyan Ou, Dennis D. Corell, Peter B. Poulsen, Yiyu Ou, Carsten Dam-Hansen, Paul Michael Petersen, Technical Univ. of Denmark (Denmark); Dan Friis, RGB Lamps (Denmark) [8278-01]

11:00 am: **Opportunities and risks with blue enhanced light sources**, Dieter Lang, OSRAM GmbH (Germany). [8278-02]

11:15 am: **Smart dimming circuit used in solid-state lightings suitable for skygazer**, Keiichi Sakai, Kochi Univ. of Technology (Japan) [8278-03]

11:30 am: **Secondary optical design for safety light curtains**, Yu-Hsiang Hsu, Yi-Yung Chen, Jong-Woei A. Whang, National Taiwan Univ. of Science and Technology (Taiwan) [8278-04]

Lunch/Exhibition Break 11:45 am to 1:30 pm

SESSION 2

Room: 304 (Esplanade) Tues. 1:30 to 3:30 pm

Novel Substrates for LED Growth

Session Chair: **Kei May Lau**, Hong Kong Univ. of Science and Technology (Hong Kong, China)

1:30 pm: **High efficient semipolar LEDs with a small droop** (*Invited Paper*), Shuji Nakamura, Univ. of California, Santa Barbara (USA) [8278-05]

2:00 pm: **Towards general lighting with GaN-on-Si** (*Invited Paper*), Alois J. Krost, Otto-von-Guericke-Univ. Magdeburg (Germany) [8278-06]

2:30 pm: **High performance ThinGaN® LED with buried n-contact epitaxially grown on Si(111) substrate** (*Invited Paper*), Peter Stauss, Patrick Rode, Philipp Drechsel, Werner Bergbauer, Ulrich Steegmueller, OSRAM Opto Semiconductors GmbH (Germany); S. Fritze, Armin Dadgar, Alois J. Krost, Juergen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); T. Markurt, T. Schulz, Martin Albrecht, Leibniz-Institut für Kristallzüchtung (Germany) [8278-07]

3:00 pm: **Spontaneous emission characteristics of InGaN quantum wells light-emitting diodes on Ternary InGaN substrates**, Jing Zhang, Nelson Tansu, Lehigh Univ. (USA). [8278-08]

3:15 pm: **New MOCVD production platforms for white lighting**, Brian Dlugosch, Christof Sommerhalter, AIXTRON, Inc. (USA); Bernd Schineller, Michael Heuken, AIXTRON SE (Germany) [8278-09]

Coffee Break 3:30 to 4:00 pm

SESSION 3

Room: 304 (Esplanade) Tues. 4:00 to 5:30 pm

Solid State Lighting and Phosphors

Session Chair: **Hans Nikol**, Philips Lighting B.V. (Netherlands)

4:00 pm: **High performance LED phosphors for the BLU, automobile, and lighting applications** (*Invited Paper*), Cheolsoo Yoon, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) [8278-10]

4:30 pm: **Development and optimization of new phosphors for LED-based lighting** (*Invited Paper*), Anant A. Setlur, GE Global Research (USA) . . . [8278-11]

5:00 pm: **Cluster LEDs mixing optimization by lens design techniques**, Ming-Chin Chien, Chung-Hao Tien, Song-Bor Chiang, National Chiao Tung Univ. (Taiwan) [8278-12]

5:15 pm: **Infrared excited Yb:Er:Y₂O₃ phosphors with intense emission for lighting applications**, Gangadharan Ajith Kumar, Madhab Pokhrel, Dhiraj K. Sardar, The Univ. of Texas at San Antonio (USA). [8278-13]

OPTO

Wednesday 25 January

SESSION 4

Room: 304 (Esplanade) Wed. 8:15 to 10:30 am

Internal Quantum Efficiency and Droop Effect in LEDs I

Session Chair: E. Fred Schubert, Rensselaer Polytechnic Institute (USA)

8:15 am: **Understanding the relationship between IQE and defects in nitride-based LEDs** (*Invited Paper*), Hiroshi Amano, Nagoya Univ. (Japan) [8278-14]

8:45 am: **First-principles studies of the causes of droop** (*Invited Paper*), Chris G. Van de Walle, Univ. of California, Santa Barbara (USA); Emmanouil Kioupakis, Univ. of Michigan (USA) [8278-15]

9:15 am: **Comparative study of efficiency droop in (Al,In)GaN LEDs and laser diodes** (*Invited Paper*), Ulrich Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8278-16]

9:45 am: **Effects of polarization-field tuning in GaInN light-emitting diodes**, Jiuru Xu, Martin F. Schubert, Di Zhu, Jaehee Cho, E. Fred Schubert, Rensselaer Polytechnic Institute (USA); Hyun-Wook Shim, Cheolsoo Sone, Samsung Electro-Mechanics (Korea, Republic of) [8278-17]

10:00 am: **Effect of dislocation density on efficiency curves in InGaN/GaN multiple quantum well light-emitting diodes**, Yoshiyuki Harada, Toshiaki Hikosaka, Shigeo Kimura, Maki Sugai, Hajime Nago, Koichi Tachibana, Naoharu Sugiyama, Shinya Nunoue, Toshiba Corp. (Japan) [8278-18]

10:15 am: **Quantum efficiency characterizations of staggered InGaN quantum wells light-emitting diodes by temperature-dependent electroluminescence measurement**, Guangyu Liu, Jonathan D. Poplawsky, Jing Zhang, Volkmar Dierolf, Lehigh Univ. (USA); Hongping Zhao, Case Western Reserve Univ. (USA); Nelson Tansu, Lehigh Univ. (USA) [8278-19]

Coffee Break 10:30 to 11:00 am

SESSION 5

Room: 304 (Esplanade) Wed. 11:00 am to 12:00 pm

UV LEDs

Session Chair: Gerd Bacher, Univ. Duisburg-Essen (Germany)

11:00 am: **Deep UV LEDs with high IQE based on AlGaIn alloys with strong band structure potential fluctuations** (*Invited Paper*), Theodore D. Moustakas, The Boston Univ. Photonics Ctr. (USA) [8278-20]

11:30 am: **Influence of QW composition on the efficiency of AlGaIn-based LEDs emitting at 350 nm**, Thorsten Passow, Richard Gutt, Michael Kunzer, Wilfried Pletschen, Lutz Kirste, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Kamran Forghani, Ferdinand Scholz, Univ. Ulm (Germany); Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8278-21]

11:45 am: **Toward blue emission in ZnO based LED**, Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France) [8278-22]

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

SESSION 6

Room: 304 (Esplanade) Wed. 1:30 to 3:15 pm

Novel Techniques and Structures for LEDs

Session Chair: Mitch M. C. Chou, National Sun Yat-Sen Univ. (Taiwan)

1:30 pm: **GaN-based microcavity polariton light emitting diodes** (*Invited Paper*), Tien-Chang Lu, Shing-Chung Wang, National Chiao Tung Univ. (Taiwan); Yoshihisa Yamamoto, Stanford Univ. (USA) [8278-23]

2:00 pm: **3D nanostructures for enhanced light extraction in vertical light-emitting diodes** (*Invited Paper*), Jun Ho Son, Jong-Lam Lee, Pohang Univ. of Science and Technology (Korea, Republic of) [8278-24]

2:30 pm: **Optical mode pattern study of GaN LEDs with and without top nano-gratings**, Greg Chavoor, Doug Cattarusa, Xiaomin Jin, California Polytechnic State Univ., San Luis Obispo (USA); Xing-Xing Fu, Xiang-Ning Kang, Bei Zhang, Guo-Yi Zhang, Peking Univ. (China) [8278-25]

2:45 pm: **Light-emitting diodes with surface gratings of different periods for light extraction**, Che-Hao Liao, Cheng-Hung Lin, Horng-Shyang Chen, Chih-Yen Chen, Chieh Hsieh, Po-Han Chang, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [8278-26]

3:00 pm: **Power enhancement of 380 nm UV-LED with hexagonal pyramid structures by AlN sacrificial layer**, Tzu-Chien Hung, Po-Min Tu, Shih-Cheng Huang, Chia-Hui Shen, Chih-Peng Hsu, Advanced Optoelectronic Technology, Inc. (Taiwan) [8278-27]

Coffee Break 3:15 to 3:45 pm

SESSION 7

Room: 304 (Esplanade) Wed. 3:45 to 5:30 pm

LED Fabrication and Properties I

Session Chair: Ross P. Stanley, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland)

3:45 pm: **Steps toward understanding the growth and physics of visible group III-N LEDs** (*Invited Paper*), Daniel D. Koleske, Sandia National Labs. (USA) [8278-28]

4:15 pm: **Emission efficiency dependence on the overgrown p-GaN thickness in a high-indium InGaIn/GaN quantum-well light-emitting diode**, Horng-Shyang Chen, Chih-Yen Chen, Che-Hao Liao, Kuang-Yu Chen, Wen-Ming Chang, Jeng-Jie Huang, Yu-Feng Yao, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [8278-29]

4:30 pm: **Glass encapsulation in LED module** (*Invited Paper*), Jau-Sheng Wang, Shun-Yuan Huang, Wei-Chih Cheng, Wood-Hi Cheng, National Sun Yat-Sen Univ. (Taiwan) [8278-30]

5:00 pm: **Innovative methodology for testing the reliability of LED based systems**, Nicola Trivellini, LightCube (Italy); Matteo Meneghini, Gaudenzio Meneghesso, Enrico Zanoni, Univ. degli Studi di Padova (Italy) [8278-32]

5:15 pm: **V-doped AZO thin films and its application on GaN-based LEDs**, Yu Shan Wei, Yen-Shuo Liu, Cheng-Yi Liu, National Central Univ. (Taiwan) [8278-64]

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Spectroscopic study and white-light simulation in praseodymium-doped fluorogermanate glass as single-phosphor for white LEDs, Artur S. Gouveia-Neto, Nathalia P. Rios, Luciano A. Bueno, Univ. Federal Rural de Pernambuco (Brazil) [8278-52]

Characterization of four-color multi-package white light-emitting diodes combined with various green monochromatic phosphor-converted light-emitting diodes, Ji Hye Oh, Keyong Nam Lee, Young Rag Do, Kookmin Univ. (Korea, Republic of) [8278-53]

Effects of 2D SiO₂ and SiN_x photonic crystal on extracted light from Y₃Al₅O₁₂:Ce³⁺ ceramic plate phosphor, Hoo Keun Park, Jeong Rok Oh, Young Rag Do, Kookmin Univ. (Korea, Republic of) [8278-54]

Blue excitability of green Zn₂SiO₄:Mn²⁺ phosphor and its LED application, Hyung Seok Lim, Pukyong National Univ. (Korea, Republic of) [8278-55]

Yellow Y-Ca₂SiO₄:Ce³⁺ phosphor for white-light-emitting diode, Ji Hoon Kim, Pukyong National Univ. (Korea, Republic of) [8278-56]

Abnormal red-emission EuSi₂O₂N₂ phosphors for white-light-emitting diode, Jiang Lan, Pukyong National Univ. (Korea, Republic of) [8278-57]

Museum lighting for golden artifacts, with low correlated color temperature, high color uniformity and high color rendering index, using diffusing color mixing of red, cyan, and white-light-emitting diodes, Anders Thorseth, Dennis D. Corell, Peter B. Poulsen, Soren S. Hansen, Carsten Dam-Hansen, Technical Univ. of Denmark (Denmark) [8278-58]

Optimization of light quality from color mixing light-emitting diode systems for general lighting, Anders Thorseth, Technical Univ. of Denmark (Denmark) [8278-59]

Light emitting diode in stationary transportation applications: wavelength response to varying temperature, Giuseppe Schirripa Spagnolo, Donato Papalillo, Andrea Martocchia, Univ. degli Studi di Roma Tre (Italy) [8278-60]

Fabrication of random nanostructures for light extraction of organic light-emitting diodes, Jin-Wook Shin, Doo-Hee Cho, Jaehyun Moon, Seongwoo Choi, Jun-Han Han, Chul Woong Joo, Jin Woo Huh, Joohyun Hwang, Electronics and Telecommunications Research Institute (Korea, Republic of); Young Wook Park, Tae Hyun Park, Byeong-Kwon Ju, Korea Univ. (Korea, Republic of); Hye Yong Chu, Jeong-Ik Lee, Electronics and Telecommunications Research Institute (Korea, Republic of) [8278-61]

Electrical and optical properties of vertical GaN light-emitting diodes with deep-pillar nanostructures, Ki Seob Shin, Jae In Sim, Ho-Myoung An, Korea Univ. (Korea, Republic of); Sejong Oh, Michael Yoo, Verticle Corp. (Korea, Republic of); Tae Geun Kim, Korea Univ. (Korea, Republic of) [8278-62]

Efficiency-droop mechanism in vertical red light-emitting diodes using electrical-to-optical impulse responses, Jin-Wei Shi, F. M. Kuo, Che-Wei Lin, Wei Chen, National Central Univ. (Taiwan); Ming-Lun Lee, Southern Taiwan Univ. of Technology (Taiwan); L. J. Yan, Jinn-Kong Sheu, National Cheng Kung Univ. (Taiwan) [8278-63]

Dependence of efficiency-droop effect on the location of high indium layer in staggered InGaIn quantum wells, Yung-Chi Yao, Yi-Ching Chen, Ya-Ju Lee, National Taiwan Normal Univ. (Taiwan) [8278-65]

Thursday 26 January

SESSION 8

Room: 304 (Esplanade) Thurs. 8:30 to 10:00 am

Nanophotonics for Phosphors

Session Chair: Satoshi Kamiyama, Meijo Univ. (Japan)

8:30 am: **Colloidal quantum dots in lighting and LEDs** (*Invited Paper*), "Vladimir Bulovic, Massachusetts Institute of Technology (USA) [8278-33]

9:00 am: **Quantum dot color converting LED for back light applications** (*Invited Paper*), Eunjoo Jang, Samsung Advanced Institute of Technology (Korea, Republic of) [8278-34]

9:30 am: **Power conversion and luminous efficiency performance of nanophosphor quantum dots on color-conversion LEDs for high-quality general lighting**, Talha Erdem, Sedat Nizamoglu, Hilmi Volkan Demir, Bilkent Univ. (Turkey) [8278-35]

9:45 am: **Enhanced photoluminescence using photonic crystal phosphors**, Kyungtaek Min, Yun-Kyoung Choi, Heonsu Jeon, Seoul National Univ. (Korea, Republic of) [8278-36]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: 304 (Esplanade) Thurs. 10:30 am to 12:00 pm

Nanostructures for LEDs

Session Chair: Kurt J. Linden, Spire Corp. (USA)

10:30 am: **Near-infrared (1.46 μm) operation of In-rich InGaIn-based nanocolumn LEDs** (*Invited Paper*), Katsumi Kishino, Jumpei Kamimura, Kouich Kamiyama, Akihiko Kikuchi, Takuto Suzuki, Sophia Univ. (Japan) [8278-37]

11:00 am: **Nitride-based devices employing nanotechnology for photon management** (*Invited Paper*), Jr-Hau He, National Taiwan Univ. (Taiwan) [8278-38]

11:30 am: **Electrically driven nanoarrow array green LED**, Jet-Rung Chang, Shih-Pang Chang, National Chiao Tung Univ. (Taiwan); Yuh-Jen Cheng, Academia Sinica (Taiwan); Yi-Chen Chen, Yun-Jing Li, Kuok-Pan Sou, Hao-Chung Kuo, Chun-Yen Chang, National Chiao Tung Univ. (Taiwan) [8278-39]

11:45 am: **Top-down fabrication of GaN-based nanorod LEDs and lasers**, George T. Wang, Qiming Li, Jonathan J. Wierer, Jeffrey J. Figiel, Jeremy B. Wright, Igal Brener, Ting-Shan Luk, Sandia National Labs. (USA) [8278-40]

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

SESSION 10

Room: 304 (Esplanade) Thurs. 1:20 to 3:35 pm

Internal Quantum Efficiency and Droop Effect in LEDs II

Session Chair: Michael R. Krames, Soraa, Inc. (USA)

1:20 pm: **The efficiency droop in GaInN light-emitting diodes** (*Invited Paper*), E. Fred Schubert, Jaehee Cho, Rensselaer Polytechnic Institute (USA) [8278-41]

1:50 pm: **Droop in III-Nitride LEDs: review and recent progress** (*Invited Paper*), Aurelien David, Soraa, Inc. (USA) [8278-42]

2:20 pm: **Simulation of light-emitting diodes for new physics understanding and device design** (*Invited Paper*), Sergey Y. Karpov, Kirill Bulashevich, Oleg Khokhlev, Igor Evstratov, STR Group-Soft Impact Ltd. (Russian "Federation") [8278-43]

2:50 pm: **Efficiency droop alleviation of InGaIn/GaN blue LEDs with super-lattice active structure**, Shih-Pang Chang, Jet-Rung Chang, Yi-Chen Chen, Kuok-Pan Sou, National Chiao Tung Univ. (Taiwan); Hung-Chih Yang, Ta-Cheng Hsu, Epistar Corp. (Taiwan); Hao-Chung Kuo, Chun-Yen Chang, National Chiao Tung Univ. (Taiwan) [8278-44]

3:05 pm: **Investigation of efficiency droop for UV LED with N-type AlGaIn layer**, Po-Min Tu, Shih-Cheng Huang, Shun-Kuei Yang, Ya-Wen Lin, Tzu-Chien Hung, Chih-Peng Hsu, Advanced Optoelectronic Technology, Inc. (Taiwan) [8278-45]

3:20 pm: **Investigation of optical properties and relative carrier dynamics of various LEDs using time resolved electroluminescence system**, Yang-Seok Yoo, Yong-Hoon Cho, KAIST (Korea, Republic of) [8278-46]

Coffee Break 3:35 to 4:00 pm

SESSION 11

Room: 304 (Esplanade) Thurs. 4:00 to 5:45 pm

LED Fabrication and Properties II

Session Chair: Jong Kyu Kim,

Pohang Univ. of Science and Technology (Korea, Republic of)

4:00 pm: **Improved light output power of GaN-based vertical LEDs through efficient current injection and spreading** (*Invited Paper*), Tae-Yeon Seong, Korea Univ. (Korea, Republic of) [8278-47]

4:30 pm: **GaN-based LEDs with air voids prepared by laser scribing and chemical etching** (*Invited Paper*), Shouu-Jinn Chang, National Cheng Kung Univ. (Taiwan) [8278-48]

5:00 pm: **Photoelectrochemical liftoff of patterned sapphire substrate**, Chieh Hsieh, Che-Hao Liao, Cheng-Hung Lin, Horng-Shyang Chen, Chih-Yen Chen, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [8278-49]

5:15 pm: **GaN epilayer transferring to Cu substrate from sapphire substrate using Ga₂O₃ sacrificial layer**, Ray-Hua Horng, Dong-Sing Wu, Sin-Liang Ou, Hsu-Hung Hsueh, National Chung Hsing Univ. (Taiwan) [8278-50]

5:30 pm: **Cu-electroplating substrate for fabrication of vertical thin-GaN LED structure**, Yi-Chin Lin, Cheng-Yi Liu, National Central Univ. (Taiwan) [8278-51]

Courses of Related Interest

- SC052 Light-Emitting Diodes (Schubert) Monday, 8:30 am to 12:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Emerging Liquid Crystal Technologies VII

Conference Chair: **Liang-Chy Chien**, Kent State Univ. (USA) Conference Co-Chair: **Dirk J. Broer**, Technische Univ. Eindhoven (Netherlands)

Program Committee: **Vladimir G. Chigrinov**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Harry J. Coles**, Univ. of Cambridge (United Kingdom); **Gregory Philip Crawford**, Univ. of Notre Dame (USA); **Andy Y. Fuh**, National Cheng Kung Univ. (Taiwan); **Otto Wolfgang Haase**, Technische Univ. Darmstadt (Germany); **Jun-ichi Hanna**, Tokyo Institute of Technology (Japan); **Hirotsugu Kikuchi**, Kyushu Univ. (Japan); **Heinz-Siegfried Kitzerow**, Univ. Paderborn (Germany); **Shunsuke Kobayashi**, Tokyo Univ. of Science (Japan); **Seung Hee Lee**, Chonbuk National Univ. (Korea, Republic of); **Antonio Martins Figueiredo Neto**, Univ. de São Paulo (Brazil); **Xiangtong Li**, Oplink Communications, Inc. (USA); **Kristiaan Neyts**, Univ. Gent (Belgium); **Masanori Ozaki**, Osaka Univ. (Japan); **Ci-Ling Pan**, National Tsing Hua Univ. (Taiwan); **Ryo Sakurai**, Bridgestone Corp. (Japan); **Ivan I. Smalyukh**, Univ. of Colorado at Boulder (USA); **Richard L. Sutherland**, Mount Vernon Nazarene Univ. (USA); **Ming Hsien Wu**, Hamamatsu Corp. (USA); **Shin-Tson Wu**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Hiroshi Yokoyama**, Kent State Univ. (USA); **Tae-Hoon Yoon**, Pusan National Univ. (Korea, Republic of)

Sunday 22 January

SESSION 1

Room: 220 (Mezzanine) Sun. 1:30 to 3:30 pm

New Materials and Effects

Session Chair: **Dirk J. Broer**, Technische Univ. Eindhoven (Netherlands)

1:30 pm: **Electro-optics and optical latching in the SmAPf banana phase** (*Invited Paper*), David M. Walba, Tao Gong, Univ. of Colorado at Boulder (USA); Amaranatha Reddy, PPG Industries (USA); Matthew A. Glaser, Chenhui Zhu, Yongqiang Shen, Noel A. Clark, Univ. of Colorado at Boulder (USA) . . . [8279-01]

2:00 pm: **Pre-organized liquid crystals: biaxial nature of laterally connected dimer** (*Invited Paper*), Isa Nishiyama, DIC Corp. (Japan); Yuka Tabe, Waseda Univ. (Japan); Jun Yamamoto, Yoichi Takanishi, Yoko Ishii, Kyoto Univ. (Japan); Hiroshi Yokoyama, Kent State Univ. (USA) [8279-02]

2:30 pm: **High birefringent nematic liquid crystals: compounds and mixtures** (*Invited Paper*), Przemyslaw Kula, Roman S. Dabrowski, Jerzy Dziaduszek, Katarzyna Garbat, Military Univ. of Technology (Poland) [8279-03]

3:00 pm: **Lyotropic chromonic liquid crystals under confinement: monodomain formation and defect dynamics** (*Invited Paper*), Mohan Srinivasarao, Xuxia Yao, Jung O. Park, Georgia Institute of Technology (USA); Alejandro D. Rey, McGill Univ. (Canada) [8279-04]

Coffee Break 3:30 to 4:00 pm

SESSION 2

Room: 220 (Mezzanine) Sun. 4:00 to 6:00 pm

Photonic Crystals

Session Chair: **Ivan Smalyukh**, Univ. of Colorado at Boulder (USA)

4:00 pm: **Optofluidic tuning of photonic crystal lasers** (*Invited Paper*), Anders Kristensen, Thomas Buss, Mads Brøkner Christiansen, Cameron Smith, Niels Asger Mortensen, Technical Univ. of Denmark (Denmark) [8279-05]

4:30 pm: **Natural photonic crystals: formation, structure, function** (*Invited Paper*), Michael H. Bartl, The Univ. of Utah (USA) [8279-06]

5:00 pm: **Liquid crystalline structures for transformation optics** (*Invited Paper*), Oleg D. Lavrentovich, Jie Xiang, Heung-Shik Park, Sergij V. Shiyanyovskii, Kent State Univ. (USA); Yurii A. Nastishin, Institute of Physical Optics (Ukraine) [8279-07]

5:30 pm: **Preparation of porous polymer materials for bulky liquid crystal devices** (*Invited Paper*), Toshiaki Nose, Toshifumi Ito, Ryouta Ito, Michinori Honma, Akita Prefectural Univ. (Japan); Takeshi Watanabe, Kenji Ito, Susumu Yanagihara, Yurikogyo Co., Ltd. (Japan) [8279-08]

Monday 23 January

SESSION 3

Room: 220 (Mezzanine) Mon. 8:00 to 9:00 am

Lasers

Session Chair: **Anders Kristensen**, Technical Univ. of Denmark (Denmark)

8:00 am: **Continuous wave mirrorless lasing in cholesteric liquid crystals** (*Invited Paper*), Bahman Taheri, Antonio F. Munoz Flores, AlphaMicron, Inc. (USA); Michael E. McConney, Air Force Research Lab. (USA); Tamas Kosa, P. Luchette, Ludmila Sukhomlinova, AlphaMicron, Inc. (USA); Timothy J. White, Timothy J. Bunning, Air Force Research Lab. (USA) [8279-09]

8:30 am: **Electrically and all-optically controllable random lasers based on dye-doped liquid crystal films** (*Invited Paper*), Chia-Rong Lee, Jia-De Lin, Bo-Yuang Huang, National Cheng Kung Univ. (Taiwan) [8279-10]

SESSION 4

Room: 220 (Mezzanine) Mon. 9:00 to 10:15 am

Polarizers and Spatial Light Modulators

Session Chair: **Michael J. Escuti**, North Carolina State Univ. (USA)

9:00 am: **Recent applications of liquid crystal spatial light modulators** (*Invited Paper*), Le Li, Kent Optronics, Inc. (USA) [8279-11]

9:30 am: **Thin film polarizer based on photo-curable chromonic liquid crystalline solutions** (*Invited Paper*), Hye-Jin Yang, Sora Yoon, Yun-Ju Bae, Chonbuk National Univ. (Korea, Republic of); Seung-Han Shin, Korea Institute of Industrial Technology (Korea, Republic of); Kwang-Un Jeong, Myong-Hoon Lee, Chonbuk National Univ. (Korea, Republic of) [8279-12]

10:00 am: **Multi-twist retarders for broadband polarization transformation**, Ravi K. Komanduri, Jihwan Kim, Kris F. Lawler, Michael J. Escuti, North Carolina State Univ. (USA) [8279-13]

Coffee Break 10:15 to 10:45 am

SESSION 5

Room: 220 (Mezzanine) Mon. 10:45 am to 12:15 pm

Semiconductors

Session Chair: **Rudolf Zentel**, Johannes Gutenberg Univ. Mainz (Germany)

10:45 am: **Liquid crystallinity in organic semiconductors** (*Invited Paper*), "Jun-ichi Hanna, Tokyo Institute of Technology (Japan) [8279-14]

11:15 am: **Binary systems of discotic liquid crystalline semiconductors toward solution-processing thin film devices** (*Invited Paper*), Yo Shimizu, Yukimasa Matsuda, Fabien Nekelson, Yasuo Miyake, National Institute of Advanced Industrial Science and Technology (Japan); Akihiko Fujii, Masanori Ozaki, Osaka Univ. (Japan) [8279-15]

11:45 am: **Directed assembly and in situ manipulation of semiconductor quantum dots in liquid crystal matrices** (*Invited Paper*), Sayantani Ghosh, Univ. of California, Merced (USA) [8279-16]

Lunch Break 12:15 to 1:15 pm

SESSION 6

Room: 220 (Mezzanine). Mon. 1:15 to 3:00 pm

Tunable Filters

Session Chair: Bahman Taheri, AlphaMicron, Inc. (USA)

1:15 pm: **Characterization and applications of liquid crystals in the THz frequency range** (*Invited Paper*), Ci-Ling Pan, National Tsing Hua Univ. (Taiwan); Ru-Pin Pan, National Chiao Tung Univ. (Taiwan). [8279-17]

1:45 pm: **Magnetically tunable metallic photonic crystals infiltrated with liquid crystal in terahertz range** (*Invited Paper*), Chih-Chang Shih, Yow-Gwo Wang, Hsin-Ying Wu, Tsung-Ta Tang, Chia-Jen Lin, National Chiao Tung Univ. (Taiwan); Ci-Ling Pan, National Tsing Hua Univ. (Taiwan); Ru-Pin Pan, National Chiao Tung Univ. (Taiwan). [8279-18]

2:15 pm: **Thermally responsive polymer/liquid crystal gels exhibiting large scale color changing in cholesterics** (*Invited Paper*), Lalgudi E. Natarajan, Michael E. McConney, Madeline Dunning, Vincent P. Tondiglia, Timothy J. White, Timothy J. Bunning, Air Force Research Lab. (USA). [8279-19]

2:45 pm: **Observation of PDLCs by SHG laser scanning microscopy using a liquid crystal vector beam generator**, Ayano Tanabe, Makoto Kurihara, Yuka Saito, Nobuyuki Hashimoto, Citizen Holdings Co. Ltd. (Japan); Yuichi Kozawa, Shunichi Sato, Tohoku Univ. (Japan); Terumasa Hibi, Tomomi Nemoto, Hokkaido Univ. (Japan). [8279-20]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: 220 (Mezzanine). Mon. 3:30 to 6:00 pm

Actuators and Sensors

Session Chair: Mohan Srinivasarao, Georgia Institute of Technology (USA)

3:30 pm: **A continuous flow synthesis of micrometer sized actuators from liquid crystalline elastomers** (*Invited Paper*), Rudolf Zentel, Christian Ohm, Eva Fleischmann, Johannes Gutenberg Univ. Mainz (Germany); Christophe A. Serra, Univ. de Strasbourg (France). [8279-21]

4:00 pm: **Switchable and responsive liquid crystal-functionalized microfibers produced via coaxial electrospinning** (*Invited Paper*), Jan P. F. Lagerwall, Seoul National Univ. (Korea, Republic of). [8279-22]

4:30 pm: **Thermal conductivity of native and oxidized lyotropic-like low-density lipoprotein solutions studied by using the Z-scan technique** (*Invited Paper*), Priscila Santos, Andrea Monteiro, Antonio Figueiredo Neto, Univ. de São Paulo (Brazil). [8279-23]

5:00 pm: **Photo-responsive surface topology in chiral nematic media** (*Invited Paper*), Danqing Liu, Dirk Broer, Jaap den Toonder, Technische Univ. Eindhoven (Netherlands). [8279-24]

5:30 pm: **The activated morphology of grain boundaries in nematic solid sheets** (*Invited Paper*), Carl Modes, Univ. of Cambridge (United Kingdom). [8279-25]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level). Tues. 8:00 to 10:10 am

Session Chairs: Klaus P. Streubel, OSRAM GmbH (Germany); David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

SESSION 8

Room: 220 (Mezzanine). Tues. 10:30 am to 12:15 pm

Nonlinear Optics and Beam Steering Devices

Session Chair: Le Li, Kent Optronics, Inc. (USA)

10:30 am: **All-optical nonlinear photonic liquid crystal devices** (*Invited Paper*), Andrey E. Miroshnichenko, The Australian National Univ. (Australia); Etienne Brasselet, Univ. Bordeaux 1 (France); Yuri Kivshar, The Australian National Univ. (Australia). [8279-26]

11:00 am: **Laser beam steering (and beyond) with polarization gratings: review and prospects** (*Invited Paper*), Matthew N. Miskiewicz, Jihwan Kim, Michael J. Escuti, North Carolina State Univ. (USA). [8279-27]

11:30 am: **Electrical tuning of index-guiding photonic liquid crystal fibers**, Slawomir Ertman, Tomasz R. Wolinski, Warsaw Univ. of Technology (Poland). [8279-28]

11:45 am: **Green digital signage using nanoparticle embedded narrow-gap field sequential TN-LCDs** (*Invited Paper*), Shunsuke Kobayashi, Tokyo Univ. of Science (Japan). [8279-46]

Lunch/Exhibition Break 12:15 to 1:30 pm

SESSION 9

Room: 220 (Mezzanine). Tues. 1:30 to 2:45 pm

Blue Phases and Displays

Session Chair: Jan P. F. Lagerwall, Martin-Luther Univ. Halle-Wittenberg (Germany)

1:30 pm: **Simulation of a cholesteric blue phase in a thin cell: exotic defect structures and their response to an electric field** (*Invited Paper*), Jun-ichi Fukuda, National Institute of Advanced Industrial Science and Technology (Japan); Slobodan Zumer, Univ. of Ljubljana (Slovenia) . . . [8279-30]

2:00 pm: **Novel materials for polymer-stabilized blue phase** (*Invited Paper*), Michael Wittek, Merck KGaA (Germany). [8279-31]

2:30 pm: **Electro-optic and photonic properties of aerosils-dispersed blue phase liquid crystals**, Jeoung-Yeon Hwang, Liang-Chy Chien, Kent State Univ. (USA). [8279-32]

Coffee Break 2:45 to 3:15 pm

OPTO

SESSION 10

Room: 220 (Mezzanine) Tues. 3:15 to 4:45 pm

Self-assembly of Photonic Materials

Session Chair: Oleg D. Lavrentovich, Kent State Univ. (USA)

3:15 pm: **Anomalous deformation of smectic bubbles under DC electric field** (*Invited Paper*), Yuka Tabe, Waseda Univ. (Japan) [8279-33]

3:45 pm: **Shape-controlled self-assembly of plasmonic colloidal nanoparticles and microparticles in liquid crystals** (*Invited Paper*), Julian S. Evans, Bohdan Senyuk, Ivan Smalyukh, Univ. of Colorado at Boulder (USA) [8279-34]

4:15 pm: **Defect-driven structures for self-assembly** (*Invited Paper*), Mark J. Bowick, Syracuse Univ. (USA) [8279-35]

SESSION 11

Room: 220 (Mezzanine) Tues. 4:45 to 6:15 pm

Liquid Crystal Alignment

Session Chair: Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of)

4:45 pm: **Photoalignment and photopatterning in liquid crystal photonics** (*Invited Paper*), Vladimir G. Chigrinov, Hong Kong Univ. of Science and Technology (Hong Kong, China) [8279-36]

5:15 pm: **Controlling the alignment of liquid crystals by nanoparticle-doped and UV-treated polyimide alignment films** (*Invited Paper*), Shie-Chang Jeng, National Chiao Tung Univ. (Taiwan); Shug-June Hwang, National United Univ. (Taiwan); Tai-An Chen, Han-Shiang Liu, National Chiao Tung Univ. (Taiwan) [8279-37]

5:45 pm: **New developments in nanoparticle-liquid crystal composites: from magic-sized semiconductor nanoclusters to alignment pattern formation by nanoparticle stenciling** (*Invited Paper*), Javad Mirzaei, Ryan Sawatzky, Univ. of Manitoba (Canada); Martin Urbanski, Univ. Paderborn (Germany); Anshul Sharma, Univ. of Manitoba (Canada); Kui Yu, National Research Council Canada (Canada); Heinz S. Kitzerow, Univ. Paderborn (Germany); Torsten Hegmann, Univ. of Manitoba (Canada) [8279-38]

Wednesday 25 January

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Tunable multi-spatial frequency optical profilometry using single liquid crystal cell with micro-pinhold array, Hak-Rin Kim, Kyung-Il Joo, Chang-sub Park, Kyung-Woo Park, Min-Kyu Park, Hee Yeon Noh, Shin-Won Kang, Kyungpook National Univ. (Korea, Republic of) [8279-39]

Synthesis and mesomorphism of new 2-methoxy-3-cyanopyridine mesogens, Airody V. Achikari, National Institute of Technology, Karnataka (India) [8279-40]

Analysis of nanoparticles in controlling the vertical alignment of nematic liquid crystals, Amit Choudhary, Guoqiang Li, Univ. of Missouri-St. Louis (USA) [8279-41]

Characterization of a PDLC mixed with crystal violet dye, José Fabián Villa-Manríquez, Mauricio Ortiz-Gutiérrez, Univ. Michoacana de San Nicolás de Hidalgo (Mexico); Mario Pérez-Cortés, Univ. Autónoma de Yucatán (Mexico); Juan Carlos Ibarra-Torres, Univ. de Guadalajara (Mexico); Arturo Olivares-Pérez, Manuel Jorge Ordoñez-Padilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [8279-42]

Tunable optical filter based on nanocomposite (liquid crystal)/porous silicon, Georgiy V. Tkachenko, Kharkov National Univ. of Radio Electronics (Ukraine); Igor A. Sukhoivanov, Univ. de Guanajuato (Mexico); Oleksiy V. Shulika, Kharkov National Univ. of Radio Electronics (Ukraine); Volodymyr Tkachenko, Univ. degli Studi di Napoli Federico II (Italy) [8279-43]

Pretilt angle control of liquid crystal from homogeneous to homeotropic alignment using photocurable pre-polymer, Daeseung Kang, Jeong-Hun Lee, Soongsil Univ. (Korea, Republic of) [8279-44]

Innovated shear stress sensing technique using liquid crystal, Alaeddin S. Abu-Abed, Evan C. Lemley, Andrew Spivey, Michael Jordan, Sanjay Sah, Sebastian Munoz, Univ. of Central Oklahoma (USA); Shadi A. Alboon, Yarmouk Univ. (Jordan) [8279-45]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Advances in Display Technologies II

Conference Chairs: **Liang-Chy Chien**, Kent State Univ. (USA); **Sin-Doo Lee**, Seoul National Univ. (Korea, Republic of); **Ming Hsien Wu**, Hamamatsu Corp. (USA)

Program Committee: **Karlheinz Blankenbach**, Pforzheim Univ. (Germany); **Pierre M. Boher**, ELDIM (France); **Cheng-Huan Chen**, National Tsing Hua Univ. (Taiwan); **Chin Hsin Chen**, National Chiao Tung Univ. (Taiwan); **Janglin Chen**, Industrial Technology Research Institute (Taiwan); **Jurgen Daniel**, Palo Alto Research Center, Inc. (USA); **Paul S. Drzaic**, Apple Inc. (USA); **Mark Fihn**, Veritas et Visus (USA); **Norbert Fruehauf**, Univ. Stuttgart (Germany); **Nobuyuki Hashimoto**, Citizen Holdings Co. Ltd. (Japan); **Klaus Hecker**, Verband Deutscher Maschinen- und Anlagenbau e. V. (Germany); **Jason C. Heikenfeld**, Univ. of Cincinnati (USA); **Alex Henzen**, IRX-Innovations B.V. (Netherlands); **Yi-Pai Huang**, National Chiao Tung Univ. (Taiwan); **Koichi Kanzaki**, Consultant (Japan); **Takashi Kitamura**, Chiba Univ. (Japan); **Byoung-Ho Lee**, Seoul National Univ. (Korea, Republic of); **Kars-Michiel H. Lenssen**, Philips Research Nederland B.V. (Netherlands); **Keith Rollins**, DuPont Teijin Films U.K. Ltd. (United Kingdom); **Ryo Sakurai**, Bridgestone Corp. (Japan); **Robert A. Sprague**, SiPix Imaging Inc. (USA); **Andrew J. Steckl**, Univ. of Cincinnati (USA); **Christopher Williams**, Logystyx UK Ltd. (United Kingdom); **Pochi Yeh**, Univ. of California, Santa Barbara (USA); **Tae-Hoon Yoon**, Pusan National Univ. (Korea, Republic of)

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

- 8:00 am **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)
- 8:05 am **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)
- 8:10 am **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)
- 8:50 am **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)
- 9:30 am **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

TECHNICAL EVENT

InterContinental Hotel, Ballroom B Tues. 7:30 to 9:00 pm

Holography

Session Chair: **Hans I. Bjelkhagen**, Glyndwr Univ. (United Kingdom) and Technium 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. Featured speaker this year will be Ian Lancaster, International Hologram Manufacturers' Association, giving a talk titled, "The IHMA Widens its Remit: Why This Matters to You."

Wednesday 25 January

SESSION 1

Room: 220 (Mezzanine) Wed. 8:30 to 10:10 am

Projection Displays I

Session Chair: **Ming Hsien Wu**, Hamamatsu Corp. (USA)

- 8:30 am **Recycling of light in LEDs with brightness increase and etendue reduction** (*Invited Paper*), Kenneth K. Li, Wavien, Inc. (USA) [8280-01]
- 9:00 am **Arc lamps for high power digital projection**, Kenneth K. Li, George X. Ouyang, Wavien, Inc. (USA) [8280-02]
- 9:20 am **MgO:PPLN based green lasers for portable laser projectors**, Yang Lu, Qingyang Xu, C2C Link Corp. (Canada); Yi Gan, Chang-Qing Xu, McMaster Univ. (Canada) [8280-03]
- 9:40 am **MgO:PPLN frequency doubling optical chips for green light generation: from lab research to mass production** (*Invited Paper*), Chang-Qing Xu, Yi Gan, Jian Sun, McMaster Univ. (Canada) [8280-04]
- Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 220 (Mezzanine) Wed. 10:40 am to 12:10 pm

LC Technologies I

Session Chair: **Vladimir G. Chigrinov**, Hong Kong Univ. of Science and Technology (Hong Kong, China)

- 10:40 am **Fast switching liquid crystal display modes** (*Invited Paper*), Lachezar Komitov, Göteborg Univ. (Sweden); Gurumurthy Hegde, Univ. Malaysia Pahang (Malaysia) [8280-05]
- 11:10 am **Unusually large surface electroclinic effects in liquid crystals and the implications for ferroelectric liquid crystal displays** (*Invited Paper*), Karl Saunders, California Polytechnic State Univ., San Luis Obispo (USA) [8280-06]
- 11:40 am **Dual mode operation of a splay liquid crystal device stabilized by polymer walls** (*Invited Paper*), Jung-Wook Kim, Dong Han Song, Min-Gyeong Jo, Ki-Han Kim, Ji-Hoon Lee, Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of) [8280-07]
- Lunch/Exhibition Break 12:10 to 1:40 pm

Conference 8280 · Room: 220 (Mezzanine)

SESSION 3

Room: 220 (Mezzanine) Wed. 1:40 to 3:20 pm

3D Displays

Session Chair: Ming Hsien Wu, Hamamatsu Corp. (USA)

1:40 pm: **A fast-switching contrast-enhanced liquid crystal polarization modulator for high-end single-lens stereoscopic 3D projector applications** (*Invited Paper*), Jesper Osterman, LC-Tec Displays AB (Sweden); Chris Ward, Lightspeed Design, Inc. (USA); Terry Scheffer, Motif, Inc. (USA) [8280-08]

2:10 pm: **Optical characterization of different types of 3D displays** (*Invited Paper*), Pierre M. Boher, Thierry Leroux, Thibault Bignon, ELDIM (France) [8280-09]

2:40 pm: **Effect of Petzval curvature in integral imaging display**, Ganbat Baasantseren, Lodoirvasal Choimoo, National Univ. of Mongolia (Mongolia); Jae-Hyeung Park, Chungbuk National Univ. (Korea, Republic of) [8280-10]

3:00 pm: **Three-dimensional floating display by a concave cylindrical mirror and rotational wedge prisms**, Gilbae Park, Jonghyun Kim, Keehoon Hong, Byoung-Ho Lee, Seoul National Univ. (Korea, Republic of) [8280-11]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: 220 (Mezzanine) Wed. 3:50 to 4:50 pm

Projection Displays II

Session Chair: Chin Hsin Chen, National Chiao Tung Univ. (Taiwan)

3:50 pm: **Performance of correlated speckle patterns for speckle reduction in laser projectors**, Sigbjørn V. Egge, Ulf L. Österberg, Astrid Aksnes, Norwegian Univ. of Science and Technology (Norway) [8280-12]

4:10 pm: **High luminance tapered diode lasers for flying-spot display applications**, Gunnar Blume, David Feise, Ferdinand-Braun-Institut (Germany); Christian Kaspari, LayTec AG (Germany); Alexander Sahm, Katrin Paschke, Ferdinand-Braun-Institut (Germany) [8280-13]

4:30 pm: **Collimation of asymmetric laser diode at 405 nm using multimode fiber for speckle reduction through diffractive diffusers**, Weston Thomas, Christopher Middlebrook, Michigan Technological Univ. (USA) [8280-14]

SESSION 5

Room: 220 (Mezzanine) Wed. 4:50 to 5:50 pm

LC Technologies II

Session Chair: Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of)

4:50 pm: **Vertical-field-driven polymer-stabilized blue-phase liquid crystal display mode by using two prism sheets for lower operating voltage, higher brightness, and hysteresis-free switching**, Hak-Rin Kim, Yong-Hun Kim, Kyungpook National Univ. (Korea, Republic of); Sung-Taek Hur, Kyung Hee Univ. (Korea, Republic of); Ji-Sub Park, Do Hyuk Park, Kyungpook National Univ. (Korea, Republic of); Suk-Won Choi, Kyung Hee Univ. (Korea, Republic of) [8280-15]

5:10 pm: **Temperature independent low voltage polymer stabilized blue phase liquid crystalline**, Emine Kemiklioglu, Kent State Univ. (USA) [8280-16]

5:30 pm: **Pixel structure for higher optical efficiency in the patterned vertical alignment LC mode**, Byung Wok Park, Eun-Young Jeon, Ki-Han Kim, Jung-Wook Kim, Dong Han Song, Ji-Hoon Lee, Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of); Gak Seok Lee, Ki-Chul Shin, Hee Seop Kim, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) [8280-17]

Courses of Related Interest

- SC011 Design of Efficient Illumination Systems (Cassarly) Monday, 1:30 to 5:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Flexible signboards based on optical waveguides, Suntak Park, Min-Su Kim, Seung Koo Park, Ki-Uk Kyung, Electronics and Telecommunications Research Institute (Korea, Republic of) [8280-28]

Volume diffraction of nanostructured optical media, Seunghoon Han, Wan Joo Maeng, Chang-Gyun Shin, Hong-Seok Lee, Sangyoon Lee, Samsung Advanced Institute of Technology (Korea, Republic of) [8280-29]

Extremely simple holographic projection of color images, Michal Makowski, Izabela Ducin, Karol Kakarenko, Andrzej Kolodziejczyk, Maciej Sypek, Warsaw Univ. of Technology (Poland) [8280-30]

Polymer waveguide technology for flexible display applications, Ichiro Fujieda, Yuuto Okuda, Ritsumeikan Univ. (Japan) [8280-31]

Thursday 26 January

SESSION 6

Room: 220 (Mezzanine) Thurs. 8:00 to 9:20 am

Backlight Units

Session Chair: Pierre M. Boher, ELDIM (France)

8:00 am: **Strategy for developing high efficiency backlight module for LCD** (*Invited Paper*), Cheng-Huan Chen, Po-Hung Yao, National Tsing Hua Univ. (Taiwan) [8280-18]

8:30 am: **Modernizing the technology for controlling light, both laser and broadband, with diffractive waveplates** (*Invited Paper*), Nelson Tabiryan, Sarik R. Nersisyan, Svetlana V. Serak, BEAM Engineering for Advanced Measurements Co. (USA); Timothy J. White, Timothy J. Bunning, Air Force Research Lab. (USA); Diane M. Steeves, Brian R. Kimball, U.S. Army Natick Soldier Research, Development and Engineering Ctr. (USA) [8280-19]

9:00 am: **Integrated optical means based on waveguide for hologram recording**, Kyungsuk P. Pyun, Samsung Advanced Institute of Technology (Korea, Republic of); Andrew A. Putilin, P.N. Lebedev Physical Institute (Russian Federation); Alexander Morozov, Samsung Electronics Co., Ltd. (Russian Federation); GeeYoung Sung, Sangyoon Lee, Samsung Advanced Institute of Technology (Korea, Republic of) [8280-20]

SESSION 7

Room: 220 (Mezzanine) Thurs. 9:20 am to 12:40 pm

Emerging Devices and Applications

Session Chair: Andrew J. Steckl, Univ. of Cincinnati (USA)

9:20 am: **Design and implementation of wearable head-up display for mobile phone applications**, Yuzuru Takashima, Toan Tran, Lambertus Hesselink, Stanford Univ. (USA) [8280-21]

9:40 am: **Transfer-printing of colloidal quantum dots for full-color light-emitting display** (*Invited Paper*), Byoung Lyong Choi, Tae-Ho Kim, Kyung-Sang Cho, Eun Kyung Lee, Jung Woo Kim, Sang Yoon Lee, Jong Min Kim, Samsung Advanced Institute of Technology (Korea, Republic of) [8280-22]

Coffee Break 10:10 to 10:40 am
10:40 am: **Designing low permeability optical grade silicone systems**, Michelle Velderrain, NuSil Technology LLC (USA) [8280-23]

11:00 am: **Versatile electrowetting display arrays: from small to large pixels on fixed and flexible substrates**, Han You, Andrew J. Steckl, Univ. of Cincinnati (USA) [8280-24]

11:20 am: **Electrically-tunable optical zoom system using liquid crystal lenses** (*Invited Paper*), Yi-Hsin Lin, Ming-Syuan Chen, Hung-Chun Lin, National Chiao Tung Univ. (Taiwan) [8280-25]

11:50 am: **A thin porous substrate using bonded particles for reverse-emulsion electrophoretic displays**, Sang-Joon J. Lee, San Jose State Univ. (USA); Mateusz Bryning, Remy Cromer, Zikon, Inc. (USA); Manuel Ahumada, Michelle Hartono, San Jose State Univ. (USA) [8280-26]

12:10 pm: **High performance natural semiconductors for green organic electronics development** (*Invited Paper*), Mihai Irimia-Vladu, Eric D. Glowacki, Gundula Voss, Lucia Leonat, Günther Schwabegger, Marius Bodea, Helmut Sitter, Siegfried G. Bauer, Niyazi Serdar Sariciftci, Johannes Kepler Univ. Linz (Austria) [8280-27]

Practical Holography XXVI: Materials and Applications

Conference Chairs: **Hans I. Bjelkhagen**, Glyndwr Univ. (United Kingdom) and Technium OpTIC (United Kingdom); **V. Michael Bove, Jr.**, MIT Media Lab. (USA)

Program Committee: **Gerald L. Heidt**, Wasatch Photonics, Inc. (USA); **Fujio Iwata**, Toppan Printing Co., Ltd. (Japan); **Tung H. Jeong**, Lake Forest College (USA); **Raymond K. Kostuk**, The Univ. of Arizona (USA); **Gaylord E. Moss**, MossOptics (USA); **Albert O. Okorogu**, The Aerospace Corp. (USA); **Nadya O. Reingand**, CeLight, Inc. (USA); **Martin J. Richardson**, De Montfort Univ. (United Kingdom); **Chris Slinger**, QinetiQ Ltd. (United Kingdom); **Fred D. Unterseher**, Columbia Career Ctr. (USA); **Ichirou Yamaguchi**, RIKEN (Japan); **Toyohiko Yatagai**, Utsunomiya Univ. (Japan)

Sunday 22 January

SESSION 1

Room: 123 (Exhibit Level) Sun. 8:30 to 10:10 am

Materials

Session Chair: **Hans I. Bjelkhagen**, Technium OpTIC (United Kingdom) and Glyndwr Univ. (United Kingdom)

8:30 am: **PVA glue as a recording holographic medium**, Santa Toxqui-López, Arturo Olivares-Pérez, Bernardina Pinto-Iguanero, Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). [8281-01]

8:50 am: **Photosensitive holographic material with a medium of fluorescent ink**, Arturo Olivares-Pérez, Santa Toxqui-López, Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Mauricio Ortiz-Gutiérrez, Gabriel Mellado-Villaseñor, Univ. Michoacana de San Nicolás de Hidalgo (Mexico). [8281-02]

9:10 am: **Photochromic materials for holography: issues and constraints**, Andrea Bianco, Giorgio Pariani, INAF - Osservatorio Astronomico di Brera (Italy); Rossella Castagna, Chiara Bertarelli, Politecnico di Milano (Italy) [8281-03]

9:30 am: **Performances of new green sensitive liquid photopolymers for volume phase holographic gratings**, Alessio Zanutta, Andrea Bianco, Giorgio Pariani, INAF - Osservatorio Astronomico di Brera (Italy) [8281-04]

9:50 am: **Holograms with nitrocellulose and FeCl₃**, Valentin Dorantes-García, Arturo Olivares-Pérez, Manuel Jorge Ordóñez-Padilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). [8281-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: 123 (Exhibit Level) Sun. 10:40 am to 12:20 pm

Digital Holography and Scene Capture I

Session Chair: **Michael A. Klug**, Zebra Imaging, Inc. (USA)

10:40 am: **Wide viewing-zone-angle hologram generation using phase-shift hologram capturing method for holographic media communications**, Ryutaro Oi, Yasuyuki Ichihashi, Kenji Yamamoto, Takanori Senoh, Taiichiro Kurita, National Institute of Information and Communications Technology (Japan). [8281-06]

11:00 am: **Measurements of accommodation responses to horizontally scanning holographic display**, Masahito Yokouchi, Yasuhiro Takaki, Tokyo Univ. of Agriculture and Technology (Japan) [8281-07]

11:20 am: **Depth perception and user interface in digital holographic television**, James Barabas, Sundeep Jolly, Daniel E. Smalley, V. Michael Bove, Jr., MIT Media Lab. (USA) [8281-08]

11:40 am: **Transmission of hologram data and 3D image reconstruction using white LED light**, Koki Sato, Masataka Tozuka, Shonan Institute of Technology (Japan); Kunihiko Takano, Tokyo Metropolitan College of Industrial Technology (Japan); Makoto Ohki, Shonan Institute of Technology (Japan). [8281-09]

12:00 pm: **Across light and through colour**, Maria Isabel Azevedo, Martin J. Richardson, De Montfort Univ. (United Kingdom); Luís Miguel Bernardo, Univ. do Porto (Portugal) [8281-10]

Lunch Break 12:20 to 1:50 pm

SESSION 3

Room: 123 (Exhibit Level) Sun. 1:50 to 5:00 pm

Digital Holography and Scene Capture II

Session Chair: **V. Michael Bove, Jr.**, MIT Media Lab. (USA)

1:50 pm: **Instantaneous shape measurement of moving surface with high accuracy by one-shot digital holography**, Kunihiro Sato, Yoshihide Iwayama, Univ. of Hyogo (Japan) [8281-11]

2:10 pm: **Real-time recording and reconstruction of moving 3D images using electronic holography**, Kazutoshi Furuichi, Kunihiro Sato, Univ. of Hyogo (Japan). [8281-12]

2:30 pm: **Full parallax computer generated hologram using GPU-accelerated ray tracing method**, Tsubasa Ichikawa, Yuji Sakamoto, Hokkaido Univ. (Japan) [8281-13]

2:50 pm: **Multi-color full field imaging in low coherence digital holographic microscopy**, Zahra Monemhaghdoost, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Frederic Montfort, Yves Emery, Lyncée Tec SA (Switzerland); Christian Depeursinge, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8281-14]

3:10 pm: **Ray-casting CRT algorithm for holographic 3D display with full parallax occlusion effect**, Xinan Liang, Yuechao Pan, Xuewu Xu, A*STAR - Data Storage Institute (Singapore) [8281-15]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Shading of holographic reconstructed image by two-dimensional amplitude modulation of zone plates**, Takayuki Kurihara, Yasuhiro Takaki, Tokyo Univ. of Agriculture and Technology (Japan) [8281-16]

4:20 pm: **A hard-threshold based sparse inverse imaging algorithm for optical scanning holography reconstruction**, Fengjun Zhao, Xiaochao Qu, Xidian Univ. (China); Xing Zhang, Institute of Automation (China); Ting-Chung Poon, Virginia Polytechnic Institute and State Univ. (USA); Jimin Liang, Xidian Univ. (China) [8281-17]

4:40 pm: **Phase retrieval of THz radiation using set of 2D spatial intensity measurements with different wavelengths**, Nikolay V. Petrov, Victor G. Bespalov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [8281-18]

Monday 23 January

SESSION 4

Room: 123 (Exhibit Level) Mon. 8:30 to 9:50 am

Applications in Storage, Printing, and Optics I

Session Chair: Gerald L. Heidt, Wasatch Photonics, Inc. (USA)

8:30 am: **Applying field mapping refractive beam shapers to improve holographic techniques**, Alexander V. Laskin, Vadim Laskin, AdlOptica Optical Systems GmbH (Germany) [8281-19]

8:50 am: **In-line hologram reconstruction with Hartley transform and iteration**, Meric Ozcan, Sabanci Univ. (Turkey) [8281-20]

9:10 am: **Novel modulation techniques for coaxial holographic data encoding**, Po Sheun Chung, City Univ. of Hong Kong (Hong Kong, China); Wei Jia, Shanghai Institute of Optics and Fine Mechanics (China); Zhongyu Chen, Tsing Chung, Fung Wen, Yuk Tak Chow, City Univ. of Hong Kong (Hong Kong, China) [8281-21]

9:30 am: **The volume hologram printer to record the wavefront of a 3D object**, Osamu Miyamoto, Takeshi Yamaguchi, Hiroshi Yoshikawa, Nihon Univ. (Japan) [8281-22]

Coffee Break 9:50 to 10:30 am

SESSION 5

Room: 123 (Exhibit Level) Mon. 10:30 to 11:50 am

Applications in Storage, Printing, and Optics II

Session Chair: Hans I. Bjelkhagen, Technium OptIC (United Kingdom) and Glyndwr Univ. (United Kingdom)

10:30 am: **IHMA widens its remit: why this matters to you**, Ian M. Lancaster, Reconnaissance International Ltd. (United Kingdom) [8281-42]

10:50 am: **Adaptation of holprinter technology to fabricate a holoscreen for a fixed-frame animated 3D holographic display**, Javid Khan, Holoxica Ltd. (United Kingdom); Alan Greenaway, Heriot-Watt Univ. (United Kingdom); Ian Underwood, The Univ. of Edinburgh (United Kingdom); Richard Melling, View Holographics (United Kingdom) [8281-23]

11:10 am: **Holographic fabrication of graded index materials for transformation optics applications**, Kris Ohlinger, Univ. of North Texas (USA); Zsolt Poole, Univ. of Pittsburgh (USA); Yuankun Lin, Huiliang Zhang, Univ. of North Texas (USA); Kevin Chen, Univ. of Pittsburgh (USA) [8281-24]

11:30 am: **A compact holographic recording setup for tuning pitch using polarizing prisms**, Jihwan Kim, Ravi K. Komanduri, Michael J. Escuti, North Carolina State Univ. (USA) [8281-25]

Tuesday 24 January

OPTO Plenary Session

Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: Klaus P. Streubel, OSRAM GmbH (Germany); David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

TECHNICAL EVENT

InterContinental Hotel, Ballroom B Tues. 7:30 to 9:00 pm

Holography

Session Chair; **Hans I. Bjelkhagen**, Glyndwr Univ. (United Kingdom) and Technium 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 (HNNT), 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. Featured speaker this year will be Ian Lancaster, International Hologram Manufacturers' Association, giving a talk titled, "The IHMA Widens its Remit: Why This Matters to You."

Wednesday 25 January

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Hologram pattern of the electromagnetic wave diffraction from a pyramidal horn antenna, Makoto Ohki, Shonan Institute of Technology (Japan); Kunihiko Takano, Tokyo Metropolitan College of Industrial Technology (Japan); Masataka Tozuka, Koki Sato, Shonan Institute of Technology (Japan); Shogo Kozaki, Gunma Univ. (Japan) [8281-26]

Two-dimensional signal processing using morphological filter for holographic memory, Yo Kondo, Yusuke Shigaki, Manabu Yamamoto, Tokyo Univ. of Science (Japan) [8281-27]

Acceleration of calculation method for CGH with spherical basic object light by using graphic processing units, Kohei Hosoyachi, Yuji Sakamoto, Hokkaido Univ. (Japan) [8281-28]

Read/write characteristics of reflection type hologram memory using spherical reference beam, Akihito Nakajima, Shohei Ozawa, Kai Yamada, Manabu Yamamoto, Hideki Akamatsu, Kaito Okubo, Tokyo Univ. of Science (Japan) [8281-29]

Calculation method for reconstruction at arbitrary depth in CGH with Fourier transform optical system, Yusuke Sato, Yuji Sakamoto, Hokkaido Univ. (Japan) [8281-30]

Enlargement of visual field considering depth of object for eyepiece-type electro holography, Chanyoung Yang, Yuji Sakamoto, Hokkaido Univ. (Japan); Fumio Okuyama, Suzuka Univ. of Medical Science (Japan) [8281-31]

Computer-generated holograms at arbitrary positions using multi-view images, Yusuke Ohsawa, Yuji Sakamoto, Hokkaido Univ. (Japan) [8281-32]

Image-type high-definition CGHs encoded by optimized error diffusion, Hiroshi Yamashita, Kyoji Matsushima, Sumio Nakahara, Kansai Univ. (Japan) [8281-33]

Advanced rendering techniques for producing specular smooth surfaces in polygon-based high-definition computer holography, Hirohito Nishi, Kyoji Matsushima, Sumio Nakahara, Kansai Univ. (Japan) [8281-34]

Study of holograms made with saccharides and iron ions, Manuel Jorge Ordóñez-Padilla, Arturo Olivares-Pérez, Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Mauricio Ortiz-Gutiérrez, Univ. Michoacana de San Nicolás de Hidalgo (Mexico); Valentin Dorantes-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [8281-35]

OPTO

SPIE PRESS



Analysis of albumin hologram, Manuel Jorge Ordóñez-Padilla, Arturo Olivares-Pérez, Luis R. Berriel-Valdos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Mauricio Ortiz-Gutiérrez, José F. Villa-Manríquez, Univ. Michoacana de San Nicolás de Hidalgo (Mexico). [8281-36]

Interferometric measurement of refraction index of dye-doped photopolymer, Gabriel Mellado-Villaseñor, Mauricio Ortiz-Gutiérrez, Univ. Michoacana de San Nicolás de Hidalgo (Mexico); Mario Pérez-Cortés, Univ. Autónoma de Yucatán (Mexico); Juan Carlos Ibarra-Torres, Univ. de Guadalajara (Mexico); Arturo Olivares-Pérez, Santa Toxqui-López, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). [8281-37]

The efficiency of holograms with registration nitrocellulose and FeCl₃, Rosaura Vallejo-Mendoza, Arturo Olivares-Perez, Nikolai A. Korneev, Valentin Dorantes-García, Manuel Jorge Ordóñez-Padilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). [8281-38]

The behavior of the diffraction efficiency of a function of thickness using holographic gratings as material registration with gum Arabic ammonium dichromate, Bernardina Pinto-Iguanero, Benemérita Univ. Autónoma de Puebla (Mexico); Arturo Olivares-Pérez, Santa Toxqui-López, Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). [8281-39]

Fabrication of the multi-level phase type hologram for display using the Laser Direct Write Lithography System, Nakano Seiji, Sumio Nakahara, Shoso Singubara, Kansai Univ. (Japan) [8281-40]

Multiplex and multilevel optical recording for optical mass storage by retardagraphy, Hiroki Sekiguchi, Daisuke Barada, Takanori Ochiai, Utsunomiya Univ. (Japan); Takashi Fukuda, National Institute of Advanced Industrial Science and Technology (Japan); Shigeo Kawata, Toyohiko Yatagai, Utsunomiya Univ. (Japan). [8281-41]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.



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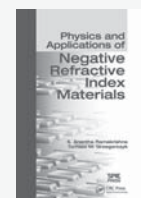
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and Akhlesh Lakhtakia
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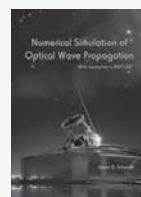
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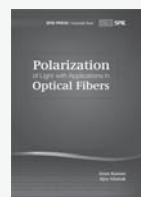
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Broadband Access Communication Technologies VI

Conference Chairs: **Benjamin Dingel**, Nasfine Photonics, Inc. (USA); **Raj Jain**, Washington Univ. in St. Louis (USA); **Katsutoshi Tsukamoto**, Osaka Univ. (Japan)

Program Committee: **Abdel-Karim Al-Tamimi**, Yarmouk Univ. (Jordan); **Arjan Duresi**, Indiana Univ.-Purdue Univ. Indianapolis (USA); **David W. Faulkner**, British Telecom Research Labs. (United Kingdom); **Mahbub Hassan**, The Univ. of New South Wales (Australia); **Mohsen Kavehrad**, The Pennsylvania State Univ. (USA); **Rangaraj Madabhushi**, Madabhushi Consultants, LLC (USA); **Nicholas Madamopoulos**, The City College of New York (USA); **Dalma Novak**, Pharad, LLC (USA); **Jean-Charles Point**, JCP-Consult (France); **Ken-ichi Sato**, Nagoya Univ. (Japan); **Chakchai So-In**, Khon Kaen Univ. (Thailand); **Peter Van Daele**, Univ. Gent (Belgium); **Jeroen S. Wellen**, Alcatel-Lucent (Netherlands)

Tuesday 24 January

OPTO Plenary Session
Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

Room: 206 (Mezzanine) Tues. 10:30 am to 12:10 pm

Optical Communications Plenary Session

Session Chairs: **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA); **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **Space-division multiplexed transmission over few-mode- and coupled-core fiber based on coherent MIMO digital signal processing** (*Invited Paper*), Roland Ryf, Sebastian Randel, René-Jean Essiambre, Peter J. Winzer, Alcatel-Lucent Bell Labs. (USA) [8284-01]

10:55 am: **112 Gb/s PM-QPSK transmission systems with reach lengths enabled by optical fibers with ultra-low loss and very large effective area** (*Invited Paper*), John D. Downie, Corning Incorporated (USA) [8284-02]

11:20 am: **Optical coherent technologies in next generation access networks** (*Invited Paper*), Katsumi Iwatsuki, NTT Network Innovation Labs. (Japan); Katsutoshi Tsukamoto, Osaka Univ. (Japan). [8282-01]

11:45 am: **Optics-bloodstream for future data networks** (*Invited Paper*), Cedric F. Lam, Google Inc. (USA) [8283-01]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 1

Room: 206 (Mezzanine) Tues. 1:30 to 3:15 pm

Advanced Signal Processing

Joint Session with Conference 8284

Session Chairs: **Katsutoshi Tsukamoto**, Osaka Univ. (Japan); **Dieter Stefan Jäger**, Univ. Duisburg-Essen (Germany)

1:30 pm: **Optical signal processing for wireless transmission** (*Invited Paper*), Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan) [8282-02]

1:55 pm: **Adjustable transfer function optical filter for microwave applications**, Nicholas Madamopoulos, Jia Kuang, The City College of New York (USA); Andru J. Prescod, Corning Incorporated (USA). [8282-03]

2:15 pm: **Multi-input injection locking in single mode Fabry-Pérot laser diode and its application in optical signal processing**, Bikash Nakarmi, Mohammad Rakib-Uddin, Yong Hyub Won, KAIST (Korea, Republic of) [8284-03]

2:35 pm: **Super receiver design for superchannel coherent optical systems**, Cheng Liu, Jie Pan, Thomas F. Detwiler, Andrew J. Stark, Yu-Ting Hsueh, Gee-Kung Chang, Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-04]

2:55 pm: **Uncooled MIMO WDM system using advanced receiver signal processing techniques**, Sim Heung Lee, Richard V. Penty, Ian H. White, Univ. of Cambridge (United Kingdom); David G. Cunningham, Avago Technologies Ltd. (United Kingdom) [8284-05]

Coffee Break 3:15 to 3:40 pm

Room: 206 (Mezzanine) Tues. 3:40 to 5:40 pm

Session of Interest on Coding and Modulation Format

Joint Session between Conferences 8283 and 8284

Session Chairs: **Atul K. Srivastava**, OneTerabit (USA); **John C. Cartledge**, Queen's Univ. (Canada)

3:40 pm: **Advanced modulation formats for high-capacity transmission system at 100 G and beyond** (*Invited Paper*), Jianjun Yu, ZTEK Corp., Inc. (USA) [8283-02]

4:05 pm: **Energy-efficient hybrid coded modulations enabling terabit optical ethernet** (*Invited Paper*), Ivan B. Djordjevic, The Univ. of Arizona (USA) [8283-03]

4:30 pm: **Efficient multiplexing and demultiplexing of orbital angular momentum beams**, Kevin M. Birnbaum, Baris I. Erkmen, Jet Propulsion Lab. (USA) [8284-06]

4:50 pm: **Continuous phase modulation parameter optimization for DWDM systems**, Thomas F. Detwiler, Alexander Blanquet, Andrew J. Stark, Georgia Institute of Technology (USA); Bert E. Basch, Verizon Labs., Inc. (USA); Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-07]

Wednesday 25 January

SESSION 2

Room: 206 (Mezzanine) Wed. 8:00 to 10:20 am

High-Capacity Coherent Optical Technologies

Joint Session with Conference 8284

Session Chairs: **Roland Ryf**, Alcatel-Lucent Bell Labs. (USA); **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA)

8:00 am: **Optical OFDM based on the fractional Fourier transform** (*Invited Paper*), Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy) [8284-08]

8:25 am: **Reconfigurable optical transmitters and receivers** (*Invited Paper*), Wolfgang Freude, Rene Schmogrow, David Hillerkuss, Joachim Meyer, Michael Dreschmann, Karlsruher Institut für Technologie (Germany); Bernd Nebendahl, Agilent Technologies Deutschland GmbH (Germany); Michael Huebner, Jürgen Becker, Christian Koos, Juerg Leuthold, Karlsruher Institut für Technologie (Germany) [8284-09]

8:50 am: **Coherent OCDMA communication systems** (*Invited Paper*), Xu Wang, Heriot-Watt Univ. (United Kingdom) [8282-04]

9:15 am: **Performance of 32-Gbaud PDM-QPSK in nonlinear transport regimes with different phase recovery methods**, Andrew J. Stark, Yu-Ting Hsueh, Thomas F. Detwiler, Cheng Liu, Kedar Mehta, Georgia Institute of Technology (USA); Mark Filer, Sorin Tibuleac, ADVA Optical Networking North America, Inc. (USA); Gee-Kung Chang, Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-10]

9:35 am: **Performance of PM QPSK and PM 16-QAM coherent optical fiber communication systems** (*Invited Paper*), John C. Cartledge, Queen's Univ. (Canada); John D. Downie, Jason Hurley, Corning Incorporated (USA); Abdullah Karar, Jian Hong Ke, Queen's Univ. (Canada); Ioannis Roudas, Corning Incorporated (USA); Kim Roberts, Ciena Canada (Canada) [8284-11]

10:00 am: **VCSEL-based optical transceiver module operating at 25 Gb/s and using a single CMOS IC**, Gil Afriat, Lior Horwitz, Dror Lazar, Assaf Issachar, Alexander Pogrebinsky, Adeel Ran, Ehud Shoor, Roi Bar, Rushdy Saba, Intel Corp. (Israel) [8282-05]

Coffee Break 10:20 to 10:40 am

SESSION 3

Room: 206 (Mezzanine)..... Wed. 10:40 am to 12:40 pm

Next-Generation Devices and Components

Joint Session with Conferences 8283 and 8284

Session Chairs: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA);
Werner Weiershausen, Deutsche Telekom AG (Germany)

10:40 am: **Microring resonator for optical access networks** (*Invited Paper*), Michal F. Lipson, Cornell Univ. (USA) [8282-06]

11:05 am: **Power balancing effect on the performance of IMPACC modulator under critical coupling (CC), over coupling (OC), and under coupling (UC) conditions at high frequency**, Benjamin B. Dingel, Nasfene Photonics, Inc. (USA); Nicholas Madamopoulos, The City College of New York (USA); Andru Prescod, Corning Incorporated (USA); Rangaraj Madabhushi, Madabhushi Consultants, LLC (USA) [8282-07]

11:25 am: **InP-based Mach Zehnder modulators for next generation systems** (*Invited Paper*), Eilichi Yamada, Yasuo Shibata, Hiroyuki Ishii, NTT Photonics Labs. (Japan) [8284-12]

11:50 am: **SOA-based Mamyshev-type regeneration: towards an all-optical error correction?** (*Invited Paper*), Hacene Chaouch, College of Optical Sciences, The Univ. of Arizona (USA); Franko Küppers, Technische Univ. Darmstadt (Germany) [8283-04]

12:15 pm: **Integrated photonic components for 100G and beyond** (*Invited Paper*), Atul K. Srivastava, OneTerabit (USA) [8283-05]

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

SESSION 4

Room: 222 (Mezzanine)..... Wed. 1:40 to 3:20 pm

Special Session on Optical Technologies for Mobile Microwave Access

Session Chairs: **Raj Jain**, Washington Univ. in St. Louis (USA);
Katsutoshi Tsukamoto, Osaka Univ. (Japan)

1:40 pm: **LTE enhanced packet core: overview and recent enhancements** (*Invited Paper*), Subir Varma, Tellabs, Inc. (USA) [8282-08]

2:05 pm: **Optical transport technologies in mobile broadband radio systems** (*Invited Paper*), Yukio Horiuchi, KDDI R&D Labs., Inc. (Japan) [8282-09]

2:30 pm: **Transportation of a microwave environment over networks and the applications** (*Invited Paper*), Yojo Shoji, National Institute of Information and Communications Technology (Japan) [8282-10]

2:55 pm: **Virtualized packet optical integrated transport network** (*Invited Paper*), Mallikarjun Tatipamula, Ericsson, Inc. (USA) [8282-11]

Coffee Break 3:20 to 3:50 pm

SESSION 5

Room: 222 (Mezzanine)..... Wed. 3:50 to 5:45 pm

Radio-over Fiber Communication and Access Pricing

Session Chairs: **Katsutoshi Tsukamoto**, Osaka Univ. (Japan);
Andru J Prescod, Corning Incorporated (USA)

3:50 pm: **Pricing by timing: innovating broadband data plans** (*Invited Paper*), Sangtae Ha, Carlee Joe-Wong, Soumya Sen, Mung Chiang, Princeton Univ. (USA) [8282-12]

4:15 pm: **Multi-gigabit millimeterwave radio-over-fiber communication systems and networks** (*Invited Paper*), Andreas Stöhr, Univ. Duisburg-Essen (Germany) [8282-13]

4:40 pm: **Analog photonic link by using DFB lasers operated in the low laser threshold current region and external modulation**, Alejandro García Juárez, Univ. de Sonora (Mexico); Ignacio Enrique Zaldivar Huerta, Instituto Nacional de Astrofísica Óptica y Electrónica (Mexico); Jorge Rodríguez Asomoza, Univ. de las Américas Puebla (Mexico); María del Rocío Gómez Colín, Armando Gregorio Rojas Hernández, Dainet Berman Mendoza, Roberto Gómez Fuentes, Alicia Vera Marquina, Univ. de Sonora (Mexico) [8282-14]

5:00 pm: **Evaluation on a costless 60-GHz OFDM-based indoor wireless over multimode fiber green system employing a photonic integrated smart antenna** (*Invited Paper*), Spiros S. Mikroulis, Panos Sotiropoulos, Evangelos Pikasis, Technological Educational Institute of Athens (Greece); George Agapiou, Hellenic Telecommunications Organization SA (Greece) [8282-15]

5:25 pm: **Temperature impairment characterization in Radio-over-Multimode Fiber systems**, Carmen Vázquez, David S. Montero, Univ. Carlos III de Madrid (Spain) [8282-20]

Thursday 26 January

SESSION 6

Room: 206 (Mezzanine)..... Thurs. 8:00 to 10:10 am

Metro and Alternative Access Technologies (Visible Light Communication)

Joint Session with Conference 8283

Session Chairs: **Atul K. Srivastava**, OneTerabit (USA);
Raj Jain, Washington Univ. in St. Louis (USA)

8:00 am: **An efficient solution for building high-bandwidth active metro and access networks** (*Invited Paper*), Peter Hostalka, Huawei Technologies Co., Ltd. (Germany); L. Pang, A. Shen, Huawei Technologies Co., Ltd. (China) [8283-06]

8:25 am: **Service driven packet-optical convergence for data-center campus applications and metro applications** (*Invited Paper*), Hans-Juergen Schmidtke, Juniper Networks, Inc. (USA) [8283-07]

8:50 am: **Visible light communication in dynamic environment using image/high-speed communication hybrid sensor**, Keita Maeno, Mehrdad Panahpour Tehrani, Toshiaki Fujii, Hiraku Okada, Masayuki Tanimoto, Takaya Yamazato, Nagoya Univ. (Japan); Tomohiro Yendo, Nagaoka Univ. of Technology (Japan) [8282-16]

9:10 am: **Energy efficient lighting and communications**, Zhou Zhou, Mohsen Kavehrad, The Pennsylvania State Univ. (USA); Peng Deng, Wuhan National Lab. for Optoelectronics (China) [8282-17]

9:30 am: **The Smart Room: a 100 Mb/s integrated optical access point transceiver for indoor visible light communication**, Ninrat B. Datiri, Ali Mirvakili, Chirag Sthalekar, Enjin Fu, Chenguang Xi, Shahan C. Nercessian, Twinkle Shah, Benazeer Noorani, Valencia M. J. Koomson, Tufts Univ. (USA) [8282-18]

9:50 am: **Hybrid positioning with lighting LEDs and Zigbee multihop wireless network**, Yong Up Lee, Sungkeun Baang, Joohyeon Park, Hallym Univ. (Korea, Republic of); Zhou Zhou, Mohsen Kavehrad, The Pennsylvania State Univ. (USA) [8282-19]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Optical Metro Networks and Short-Haul Systems IV

Conference Chairs: **Werner Weiershausen**, Deutsche Telekom AG (Germany); **Benjamin Dingel**, Nasfine Photonics, Inc. (USA); **Achyut Dutta**, Banpil Photonics, Inc. (USA); **Atul K. Srivastava**, OneTerabit (USA)

Program Committee: **Ronald Freund**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Akimasa Kaneko**, NEL America, Inc. (USA); **Franko Küppers**, College of Optical Sciences, The Univ. of Arizona (USA); **Ralph Leppla**, Deutsche Telekom AG (Germany); **Ernst-Dieter Schmidt**, Nokia Siemens Networks (Germany); **Sascha Vorbeck**, Deutsche Telekom AG (Germany); **Winston I. Way**, Vello Systems (USA)

Tuesday 24 January

OPTO Plenary Session
Room: 134 (Exhibit Level) Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

Room: 206 (Mezzanine) Tues. 10:30 am to 12:10 pm

Optical Communications Plenary Session

Session Chairs: **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA); **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **Space-division multiplexed transmission over few-mode- and coupled-core fiber based on coherent MIMO digital signal processing** (*Invited Paper*), Roland Ryf, Sebastian Randel, René-Jean Essiambre, Peter J. Winzer, Alcatel-Lucent Bell Labs. (USA) [8284-01]

10:55 am: **112 Gb/s PM-QPSK transmission systems with reach lengths enabled by optical fibers with ultra-low loss and very large effective area** (*Invited Paper*), John D. Downie, Corning Incorporated (USA) [8284-02]

11:20 am: **Optical coherent technologies in next generation access networks** (*Invited Paper*), Katsumi Iwatsuki, NTT Network Innovation Labs. (Japan); Katsutoshi Tsukamoto, Osaka Univ. (Japan). [8282-01]

11:45 am: **Optics-bloodstream for future data networks** (*Invited Paper*), Cedric F. Lam, Google Inc. (USA) [8283-01]

Lunch/Exhibition Break 12:10 to 1:30 pm

Room: 206 (Mezzanine) Tues. 1:30 to 3:15 pm

Session of Interest on Advanced Signal Processing

Joint Session between Conferences 8282 and 8284

Session Chairs: **Katsutoshi Tsukamoto**, Osaka Univ. (Japan); **Dieter Stefan Jäger**, Univ. Duisburg-Essen (Germany)

1:30 pm: **Optical signal processing for wireless transmission** (*Invited Paper*), Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan) [8282-02]

1:55 pm: **Adjustable transfer function optical filter for microwave applications**, Nicholas Madamopoulos, Jia Kuang, The City College of New York (USA); Andru J. Prescod, Corning Incorporated (USA). [8282-03]

2:15 pm: **Multi-input injection locking in single mode Fabry-Pérot laser diode and its application in optical signal processing**, Bikash Nakarmi, Mohammad Rakib-Uddin, Yong Hyub Won, KAIST (Korea, Republic of) [8284-03]

2:35 pm: **Super receiver design for superchannel coherent optical systems**, Cheng Liu, Jie Pan, Thomas F. Detwiler, Andrew J. Stark, Yu-Ting Hsueh, Ge-Kung Chang, Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-04]

2:55 pm: **Uncooled MIMO WDM system using advanced receiver signal processing techniques**, Sim Heung Lee, Richard V. Penty, Ian H. White, Univ. of Cambridge (United Kingdom); David G. Cunningham, Avago Technologies Ltd. (United Kingdom) [8284-05]

Coffee Break 3:15 to 3:40 pm

SESSION 1

Room: 206 (Mezzanine) Tues. 3:40 to 5:40 pm

Coding and Modulation Format

Joint Session with Conference 8284

Session Chairs: **Atul K. Srivastava**, OneTerabit (USA); **John C. Cartledge**, Queen's Univ. (Canada)

3:40 pm: **Advanced modulation formats for high-capacity transmission system at 100 G and beyond** (*Invited Paper*), Jianjun Yu, ZTEK Corp., Inc. (USA) [8283-02]

4:05 pm: **Energy-efficient hybrid coded modulations enabling terabit optical ethernet** (*Invited Paper*), Ivan B. Djordjevic, The Univ. of Arizona (USA) [8283-03]

4:30 pm: **Efficient multiplexing and demultiplexing of orbital angular momentum beams**, Kevin M. Birnbaum, Baris I. Erkmen, Jet Propulsion Lab. (USA) [8284-06]

4:50 pm: **Continuous phase modulation parameter optimization for DWDM systems**, Thomas F. Detwiler, Alexander Blanquet, Andrew J. Stark, Georgia Institute of Technology (USA); Bert E. Basch, Verizon Labs., Inc. (USA); Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-07]

Wednesday 25 January

Room: 206 (Mezzanine). Wed. 8:00 to 10:20 am

Session of Interest on High-Capacity Coherent Optical Technologies

Joint Session between Conferences 8282 and 8284

Session Chairs: **Roland Ryf**, Alcatel-Lucent Bell Labs. (USA); **Benjamin B. Dingel**, Nafshine Photonics, Inc. (USA)

8:00 am: **Optical OFDM based on the fractional Fourier transform** (*Invited Paper*), Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy) . [8284-08]

8:25 am: **Reconfigurable optical transmitters and receivers** (*Invited Paper*), Wolfgang Freude, Rene Schmogrow, David Hillerkuss, Joachim Meyer, Michael Dreschmann, Karlsruhe Institut für Technologie (Germany); Bernd Nebendahl, Agilent Technologies Deutschland GmbH (Germany); Michael Huebner, Jürgen Becker, Christian Koos, Juerg Leuthold, Karlsruher Institut für Technologie (Germany) [8284-09]

8:50 am: **Coherent OCDMA communication systems** (*Invited Paper*), Xu Wang, Heriot-Watt Univ. (United Kingdom) [8284-04]

9:15 am: **Performance of 32-Gbaud PDM-QPSK in nonlinear transport regimes with different phase recovery methods**, Andrew J. Stark, Yu-Ting Hsueh, Thomas F. Detwiler, Cheng Liu, Kedar Mehta, Georgia Institute of Technology (USA); Mark Filer, Sorin Tibuleac, ADVA Optical Networking North America, Inc. (USA); Gee-Kung Chang, Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-10]

9:35 am: **Performance of PM QPSK and PM 16-QAM coherent optical fiber communication systems** (*Invited Paper*), John C. Cartledge, Queen's Univ. (Canada); John D. Downie, Jason Hurley, Corning Incorporated (USA); Abdullah Karar, Jian Hong Ke, Queen's Univ. (Canada); Ioannis Roudas, Corning Incorporated (USA); Kim Roberts, Ciena Canada (Canada) [8284-11]

10:00 am: **VCSEL-based optical transceiver module operating at 25 Gb/s and using a single CMOS IC**, Gil Afriat, Lior Horwitz, Dror Lazar, Assaf Issachar, Alexander Pogrebinsky, Adeel Ran, Ehud Shoor, Roi Bar, Rushdy Saba, Intel Corp. (Israel) [8284-05]

Coffee Break 10:20 to 10:40 am

SESSION 2

Room: 206 (Mezzanine). Wed. 10:40 am to 12:40 pm
Next-Generation Devices and Components

Joint Session with Conferences 8282 and 8284

Session Chairs: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Werner Weiershausen**, Deutsche Telekom AG (Germany)

10:40 am: **Microring resonator for optical access networks** (*Invited Paper*), Michal F. Lipson, Cornell Univ. (USA) [8282-06]

11:05 am: **Power balancing effect on the performance of IMPACC modulator under critical coupling (CC), over coupling (OC), and under coupling (UC) conditions at high frequency**, Benjamin B. Dingel, Nafshine Photonics, Inc. (USA); Nicholas Madamopoulos, The City College of New York (USA); Andru Prescod, Corning Incorporated (USA); Rangaraj Madabhushi, Madabhushi Consultants, LLC (USA) [8282-07]

11:25 am: **InP-based Mach Zehnder modulators for next generation systems** (*Invited Paper*), Eiichi Yamada, Yasuo Shibata, Hiroyuki Ishii, NTT Photonics Labs. (Japan) [8284-12]

11:50 am: **SOA-based Mamyshev-type regeneration: towards an all-optical error correction?** (*Invited Paper*), Hacene Chaouch, College of Optical Sciences, The Univ. of Arizona (USA); Franko Küppers, Technische Univ. Darmstadt (Germany) [8283-04]

12:15 pm: **Integrated photonic components for 100G and beyond** (*Invited Paper*), Atul K. Srivastava, OneTerabit (USA) [8283-05]

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

SESSIONS OF INTEREST Wed. 1:40 to 3:20 pm

See programs for conferences 8282 and 8284

SESSIONS OF INTEREST Wed. 3:40 to 5:25 pm

See programs for conferences 8282 and 8284

POSTERS-WEDNESDAY

Room: 103 (Exhibit Level) Wed. 6:00 to 8:00 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 at <http://spie.org/x27476.xml>.

Design of the optical fibers for differential mode delay compensation, Vladimir A. Burdin, Anton V. Bourdine, Povolzhskaya State Academy of Telecommunications and Informatics (Russian Federation); Oleg R. Delmukhmetov, Ufa State Aviation Technical Univ. (Russian Federation) [8283-17]

Optical link upgrade by dispersion and nonlinearity management technique realized by compensating optical cable coiled around of fiber optic closure, Vladimir A. Burdin, Anton V. Bourdine, Kirill A. Volkov, Povolzhskaya State Academy of Telecommunications and Informatics (Russian Federation) [8283-18]

Thursday 26 January

SESSION 3

Room: 206 (Mezzanine). Thurs. 8:00 to 10:10 am
Metro and Alternative Access Technologies (Visible Light Communication)

Joint Session with Conference 8282

Session Chairs: **Atul K. Srivastava**, OneTerabit (USA); **Raj Jain**, Washington Univ. in St. Louis (USA)

8:00 am: **An efficient solution for building high-bandwidth active metro and access networks** (*Invited Paper*), Peter Hostalka, Huawei Technologies Co., Ltd. (Germany); L. Pang, A. Shen, Huawei Technologies Co., Ltd. (China) [8283-06]

8:25 am: **Service driven packet-optical convergence for data-center campus applications and metro applications** (*Invited Paper*), Hans-Juergen Schmidtke, Juniper Networks, Inc. (USA) [8283-07]

8:50 am: **Visible light communication in dynamic environment using image/high-speed communication hybrid sensor**, Keita Maeno, Mehrdad Panahpour Tehrani, Toshiaki Fujii, Hiraku Okada, Masayuki Tanimoto, Takaya Yamazato, Nagoya Univ. (Japan); Tomohiro Yendo, Nagaoka Univ. of Technology (Japan) . . [8282-16]

9:10 am: **Energy efficient lighting and communications**, Zhou Zhou, Mohsen Kavehrad, The Pennsylvania State Univ. (USA); Peng Deng, Wuhan National Lab. for Optoelectronics (China) [8282-17]

9:30 am: **The Smart Room: a 100 Mb/s integrated optical access point transceiver for indoor visible light communication**, Ninrat B. Datiri, Ali Mirvakili, Chirag Sthalekar, Enjin Fu, Chenguang Xi, Shahan C. Nercessian, Twinkle Shah, Benazeer Noorani, Valencia M. J. Koomson, Tufts Univ. (USA) [8282-18]

9:50 am: **Hybrid positioning with lighting LEDs and Zigbee multihop wireless network**, Yong Up Lee, Sungkeun Baang, Joohyeon Park, Hallym Univ. (Korea, Republic of); Zhou Zhou, Mohsen Kavehrad, The Pennsylvania State Univ. (USA) [8282-19]

Coffee Break 10:10 to 10:30 am

OPTO

SESSION 4

Room: 206 (Mezzanine). Thurs. 10:30 am to 12:35 pm

Advanced Component Technologies

Joint Session with Conference 8284

Session Chairs: **Achyut Dutta**, Banpil Photonics, Inc. (USA);
Dieter Stefan Jäger, Univ. Duisburg-Essen (Germany)

10:30 am: **Next-generation ROADM technologies and architecture** (*Invited Paper*), Manish Sharma, Per B. Hansen, Bimal Nayar, Peter J. Wigley, Oclaro, Inc. (USA). [8283-08]

10:55 am: **Polarization division multiplexed 2x10-Gbps transmissions over 10-km long holey fiber in 1.0- μ m waveband photonic transport system**, Naokatsu Yamamoto, Atsushi Kanno, Kouichi Akahane, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Yu Omigawa, Yasuaki Kurata, Hideyuki Sotobayashi, Aoyama Gakuin Univ. (Japan). [8283-09]

11:15 am: **Optimization of broadband detector performance for optical communication: design and simulation**, Andrew Lange, Robert Olah, Achyut Dutta, Banpil Photonics, Inc. (USA); Nibir K. Dhar, Defense Advanced Research Projects Agency (USA) [8283-10]

11:35 am: **Reduction of crosstalk in a colourless multicasting LCOS based wavelength selective switch by the application of wavefront encoding**, Brian Robertson, Zichen Zhang, Haining Yang, Maura M. Redmond, Neil Collings, Univ. of Cambridge (United Kingdom); Jinsong Liu, Wuxi OptonTech Ltd. (China); Ruisheng S. Lin, Anna M. Jeziorska-Chapman, John R. Moore, William A. Crossland, Daping P. Chu, Univ. of Cambridge (United Kingdom). [8284-27]

11:55 am: **Radiation-resistant erbium-doped optical fiber for space applications**, Jérémie Thomas, Mikhaél Myara, Philippe Signoret, Univ. Montpellier 2 (France); Alain Pastouret, Ekaterina Burov, David E. Boivin, Olivier Cavani, Draka (France); Michel Sotom, Michel Maignan, Thales Alenia Space (France); Olivier Gilard, Ctr. National d'Études Spatiales (France) [8284-28]

12:15 pm: **Advanced high-speed polarimeter for telecommunications, optical channel monitoring, and fiber sensing**, Vitaly Mikhailov, Paul S. Westbrook, OFS Labs. (USA) [8284-29]

Lunch/Exhibition Break. 12:35 to 1:35 pm

SESSION 5

Room: 206 (Mezzanine). Thurs. 1:35 to 4:00 pm

Optical Network

Session Chair: **Werner Weiershausen**, Deutsche Telekom AG (Germany)

1:35 pm: **Operation View: the key challenges for the implementation of new functionalities in a new 40G/100G (terabit) network** (*Invited Paper*), Heinz Mayer, Deutsche Telekom AG (Germany) [8283-11]

2:00 pm: **Modern transmission networks: high bandwidth, long ranges, and high flexibility** (*Invited Paper*), Fred Masiak, Andreas Reinking, Vodafone D2 GmbH (Germany). [8283-12]

2:25 pm: **Network architecture in a converged optical + IP network** (*Invited Paper*), Walid Wakim, Harald Zottmann, Cisco Systems, Inc. (USA) [8283-13]

2:50 pm: **On-line routing, wavelength assignment, and spectrum allocation in wavelength convertible flexible optical WDM networks**, Ankitkumar N. Patel, Philip N. Ji, NEC Labs. America, Inc. (USA); Jason P. Jue, The Univ. of Texas at Dallas (USA); Ting Wang, NEC Labs. America, Inc. (USA) . . . [8283-14]

3:10 pm: **Using omnipresent ethernet based packet optical transport networks** (*Invited Paper*), Ashwin Gumaste, Indian Institute of Technology Bombay (India) [8283-15]

3:35 pm: **100G and beyond: optical transmission activities in Brazil** (*Invited Paper*), Júlio César R. F. de Oliveira, V. B. Ribeiro, J. C. M. Diniz, R. Silva, E. P. Silva, L. H. H. Carvalho, D. M. Pataca, Fabio D. Simoes, Fundacao CpqD (Brazil) [8283-16]

Courses of Related Interest

- SC188 Laser Beam Propagation for Applications in Laser Communications, Laser Radar, and Active Imaging (Phillips, Andrews) Wednesday, 8:30 am to 5:30 pm
- SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

**Don't miss the free
Photonics West
Exhibition**

24-26 January 2012
South Hall ABC and North Hall D
Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm
Thursday · 10:00 am to 4:00 pm

Tuesday-Thursday 24-26 January 2012 • Proceedings of SPIE Vol. 8284

Next-Generation Optical Communication: Components, Sub-Systems, and Systems

Conference Chairs: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Dieter Stefan Jäger**, Univ. Duisburg-Essen (Germany)

Program Committee: **Young-Kai Chen**, Alcatel-Lucent Bell Labs. (USA); **Benjamin Dingel**, Nasfne Photonics, Inc. (USA); **Ronald Freund**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Jin Hong**, Opnext, Inc. (USA); **Sander L. Jansen**, Nokia Siemens Networks (Germany); **Masataka Nakazawa**, Tohoku Univ. (Japan); **Alan C. Nilsson**, Infinera Corp. (USA); **Ioannis Roudas**, Univ. of Patras (Greece); **Akihide Sano**, NTT Network Innovation Labs. (Japan); **Atul K. Srivastava**, OneTerabit (USA); **Fatih Yaman**, NEC Labs. America, Inc. (USA); **Xiang Zhou**, AT&T Labs. Research (USA)

Tuesday 24 January

OPTO Plenary Session
Room: 134 (Exhibit Level). Tues. 8:00 to 10:10 am

Session Chairs: **Klaus P. Streubel**, OSRAM GmbH (Germany); **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom)

8:00 am: **Welcome and Opening Remarks**, Klaus P. Streubel, OSRAM GmbH (Germany)

8:05 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Precourt Institute for Energy, Stanford Univ. (USA)

8:10 am: **Spinoptics: Spin Degeneracy Removal in Nanostructures**, Erez Hasman, Technion-Israel Institute of Technology (Israel)

8:50 am: **High-Contrast Metastructures for Integrated Optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA)

9:30 am: **Engaging Spins in Semiconductors for Quantum Information Processing**, David Awschalom, Univ. of California, Santa Barbara (USA)

See p. 26 for details.

Coffee Break 10:10 to 10:30 am

Room: 206 (Mezzanine). Tues. 10:30 am to 12:10 pm

Optical Communications Plenary Session

Session Chairs: **Benjamin B. Dingel**, Nasfne Photonics, Inc. (USA); **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **Space-division multiplexed transmission over few-mode- and coupled-core fiber based on coherent MIMO digital signal processing** (*Invited Paper*), Roland Ryf, Sebastian Randel, René-Jean Essiambre, Peter J. Winzer, Alcatel-Lucent Bell Labs. (USA) [8284-01]

10:55 am: **112 Gb/s PM-QPSK transmission systems with reach lengths enabled by optical fibers with ultra-low loss and very large effective area** (*Invited Paper*), John D. Downie, Corning Incorporated (USA) [8284-02]

11:20 am: **Optical coherent technologies in next generation access networks** (*Invited Paper*), Katsumi Iwatsuki, NTT Network Innovation Labs. (Japan); Katsutoshi Tsukamoto, Osaka Univ. (Japan) [8282-01]

11:45 am: **Optics-bloodstream for future data networks** (*Invited Paper*), Cedric F. Lam, Google Inc. (USA) [8283-01]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 1

Room: 206 (Mezzanine). Tues. 1:30 to 3:15 pm

Advanced Signal Processing

Joint Session with Conference 8282

Session Chairs: **Katsutoshi Tsukamoto**, Osaka Univ. (Japan); **Dieter Stefan Jäger**, Univ. Duisburg-Essen (Germany)

1:30 pm: **Optical signal processing for wireless transmission** (*Invited Paper*), Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan) [8282-02]

1:55 pm: **Adjustable transfer function optical filter for microwave applications**, Nicholas Madamopoulos, Jia Kuang, The City College of New York (USA); Andru J. Prescod, Corning Incorporated (USA) [8282-03]

2:15 pm: **Multi-input injection locking in single mode Fabry-Pérot laser diode and its application in optical signal processing**, Bikash Nakarmi, Mohammad Rakib-Uddin, Yong Hyub Won, KAIST (Korea, Republic of) [8284-03]

2:35 pm: **Super receiver design for superchannel coherent optical systems**, Cheng Liu, Jie Pan, Thomas F. Detwiler, Andrew J. Stark, Yu-Ting Hsueh, Gee-Kung Chang, Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-04]

2:55 pm: **Uncooled MIMO WDM system using advanced receiver signal processing techniques**, Sim Heung Lee, Richard V. Penty, Ian H. White, Univ. of Cambridge (United Kingdom); David G. Cunningham, Avago Technologies Ltd. (United Kingdom) [8284-05]

Coffee Break 3:15 to 3:40 pm

SESSION 2

Room: 206 (Mezzanine). Tues. 3:40 to 5:40 pm

Coding and Modulation Format

Joint Session with Conference 8283

Session Chairs: **Atul K. Srivastava**, OneTerabit (USA); **John C. Cartledge**, Queen's Univ. (Canada)

3:40 pm: **Advanced modulation formats for high-capacity transmission system at 100 G and beyond** (*Invited Paper*), Jianjun Yu, ZTEK Corp., Inc. (USA) [8283-02]

4:05 pm: **Energy-efficient hybrid coded modulations enabling terabit optical ethernet** (*Invited Paper*), Ivan B. Djordjevic, The Univ. of Arizona (USA) [8283-03]

4:30 pm: **Efficient multiplexing and demultiplexing of orbital angular momentum beams**, Kevin M. Birnbaum, Baris I. Erkmen, Jet Propulsion Lab. (USA) [8284-06]

4:50 pm: **Continuous phase modulation parameter optimization for DWDM systems**, Thomas F. Detwiler, Alexander Blanquet, Andrew J. Stark, Georgia Institute of Technology (USA); Bert E. Basch, Verizon Labs., Inc. (USA); Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-07]

OPTO

Wednesday 25 January

SESSION 3

Room: 206 (Mezzanine) Wed. 8:00 to 10:20 am

High-Capacity Coherent Optical Technologies

Joint Session with Conference 8282

Session Chairs: **Roland Ryf**, Alcatel-Lucent Bell Labs. (USA);
Benjamin B. Dingel, Nasfne Photonics, Inc. (USA)

8:00 am: **Optical OFDM based on the fractional Fourier transform** (*Invited Paper*), Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy) . [8284-08]

8:25 am: **Reconfigurable optical transmitters and receivers** (*Invited Paper*), Wolfgang Freude, Rene Schmogrow, David Hillerkuss, Joachim Meyer, Michael Dreschmann, Karlsruher Institut für Technologie (Germany); Bernd Nebendahl, Agilent Technologies Deutschland GmbH (Germany); Michael Huebner, Jürgen Becker, Christian Koos, Juerg Leuthold, Karlsruher Institut für Technologie (Germany) [8284-09]

8:50 am: **Coherent OCDMA communication systems** (*Invited Paper*), Xu Wang, Heriot-Watt Univ. (United Kingdom) [8282-04]

9:15 am: **Performance of 32-Gbaud PDM-QPSK in nonlinear transport regimes with different phase recovery methods**, Andrew J. Stark, Yu-Ting Hsueh, Thomas F. Detwiler, Cheng Liu, Kedar Mehta, Georgia Institute of Technology (USA); Mark Filer, Sorin Tibuleac, ADVA Optical Networking North America, Inc. (USA); Gee-Kung Chang, Stephen E. Ralph, Georgia Institute of Technology (USA) [8284-10]

9:35 am: **Performance of PM QPSK and PM 16-QAM coherent optical fiber communication systems** (*Invited Paper*), John C. Cartledge, Queen's Univ. (Canada); John D. Downie, Jason Hurley, Corning Incorporated (USA); Abdullah Karar, Jian Hong Ke, Queen's Univ. (Canada); Ioannis Roudas, Corning Incorporated (USA); Kim Roberts, Ciena Canada (Canada) [8284-11]

10:00 am: **VCSEL-based optical transceiver module operating at 25 Gb/s and using a single CMOS IC**, Gil Afriat, Lior Horwitz, Dror Lazar, Assaf Issachar, Alexander Pogrebinsky, Adeel Ran, Ehud Shoor, Roi Bar, Rushdy Saba, Intel Corp. (Israel) [8282-05]

Coffee Break 10:20 to 10:40 am

SESSION 4

Room: 206 (Mezzanine) Wed. 10:40 am to 12:40 pm

Next-Generation Devices and Components

Joint Session with Conferences 8282 and 8283

Session Chairs: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Werner Weiershausen**, Deutsche Telekom AG (Germany)

10:40 am: **Microring resonator for optical access networks** (*Invited Paper*), Michal F. Lipson, Cornell Univ. (USA) [8282-06]

11:05 am: **Power balancing effect on the performance of IMPACC modulator under critical coupling (CC), over coupling (OC), and under coupling (UC) conditions at high frequency**, Benjamin B. Dingel, Nasfne Photonics, Inc. (USA); Nicholas Madamopoulos, The City College of New York (USA); Andru Prescod, Corning Incorporated (USA); Rangaraj Madabhushi, Madabhushi Consultants, LLC (USA) [8282-07]

11:25 am: **InP-based Mach Zehnder modulators for next generation systems** (*Invited Paper*), Eiichi Yamada, Yasuo Shibata, Hiroyuki Ishii, NTT Photonics Labs. (Japan) [8284-12]

11:50 am: **SOA-based Mamyshev-type regeneration: towards an all-optical error correction?** (*Invited Paper*), Hacene Chaouch, College of Optical Sciences, The Univ. of Arizona (USA); Franko Küppers, Technische Univ. Darmstadt (Germany) [8283-04]

12:15 pm: **Integrated photonic components for 100G and beyond** (*Invited Paper*), Atul K. Srivastava, OneTerabit (USA) [8283-05]

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

SESSION 5

Room: 212 (Mezzanine) Wed. 1:40 to 3:10 pm

Space-Division Multiplexed Optical Transmission I

Session Chair: **Kunimasa Saitoh**, Hokkaido Univ. (Japan)

1:40 pm: **Few mode fibers for mode division multiplexing transmission** (*Invited Paper*), Hirokazu Kubota, Toshio Morioka, NTT Network Innovation Labs. (Japan) [8284-13]

2:05 pm: **Efficient optical amplification for spatial division multiplexing** (*Invited Paper*), Peter M. Krummrich, Technische Univ. Dortmund (Germany) [8284-14]

2:30 pm: **Multimode fiber amplifier with tunable modal gain using a reconfigurable multimode pump**, Neng Bai, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Ezra Ip, Ting Wang, NEC Labs. America, Inc. (USA); Guifang Li, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8284-15]

2:50 pm: **Fabrication and characterization of ion-exchanged glass binary phase plates for mode-division multiplexing**, Carlos Montero Orille, Vicente Moreno, Xesus Prieto-Blanco, Univ. de Santiago de Compostela (Spain); Eduardo F. Mateo, Ezra M. Ip, NEC Labs. America, Inc. (USA); Jesus Linares Beiras, Univ. de Santiago de Compostela (Spain) [8284-16]

Coffee Break 3:10 to 3:40 pm

SESSION 6

Room: 212 (Mezzanine) Wed. 3:40 to 5:10 pm

Space-Division Multiplexed Optical Transmission II

Session Chair: **Peter M. Krummrich**, Technische Univ. Dortmund (Germany)

3:40 pm: **Low-crosstalk multi-core fibers for long-haul transmission** (*Invited Paper*), Kunimasa Saitoh, Masanori Koshiba, Hokkaido Univ. (Japan); Katsuhiro Takenaga, Shoichiro Matsuo, Fujikura Ltd. (Japan) [8284-17]

4:05 pm: **Supermodes for optical transmission**, Cen Xia, Neng Bai, Guifang Li, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8284-18]

4:25 pm: **Measurement of complex mode amplitudes in multimode fiber**, Bilal A. Alvi, Institute of Business Management (Pakistan); Muhammad Asif, Amber Israr, Sir Syed Univ. of Engineering & Technology (Pakistan) . . . [8284-19]

4:45 pm: **Detailed modeling of integrated IQ-transmitters for 100G+ applications** (*Invited Paper*), Andre Richter, Cristina Arellano, VPIsystems GmbH (Germany); David Carrara, Telecom SudParis (France); Sergei Mingaleev, Eugene Sokolov, VPI Development Ctr. (Belarus); Igor Koltchanov, VPIsystems GmbH (Germany) [8284-20]

Thursday 26 January

SESSION 7

Room: 212 (Mezzanine). Thurs. 8:00 to 10:15 am

Coherent Optical Transmission: Nonlinear Effects

Session Chair: Fatih Yaman, NEC Labs. America, Inc. (USA)

- 8:00 am: **MLSE for linear and nonlinear ISI mitigation in optical coherent detection systems** (*Invited Paper*), Yi Cai, Huawei Technologies Co., Ltd. (USA) [8284-21]
- 8:25 am: **Stimulated Raman crosstalk in WDM system employing distributed Raman amplifier for DPSK and OOK modulation format**, Anamika Anamika, Vishnu Priye, Indian School Of Mines (India) [8284-22]
- 8:45 am: **Recent advances in digital backward propagation algorithm for coherent transmission systems with higher order modulation formats** (*Invited Paper*), Bernhard Schmauss, Rameez Asif, Chien-Yu Lin, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8284-23]
- 9:10 am: **Digital nonlinear compensation techniques for high-speed DWDM transmission systems** (*Invited Paper*), Takeshi Hoshida, Fujitsu Labs. (Japan); Liang Dou, Fujitsu Research and Development Center Co., Ltd. (China); Takahito Tanimura, Fujitsu Labs. (Japan); Weizhen Yan, Fujitsu Research and Development Center Co., Ltd. (China); Shoichiro Oda, Fujitsu Labs. (Japan); Lei Li, Fujitsu Research and Development Center Co., Ltd. (China); Hisao Nakashima, Fujitsu Labs. (Japan); Meng Yan, Zhenning Tao, Fujitsu Research and Development Center Co., Ltd. (China); Jens C. Rasmussen, Fujitsu Labs. (Japan). [8284-24]
- 9:35 am: **Low-complexity logarithmic step-size based filtered digital backward propagation algorithm for compensating fiber transmission impairments**, Muhammad Rameez Asif, Chien-Yu Lin, Michael F. Holtmannspoetter, Bernhard Schmauss, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8284-25]
- 9:55 am: **Non-linear tolerance of 400Gbit/s DP-RZ-QPSK transmission over 1200km SMF-28 employing digital backward propagation**, Muhammad Rameez Asif, Chien-Yu Lin, Muhammad Usman, Bernhard Schmauss, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8284-26]
- Coffee Break 10:15 to 10:30 am

SESSION 8

Room: 206 (Mezzanine). Thurs. 10:30 am to 12:35 pm

Advanced Component Technologies

Joint Session with Conference 8283

Session Chairs: Achyut Dutta, Banpil Photonics, Inc. (USA); Dieter Stefan Jäger, Univ. Duisburg-Essen (Germany)

- 10:30 am: **Next-generation ROADM technologies and architecture** (*Invited Paper*), Manish Sharma, Per B. Hansen, Bimal Nayar, Peter J. Wigley, Oclaro, Inc. (USA). [8283-08]
- 10:55 am: **Polarization division multiplexed 2x10-Gbps transmissions over 10-km long holey fiber in 1.0-µm waveband photonic transport system**, Naokatsu Yamamoto, Atsushi Kanno, Kouichi Akahane, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Yu Omigawa, Yasuaki Kurata, Hideyuki Sotobayashi, Aoyama Gakuin Univ. (Japan). [8283-09]
- 11:15 am: **Optimization of broadband detector performance for optical communication: design and simulation**, Andrew Lange, Robert Olah, Achyut Dutta, Banpil Photonics, Inc. (USA); Nibir K. Dhar, Defense Advanced Research Projects Agency (USA) [8283-10]
- 11:35 am: **Reduction of crosstalk in a colourless multicasting LCOS based wavelength selective switch by the application of wavefront encoding**, Brian Robertson, Zichen Zhang, Haining Yang, Maura M. Redmond, Neil Collings, Univ. of Cambridge (United Kingdom); Jinsong Liu, Wuxi OptonTech Ltd. (China); Ruisheng S. Lin, Anna M. Jeziorska-Chapman, John R. Moore, William A. Crossland, Daping P. Chu, Univ. of Cambridge (United Kingdom). [8284-27]
- 11:55 am: **Radiation-resistant erbium-doped optical fiber for space applications**, Jérémie Thomas, Mikhaël Myara, Philippe Signoret, Univ. Montpellier 2 (France); Alain Pastouret, Ekaterina Burov, David E. Boivin, Olivier Cavani, Draka (France); Michel Sotom, Michel Maignan, Thales Alenia Space (France); Olivier Gilard, Ctr. National d'Études Spatiales (France) [8284-28]
- 12:15 pm: **Advanced high-speed polarimeter for telecommunications, optical channel monitoring, and fiber sensing**, Vitaly Mikhailov, Paul S. Westbrook, OFS Labs. (USA) [8284-29]

Courses of Related Interest

SC747 Semiconductor Photonic Device Fundamentals (Linden) Monday, 8:30 am to 5:30 pm

See Course Materials Desk located near the SPIE Registration Area, North Lobby for course and workshop details.

Photonics West maps:

- Moscone Center Maps pp. 2–4
- Walking Map p. 4



GREEN PHOTONICS



Symposium Chair

Stephen J. Eglash

Precourt Institute for Energy, Stanford Univ. (USA)

Conferences and Courses: 21–26 January 2012

Photonics West Exhibition: 24–26 January 2012

BIOS EXPO: 21–22 January 2012

The Moscone Center | San Francisco, California, USA

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Energy, sustainability, and conservation are inherently interdisciplinary. With over 50 papers, the Green Photonics virtual symposium brings together the latest research in a broad range of photonics applications across Photonics West.

Green Photonics Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
		GP101 Green Photonics in Solid State Lighting and Displays, p. 323			
		GP102 Green Photonics in Laser-assisted Manufacturing and Micro/Nano Fabrication, p. 324			
		GP103 Green Photonics in Communications, p. 325			
		GP104 Green Photonics in Renewable Energy Generation: Fusion and Photovoltaics, p. 326			
	<p>Green Photonics Awards</p> <p>Awards in each of the four areas will be presented at the OPTO Plenary Session on Tuesday morning, and the LASE Plenary Session on Wednesday morning.</p> <p>Awards presented at the OPTO Plenary Session:</p> <ul style="list-style-type: none"> • Green Photonics Award for Solid State Lighting/Displays • Green Photonics Award for Optical Communications Research • Green Photonics Award for Renewable Energy Generation: Fusion and Photovoltaics <p>Award presented at the LASE Plenary Session:</p> <ul style="list-style-type: none"> • Green Photonics Award for Laser-assisted Manufacturing or Micro/Nano Fabrication 				

Green Photonics in Solid State Lighting and Displays

Monday 23 January

AFTERNOON

4:40 pm: **The effect of exciton dimensionality on resonance energy transfer: advances for organic color converters in hybrid inorganic/organic LEDs**, Jan Junis Rindermann, Univ. of Southampton (United Kingdom); Galia R. Pozina, Bo Monemar, Lars Hultman, Linköping Univ. (Sweden); Hiroshi Amano, Nagoya Univ. (Japan); Pavlos G. Lagoudakis, Univ. of Southampton (United Kingdom) [8255-17]

Tuesday 24 January

AFTERNOON

4:30 pm: **Real-space distribution of cavity modes in single ZnO nanowires** (*Invited Paper*), Frank Güell, Univ. de Barcelona (Spain); Alejandro R. Goñi, Consejo Superior de Investigaciones Científicas (Spain); Josep Oriol Ossó, MATGAS (Spain); Luis A. Perez, Eduardo A. Coronado, La Univ. Nacional de Córdoba (Argentina); Joan Ramón Morante, Institut de Recerca en Energia de Catalunya (Spain) [8263-53]

5:15 pm: **Infrared excited Yb:Er:Y₂O₃ phosphors with intense emission for lighting applications**, Gangadharan Ajith Kumar, Madhab Pokhrel, Dhiraj K. Sardar, The Univ. of Texas at San Antonio (USA) [8278-13]

Wednesday 25 January

AFTERNOON

2:50 pm: **Polariton lasers based on GaN microcavities** (*Invited Paper*), Alexey V. Kavokin, Univ. of Southampton (United Kingdom) [8262-60]

WEDNESDAY- POSTERS

Analysis of nanoparticles in controlling the vertical alignment of nematic liquid crystals, Amit Choudhary, Guoqiang Li, Univ. of Missouri-St. Louis (USA) [8279-41]

Thursday 26 January

MORNING

9:30 am: **Power conversion and luminous efficiency performance of nanophosphor quantum dots on color-conversion LEDs for high-quality general lighting**, Talha Erdem, Sedat Nizamoglu, Hilmi Volkan Demir, Bilkent Univ. (Turkey) [8278-35]

AFTERNOON

12:00 pm: **Simulation of the evolution of spectrum-managed optical pulse propagation in active fibers with programmable gain spectral profile**, Tianxin Yang, Zifei Wang, Delin Yang, Dongfang Jia, Mei Sang, Tianjin Univ. (China) [8255-62]

ROOM LOCATIONS VARY

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To find their room location, locate the talk's paper number [xxxx-xx], use the first four digits to look up the corresponding conference (conferences are in numerical order), and note the session room location.

Green Photonics in Laser-assisted Manufacturing and Micro/Nano Fabrication

Sunday 22 January

MORNING

10:40 am: **Plasmonic nanocavities for photovoltaics devices and biosensing** (*Invited Paper*), Stéphane S. Collin, Andrea Cattoni, Clément Collin, Inès Massiot, Petru V. Ghenuche, Nathalie Bardou, Dominique Decanini, Anne-Marie Haghiri-Gosnet, Jean-Luc Pelouard, Ctr. National de la Recherche Scientifique (France) [8268-07]

AFTERNOON

1:20 pm: **Quantum cascade laser enabled nano-liter polymer waveguide sensor**, Sheng Wu, Andrei Deev, California Institute of Technology (USA) [8268-12]

1:30 pm: **Average power scaling of UV excimer lasers drives flat panel display and LIDAR applications**, Ralph F. Delmdahl, Rainer Paetzel, Coherent GmbH (Germany). [8238A-09]

Monday 23 January

AFTERNOON

2:10 pm: **High efficiency kW-class semiconductor laser bars with passive cooling**, John G. Bai, Zhigang Chen, nLIGHT Corp. (USA); Paul O. Leisher, Rose-Hulman Institute of Technology (USA); Mark DeFranza, Mike Grimshaw, Mark A. DeVito, Robert J. Martinsen, Jim Haden, nLIGHT Corp. (USA). [8241-31]

4:15 pm: **Guided resonances for light-assisted self assembly and structural-absorption engineering** (*Invited Paper*), Michelle L. Povinelli, Camilo Mejia Prada, Chenxi Lin, Eric Jaquay, Luis J. Martinez Rodriguez, The Univ. of Southern California (USA); Avik Dutt, Indian Institute of Technology Kharagpur (India). [8236-36]

4:40 pm: **Comparative study of the performance of semiconductor laser based coherent Doppler lidars**, Peter John L. Rodrigo, Christian Pedersen, Technical Univ. of Denmark (Denmark). [8241-37]

5:30 pm: **Mechanism of selective removal of transparent layers on semiconductors using ultrashort laser pulses**, Tino Rublack, Stefan Hartnauer, Markus Muchow, Michael Mergner, Gerhard Seifert, Martin-Luther- Univ. Halle-Wittenberg (Germany). [8247-34]

Tuesday 24 January

AFTERNOON

12:10 pm: **A coherent laser Doppler wind profiler for active control of wind turbine**, Leilei Shinohara, Siegwart Bogatscher, Nico Heussner, Harsha Umesh Babu, Wilhelm Stork, Karlsruhe Institut für Technologie (Germany) . . . [8235-39]

TUESDAY - POSTERS

Theoretical and experimental results for using phosphate glass solar laser in the focus of powerful solar concentrator, Abdukhakim Fazilov, Riskiev Tohtapulat, Abdurahmanov Abdujabbar, Radjapov Lutfulla, Payziev Shermahamat, Institute of Materials Science UAS (Uzbekistan); Joris Lousteau, Daniel Milanese, Davide Negro, Emanuele Mura, Nadia Boetti, Politecnico di Torino (Italy). [8235-58]

Femtosecond laser doping and nanostructuring of silicon for photovoltaics, Benjamin Franta, Meng-Ju Sher, Yu-Ting Lin, Katherine C. Phillips, Eric Mazur, Harvard Univ. (USA) [8243-50]

Wednesday 25 January

MORNING

9:10 am: **Tribological enhancement of surface properties by multi-scale femtosecond laser texturing: relation between laser treatment, topography, and wettability**, Pavel Bizi-Bandoki, Stéphane Valette, Stéphane Benayoun, Ecole Centrale de Lyon (France); Eric Audouard, Univ. Jean Monnet Saint-Etienne (France). [8243-32]

AFTERNOON

1:30 pm: **Long-wavelength VCSELs for sensing applications** (*Invited Paper*), Markus Ortsiefer, Vertilas GmbH (Germany). [8276-09]

Thursday 26 January

MORNING

9:00 am: **Rotary MEMS comb-drive actuator with large deflection for photonic applications**, Quamrul Huda, Fahim Amin, Univ. of Alberta (Canada); Yuebin Ning, Graham McKinnon, Norcada Inc. (Canada); Alexandre Lytkine, John Tulip, Wolfgang Jaeger, Univ. of Alberta (Canada) [8248-02]

AFTERNOON

4:50 pm: **Selective ablation of thin films in latest generation CIGS solar cells with picosecond pulses**, Andreas Burn, Martin Mural, Berner Fachhochschule Technik und Informatik (Switzerland); Reiner Witte, Bruno Frei, Solneva SA (Switzerland); Stephan Bücheler, EMPA (Switzerland); Valerio Romano, Berner Fachhochschule Technik und Informatik (Switzerland). [8243-45]

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Green Photonics in Communications

Sunday 22 January

MORNING

9:00 am: **Novel step-tunable wavelength-swept optical system based on a SSB modulator driven by a RF generator for fiber sensing networks**, Tianxin Yang, Changren Qiu, Zhaoying Wang, Chunfeng Ge, Mei Sang, Tianjin Univ. (China) [8259-01]

Monday 23 January

AFTERNOON

2:40 pm: **Broadband perfect light absorber using a multiplexed metal-dielectric structure**, Joshua Hendrickson, Air Force Research Lab. (USA); Junpeng Guo, Boyang Zhang, The Univ. of Alabama in Huntsville (USA); Walter Buchwald, Richard Soref, Air Force Research Lab. (USA) [8269-12]

Wednesday 25 January

AFTERNOON

5:00 pm: **Evaluation on a costless 60-GHz OFDM-based indoor wireless over multimode fiber green system employing a photonic integrated smart antenna** (*Invited Paper*), Spiros S. Mikroulis, Panos Sotiropoulos, Evangelos Pikasis, Technological Educational Institute of Athens (Greece); George Agapiou, Hellenic Telecommunications Organization SA (Greece). [8282-15]

6:00 pm: **Energy-efficient VCSELs for “green” data and computer communication**, Philip Moser, Technische Univ. Berlin (Germany); James A. Lott, VI Systems GmbH (Germany); Philip Wolf, Gunter Larisch, Alexey Payusov, Nikolay N. Ledentsov, Werner Hofmann, Dieter Bimberg, Technische Univ. Berlin (Germany) [8276-18]

Thursday 26 January

MORNING

9:30 am: **The Smart Room: a 100 Mb/s integrated optical access point transceiver for indoor visible light communication**, Ninrat B. Datiri, Ali Mirvakili, Chirag Sthalekar, Enjin Fu, Chenguang Xi, Shahan C. Nercessian, Twinkle Shah, Benazeer Noorani, Valencia M. J. Koomson, Tufts Univ. (USA) [8282-18]

ROOM LOCATIONS VARY

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Green Photonics in Renewable Energy Generation: Fusion and Photovoltaics

Monday 23 January

MORNING

8:30 am: **Increasing upconversion by metal and dielectric nanostructures** (*Invited Paper*), Jan Christoph Goldschmidt, Stefan Fischer, Heiko Steinkemper, Barbara Herter, Benedikt Bläsi, Fraunhofer-Institut für Solare Energiesysteme (Germany); Florian Hallermann, Gero von Plessen, RWTH Aachen (Germany); Karl W. Krämer, Daniel Biner, Univ. Bern (Switzerland); Martin Hermle, Fraunhofer-Institut für Solare Energiesysteme (Germany) [8256-01]

9:00 am: **Simulations of solar cell enhancement using whispering-gallery modes of dielectric nanospheres** (*Invited Paper*), Jonathan Grandidier, Dennis M. Callahan, Jr., Michael G. Deceglie, Jeremy N. Munday, Harry A. Atwater, California Institute of Technology (USA) [8256-02]

11:20 am: **Nanocrystalline cellulose for covert optical encryption**, Mark P. Andrews, Yuping Zhang, Vamsy P. Chodavarapu, Andrew K. Kirk, McGill Univ. (Canada) [8258-07]

11:30 am: **Improved efficiency for nanopillar array of c-Si photovoltaic by down-conversion and anti-reflection of quantum dots**, Chien-chung Lin, Hsin-Chu Chen, H. W. Han, Y. L. Tsai, C. H. Chang, Min-An Tsai, Hao-Chung Kuo, Peichen Yu, National Chiao Tung Univ. (Taiwan) [8256-07]

11:50 am: **Scattering analysis of the indium-tin-oxide (ITO) nanowhiskers on ITO film substrate for a-Si solar cell**, Hsiao-Wei Liu, Chia-Hua Chang, Cheng-Chung Lin, Peichen Yu, National Chiao Tung Univ. (Taiwan) [8256-08]

AFTERNOON

2:50 pm: **Minority carrier contacts for high efficiency tandem solar cells**, Christiana B. Honsberg, Stephen M. Goodnick, Arizona State Univ. (USA) [8256-12]

4:00 pm: **Photovoltaic properties of silicon quantum dots in dielectric matrices**, Philipp Löper, Anke Witzky, Fraunhofer-Institut für Solare Energiesysteme (Germany); Andreas Hartel, Sebastian Gutsch, Daniel Hiller, Albert-Ludwigs-Univ. Freiburg (Germany); Jan Christoph Goldschmidt, Stefan Janz, Stefan W. Glunz, Fraunhofer-Institut für Solare Energiesysteme (Germany); Margit Zacharias, Albert-Ludwigs-Univ. Freiburg (Germany) [8256-14]

4:20 pm: **Achieve more than 5% PbS quantum dot solar cells**, Jianbo Gao, National Renewable Energy Lab. (USA); So-Hee Jeong, Korea Institute of Machinery and Materials (Korea, Republic of); Octavi E. Semonin, Joseph M. Luther, National Renewable Energy Lab. (USA); Randy J. Ellingson, The Univ. of Toledo (USA); Arthur J. Nozik, Matthew C. Beard, National Renewable Energy Lab. (USA) [8256-15]

4:20 pm: **Characterization of water-based thiophene polymers for organic photovoltaics**, Tze Chien Sum, Michael Kurniawan, Kong Fai Tai, Cheng Hon A. Huan, Nanyang Technological Univ. (Singapore) [8258-16]

4:40 pm: **White organic light-emitting diodes with ultra-thin mixed emitting layer**, Taewoo Jeon, Ecole Polytechnique (France); Bernard Geffroy, Ecole Polytechnique (France) and CEA (France); Yvan Bonnassieux, Denis Tondelier, Ecole Polytechnique (France); Eléna Ishow, Univ. de Nantes (France); Sébastien V. Chenais, Sébastien Forget, Univ. Paris 13 (France) and CNRS (France) [8258-17]

Tuesday 24 January

MORNING

11:10 am: **Thin Cu(In,Ga)Se 2 photovoltaic microcells: high efficiency with reduced material usage**, Myriam Paire, Laurent Lombez, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) and Ctr. National de la Recherche Scientifique (France) and Ecole Nationale Supérieure de Chimie de Paris (France); Nicolas Péré-Laperne, Ctr. National de la Recherche Scientifique (France); Zacharie Jehl, Marie Jubault, Frédérique Donsanti, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) and Ctr. National de la Recherche Scientifique (France) and Ecole Nationale Supérieure de Chimie de Paris (France); Stéphane S. Collin, Alain Dollet, Jean-Luc Pelouard, Ctr. National de la Recherche Scientifique (France); Jean-François Guillemoles, Daniel Lincot, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) and Ctr. National de la Recherche Scientifique (France) and Ecole Nationale Supérieure de Chimie de Paris (France) . . [8256-18]

AFTERNOON

2:00 pm: **Demonstration of a multiband solar cell** (*Invited Paper*), Nair López Martínez, Lawrence Berkeley National Lab. (USA); Lothar A. Reichertz, Lawrence Berkeley National Lab. (USA) and RoseStreet Labs. Energy (USA); Kin Man Yu, Lawrence Berkeley National Lab. (USA); Kenneth Campman, Sumika Electronic Materials, Inc. (USA); Wladek Walukiewicz, Lawrence Berkeley National Lab. (USA) and RoseStreet Labs. Energy (USA) [8256-22]

Wednesday 25 January

MORNING

9:00 am: **Modeling carrier relaxation in hot carrier solar cells** (*Invited Paper*), Stephen M. Goodnick, Christiana B. Honsberg, Arizona State Univ. (USA) [8256-30]

9:30 am: **InGaAs/GaAsP quantum wells for hot carrier solar cells**, Louise C. Hirst, Markus Furher, Daniel J. Farrell, Imperial College London (United Kingdom); Arthur Le Bris, Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Murad J. Y. Tayebjee, Raphael Clady, Timothy W. Schmidt, The Univ. of Sydney (Australia); Masakazu Sugiyama, Yunpeng Wang, The Univ. of Tokyo (Japan); Nicholas J. Ekins-Daukes, Imperial College London (United Kingdom) [8256-31]

11:10 am: **Multiple exciton generation in PbSe nanorods**, Paul D. Cunningham, U.S. Naval Research Lab. (USA); Janice E. Boercker, Edward E. Foss, U.S. Naval Research Lab. (USA); Matthew P. Lumb, U.S. Naval Research Lab. (USA) and The George Washington Univ. (USA); Anthony R. Smith, Joseph G. Tischler, Joseph S. Melinger, U.S. Naval Research Lab. (USA) [8256-34]

11:40 am: **Additional donor modification by oxy groups for strengthening electro-optic response of molecules** (*Invited Paper*), Akira Otomo, Toshiaki Yamada, National Institute of Information and Communications Technology (Japan) [8258-09]

11:50 am: **The use of nanostructures for meeting the terawatt photovoltaic challenge**, Christiana B. Honsberg, Stephen M. Goodnick, Stuart G. Bowden, Arizona State Univ. (USA) [8256-36]

AFTERNOON

- 1:30 pm: **Spectroscopic ellipsometry: metrology for photovoltaics from the nano to the giga** (*Invited Paper*), Sylvain Marsillac, Old Dominion Univ. (USA); Robert W. Collins, Jr., The Univ. of Toledo (USA) [8256-37]
- 2:00 pm: **Energy conversion efficiency calculation model for direct-bonding planar-waveguide THz emitters based on optical rectification effects in GaAs**, Tianxin Yang, Xuehui Niu, Junlong Wang, Mei Sang, Tianjin Univ. (China) [8256-12]
- 2:50 pm: **A novel method to eliminate the artifacts in external quantum efficiency measurements on multi-junction solar cell**, Jing-Jing Li, Shi Liu, Swee H. Lim, Charles R. Allen, Yong-Hang Zhang, Arizona State Univ. (USA) [8256-40]
- 4:40 pm: **Minimizing solar cell reflection loss through surface texturing and implementation of 1D and 2D subwavelength dielectric gratings**, Wei Wang, Akhil Mehrotra, Andenet Alemu, Alex Freundlich, Univ. of Houston (USA) [8256-44]

WEDNESDAY - POSTERS

- Energy conversion materials for photovoltaic application**, Madhab Pokhrel, Ajith K. Gangadharan, Dhiraj K. Sardar, The Univ. of Texas at San Antonio (USA) [8256-59]
- Optimum concentration factor analysis using dynamic thermal model for a concentrated photovoltaic system**, John T. Avrett, Air Force Institute of Technology (USA) [8256-64]
- First principle investigation of optoelectronic properties of (S-Ta)-doped TiO₂: an approach for solar energy harvesting**, Shermin Arab, Roger K. Lake, Univ. of California, Riverside (USA) [8256-65]
- Numerical analysis of triangular micro-optical array for enhancement of incident power of photovoltaic panels**, Rajat Dey, Evgueni V. Bordatchev, Mohammed Tauhiduzzaman, Hugo W. Reshef, National Research Council Canada (Canada) [8256-69]

Thursday 26 January

MORNING

- 9:50 am: **Intersubband and intrasubband transition in InGaN quantum dot for solar cell application**, Kuang-Chung Wang, Yuh-Renn Wu, National Taiwan Univ. (Taiwan) [8256-49]

AFTERNOON

- 1:30 pm: **Photonic crystals for improving light absorption in organic solar cells** (*Invited Paper*), Ludovic Escoubas, David Duché, Jean-Jacques Simon, Institut Matériaux Microélectronique Nanosciences de Provence (France); Cécile Gourgon, Céline Masclaux, CEA-LETI (France); Philippe Torchio, Judikael Le Rouzo, Francois Flory, Institut Matériaux Microélectronique Nanosciences de Provence (France) [8256-54]

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General Information

Registration

Onsite Registration and Information Hours

North Lobby

Saturday 21 January	7:00 am to 5:00 pm
Sunday 22 January	7:15 am to 5:00 pm
Monday 23 January	7:15 am to 5:00 pm
Tuesday 24 January	7:30 am to 5:00 pm
Wednesday 25 January	7:30 am to 5:00 pm
Thursday 26 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

North Lobby

Open during Registration Hours

- If you have registered to attend a course, please stop by the Course Materials Desk AFTER you pick up your badge.
- You must obtain your course notes to find out class location.
- Ask at the Course Materials Desk about the latest Education Services catalog (includes all SPIE courses at events online courses, and DVDs) as well as customized in-company courses.

Exhibition Hours

BIOS EXPO

South Hall A

Saturday 21 January	Noon to 5:00 pm
Sunday 22 January	10:00 am to 5:00 pm

Photonics West Exhibition

North Hall D, South Hall ABC

Tuesday 24 January	10:00 am to 5:00 pm
Wednesday 25 January	10:00 am to 5:00 pm
Thursday 26 January	10:00 am to 4:00 pm

SPIE Receipts, Badge Corrections, Cashier

North Lobby

SPIE cashier can assist with registration payments, receipts and badge corrections.

- **Registration Payments**—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.
- **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 Correction**—Attendees who need a correction to their badge information onsite may do so at the Badge Corrections and Receipts counter in the registration area. Please have your badge removed from the badge holder, marked with your changes, and ready to hand to the attendant upon approaching the counter.

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

- Paper numbers will be placed on the poster boards in numerical order; please find your paper number and put up your poster in the designated space.
- A poster author is required to stand by the poster during the scheduled poster session to answer questions from attendees.
- Presenters who have not placed their poster(s) on their assigned board by 30 minutes prior to the session 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, or by the time listed in the individual conference program. Any posters that are 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.

South Hall A (with BIOS EXPO)

Poster Sessions:

- Saturday and Sunday 3:00 to 4:00 pm: select BIOS conferences

IMPORTANT: Setup instructions for these sessions vary. Please see the individual conference programs for details.

Room 103 (Exhibit Level)

Poster Sessions:

- Sunday 5:30 to 7:30 pm: select BIOS conferences
- Monday 5:30 to 7:30 pm: select BIOS conferences
- Tuesday 6:00 to 8:00 pm: all LASE and MOEMS-MEMS conferences
- Wednesday 6:00 to 8:00 pm: all OPTO conferences and select BIOS conferences

Poster presenters must set up their posters between 10:00 am and 4:30 pm on the day of their assigned presentation.

Photonics West maps:

Moscone Center Maps

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SPIE Onsite Services

SPIE Bookstore

Exhibit Level near Room 130

Open during Registration hours

Visit the Bookstore for:

- SPIE Press books and proceedings
- Educational and professional development CDs and DVDs
- T-shirts and gifts for kids
- SPIE Membership and Digital Library subscriptions
- Free posters and information

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

North Hall D Entrance (Exhibit Level),

Esplanade Lobby (Esplanade 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 internet session.

WiFi

Complimentary WiFi access for attendees with 802.11b wireless enabled laptops and PDAs will be available Saturday through Thursday on exhibit level near the SPIE Bookstore and in the South Lobby.



North Lower Lobby

Find your way around the exhibition floor...schedule your time in the conferences...make new connections with these new tools in the Photonics West iZone.

- SPIE Conference App
- SPIE Exhibition Directory
- What's Happening Now
- Twitter
- ThinkMap

Car Rental



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 CV029B0017.

- In the United States call 1-800-654-2240.

Parking During Photonics West

For parking information please check the SPIE website www.spie.org/x24983.xml or Concierge Desk located in Registration, North Lobby.

Business Services

Moscone Business Center

Near South Hall C (Exhibit Level)

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. Tuesday through Thursday.

Messages

SPIE has an urgent message line available during registration hours Saturday through Thursday by calling: 415-905-1000.

Luggage/Package Storage and Coat Check

Room 102 (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.

Boarding Pass Kiosks

Room 102 (Exhibit Level)

Complimentary boarding pass printing is available at kiosks located in the coat/luggage check area.

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.

Housing Desk

North Lobby

A housing desk will be open in the North Lobby; hours are posted at the desk.

Restaurant/City Information Desk

North Lobby

A Restaurant/City Information Desk will be open 10:00 am to 6:00 pm Saturday through Wednesday and 10:00 am to 2:00 pm on Thursday during registration hours for sightseeing, shopping, and restaurant information.

General Information

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/Exhibit and Level North (near Bookstore)
Monday PM	Esplanade Foyer/Exhibit and Level North (near Bookstore)
Tuesday through Thursday	All Exhibition Halls

Desserts

Saturday and Sunday

Served in the BIOS Expo, 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 for Purchase

Saturday through Thursday

A variety of food outlets will serve hot and cold snacks, espresso, beverages, deli-type sandwiches, salads, hot entrees, and pastries.

Food Outlets Open in the Exhibition Halls

South Exhibition Hall

Saturday Noon to 3:00 pm

Sunday 11:00 am to 3:00 pm

North and South Exhibition Halls

Tuesday through Thursday 10:00 am to 4:00 pm

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

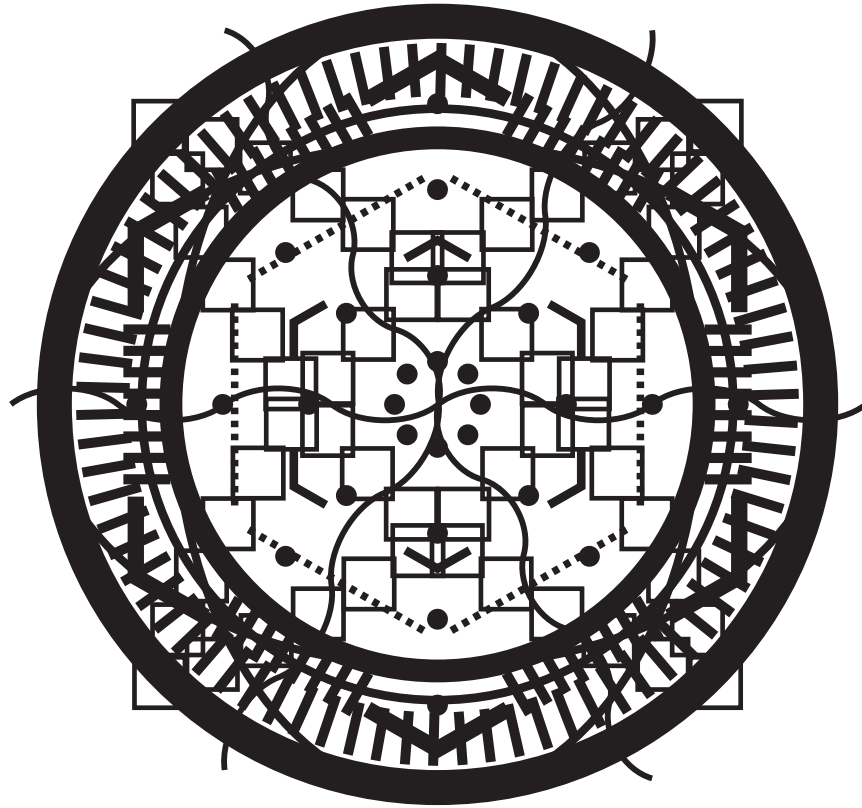
For safety and insurance reasons, no persons under the age of 16 will be allowed in the exhibition area during move-in and move-out. During open exhibition hours, only children over the age of 12 accompanied by an adult will be allowed in the exhibition area.

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.



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If you are only interested in editor-reviewed papers from a single conference or want an archive of the conference that includes your paper, choose the printed book. Available approximately 6 weeks after the meeting.



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If you are interested in editor-reviewed papers from multiple conferences and a broad topical area, choose the searchable CDs. Available approximately within 8 weeks of the meeting; PC, Macintosh, and Unix compatible.

SPIE Digital Library

The results you hear will live far beyond the conference room

All proceedings from this event will be published in the SPIE Digital Library, promoting breakthrough results, ideas, and organizations to millions of key researchers from around the world.

Available 2–4 weeks after the conclusion of the event.

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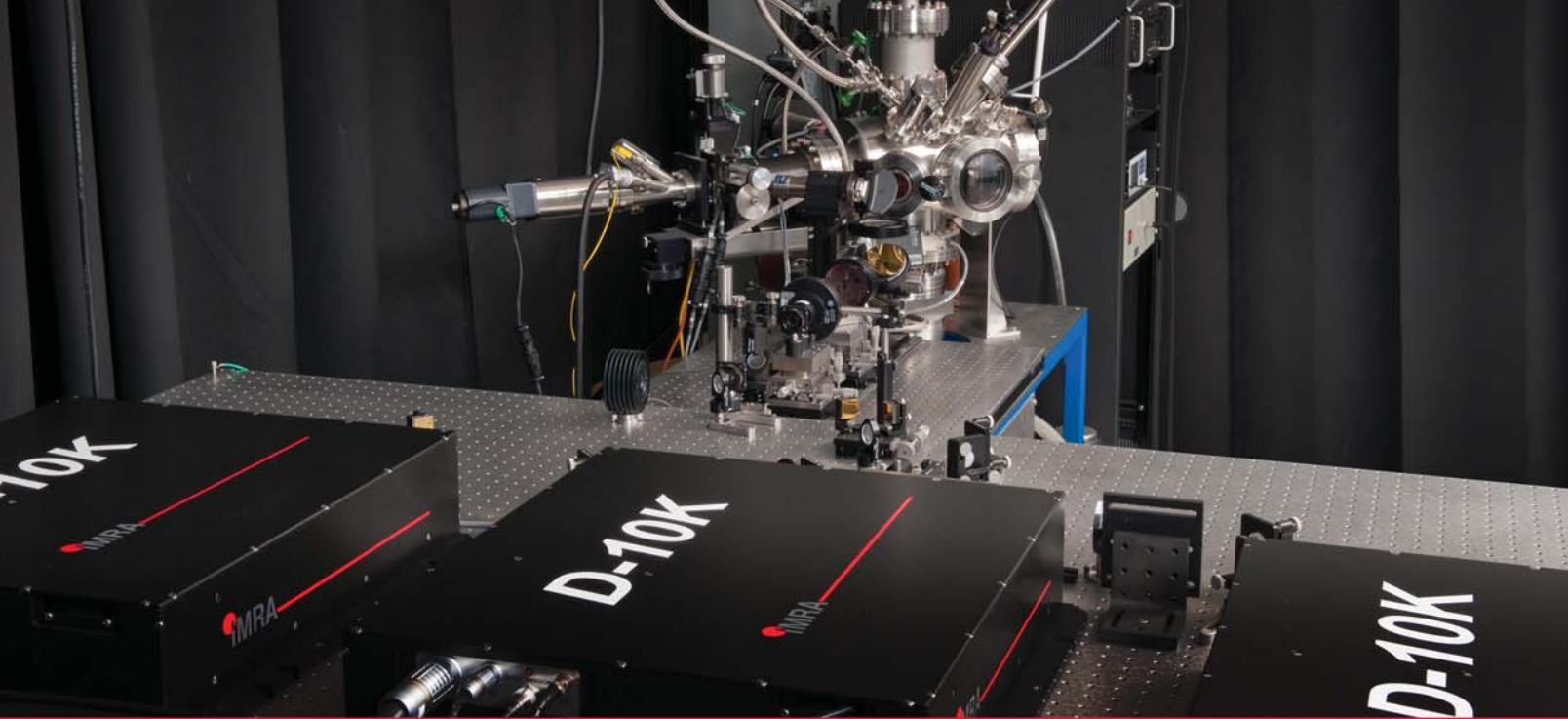
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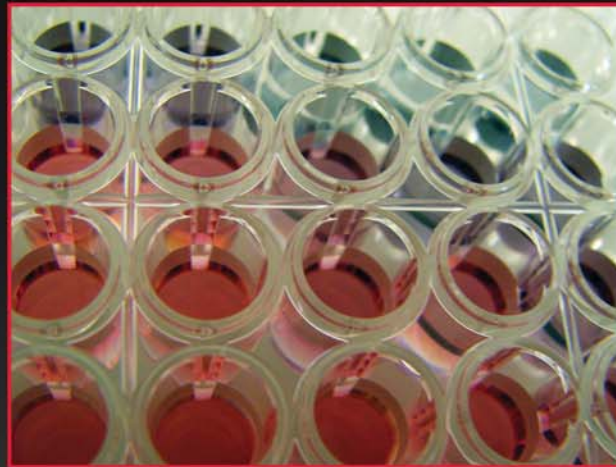
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