TECHNICAL PROGRAM

ANZCOP

AUSTRALIAN AND NEW ZEALAND CONFERENCES ON OPTICS + PHOTONICS

8–12 December 2019
RMIT Univ.
Melbourne, Australia

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8–12 December 2019
RMIT Univ.
Melbourne, Australia

AUSTRALIAN AND NEW ZEALAND CONFERENCES
ON OPTICS + PHOTONICS

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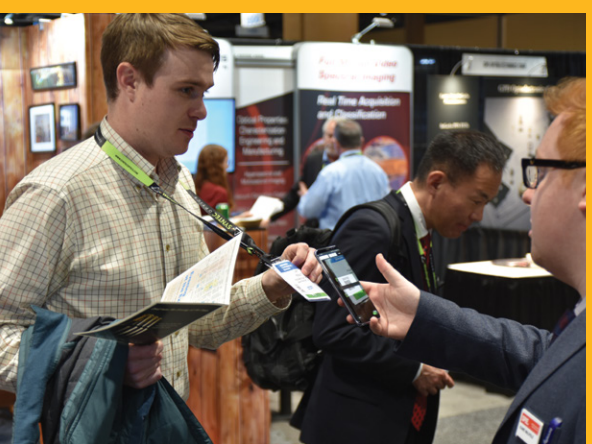
Welcome to Melbourne

FOUR TRANSDISCIPLINARY INTERNATIONAL CONFERENCES

PLENARY PRESENTATIONS



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These important sessions will provide valuable information and networking opportunities.

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Conferences

11200 **AOS Australian Conference on Optical Fibre Technology (ACOFT) and Australian Conference on Optics, Lasers, and Spectroscopy (ACOLS) 2019** (Mitchell, Rubinsztein-Dunlop) 14-22

11201 **Micro + Nano Materials, Devices, and Applications 2019** (Simpson, Juodkazis) 23-27

11202 **Biophotonics Australasia 2019** (Goldys, Gibson) 28-32

11203 **Advances in Optical Astronomical Instrumentation 2019** (Ellis, d'Orgeville) 33-38

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SYMPOSIUM CHAIR

John Harvey
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Saulius Juodkazis
Swinburne University of Technology (Australia)

M. Cather Simpson
The University of Auckland (New Zealand)

Brant C. Gibson
RMIT University (Australia)

Arnan Mitchell
RMIT University (Australia)

SPIE.

SPIE, the international society for optics and photonics, was founded in 1955 to advance light-based technologies. The not-for-profit society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent, and career and professional growth. SPIE provided more than $4 million in support of education and outreach programs in 2018.

For more information, visit www.SPIE.org.

THE AUSTRALIAN OPTICAL SOCIETY

The Australian Optical Society is a non-profit organisation for the advancement of optics in Australia. Formed in 1983, the Society embraces anyone contributing to or interested in optics in the widest sense.

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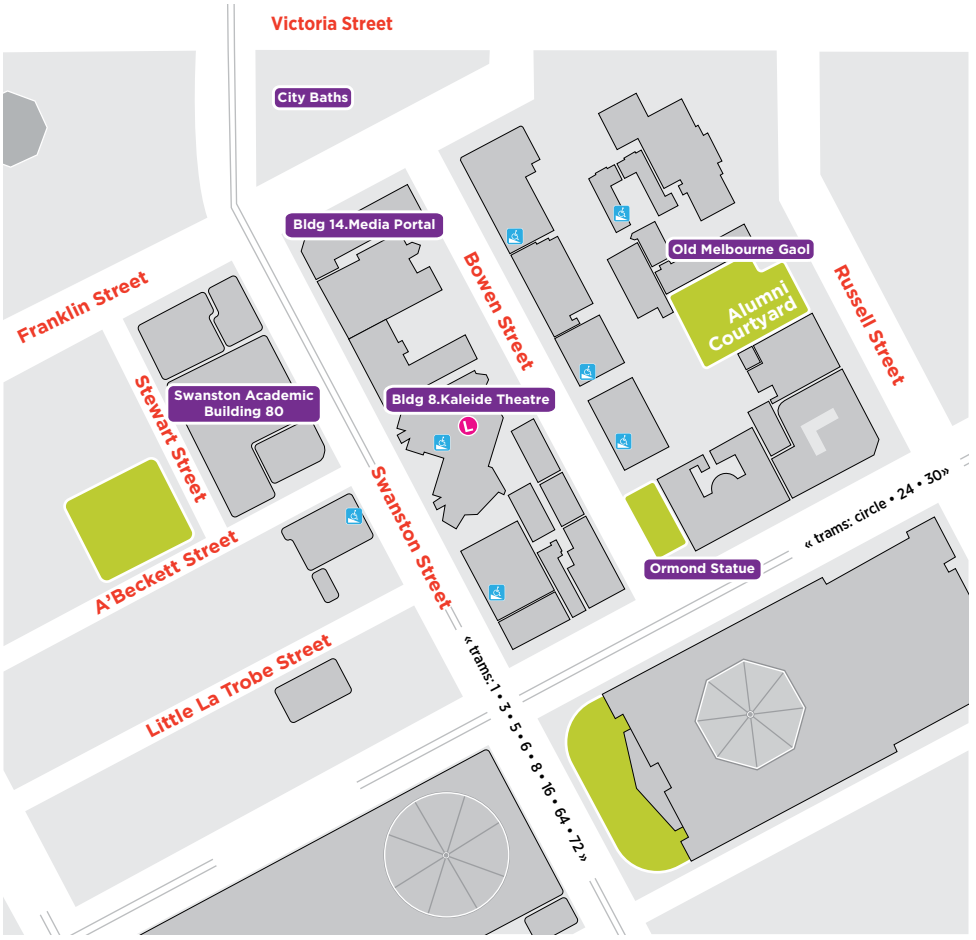
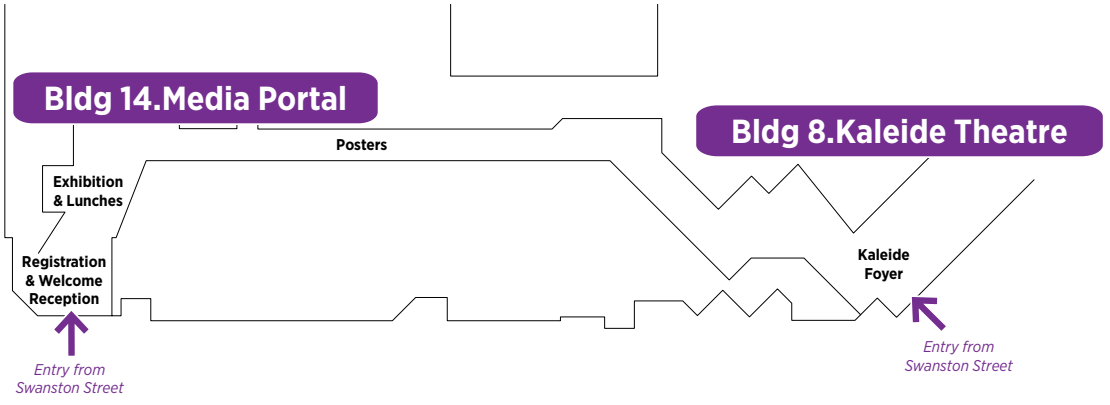
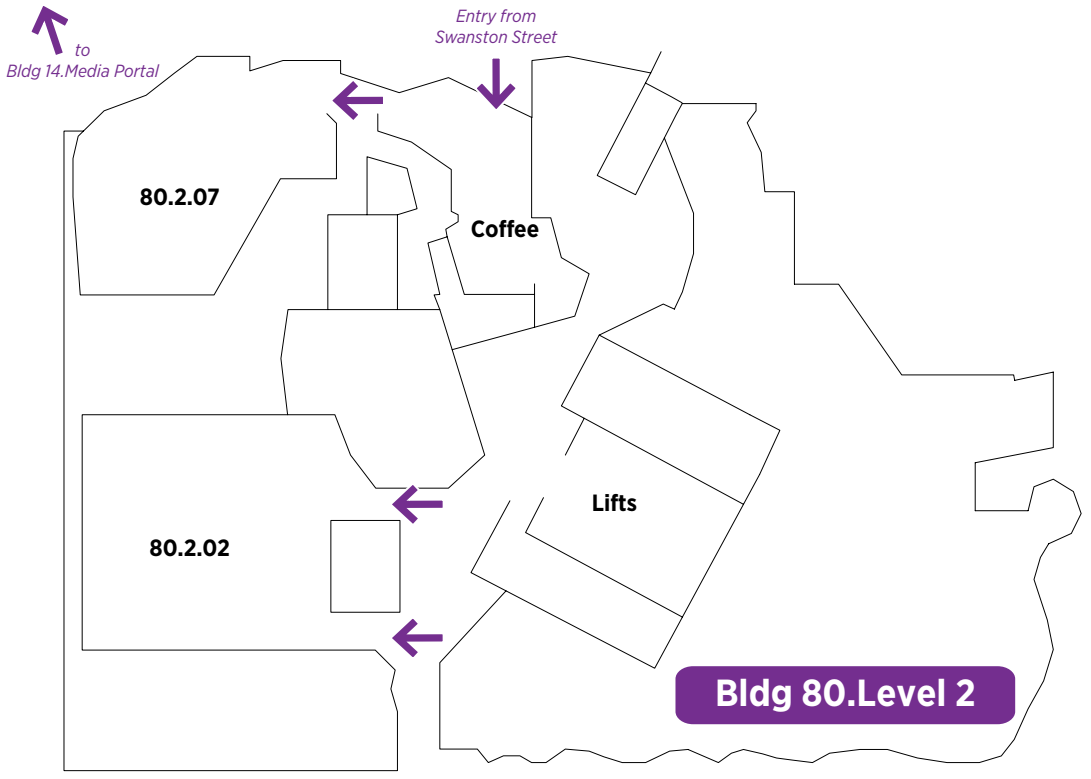


MEDIA PORTAL BUILDING

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Coffee
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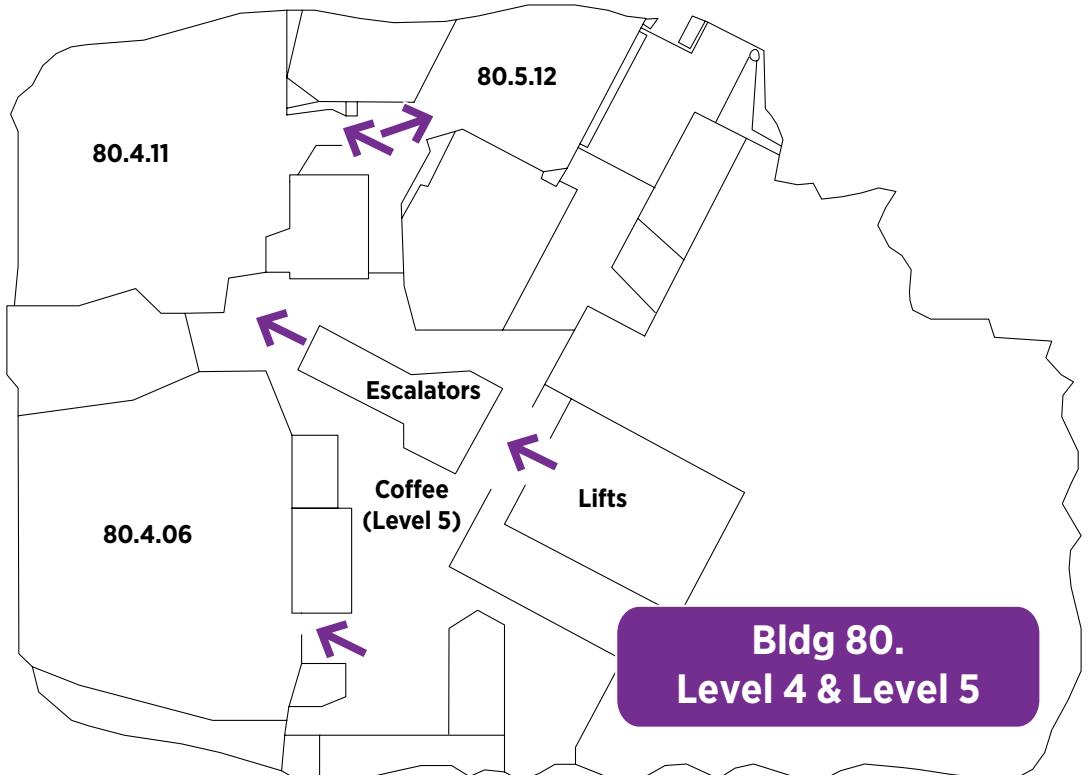
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SPECIAL EVENTS

Monday Plenary Session

Monday 9 December 2019 • 9:00 - 10:30 • Location: Bldg 80.Level 2.Rm 07

Session Chairs: **John D. Harvey,** The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00 - 9:45:

METAPHOTONICS WITH RESONANT DIELECTRIC STRUCTURES

Yuri S. Kivshar
The Australian National Univ. (Australia)

Recently emerged new field of all-dielectric resonant metaphotonics aims at the manipulation of strong optically induced electric and magnetic Mie-type resonances in dielectric and semiconductor nanostructures with relatively high refractive index. Unique advantages of dielectric resonant nanostructures over their metallic counterparts are low dissipative losses and the enhancement of both electric and magnetic fields that provide competitive alternatives for plasmonic structures including optical nanoantennas, efficient biosensors, passive and active metasurfaces, and functional metadevices. This talk will summarize the recent advances in all-dielectric resonant metaphotonics including active nanophotonics as well as the recently emerged fields of biosensing, topological photonics, and nonlinear metasurfaces.

Prof. Yuri S. Kivshar received a PhD degree in theoretical physics in 1984 from the Institute for Low Temperature Physics and Engineering of the USSR Academy of Science (Kharkov, Ukraine). From 1988 to 1993 he worked at several research centres in USA, Spain, and Germany, and in 1993 he moved to Australia where later he established Nonlinear Physics Center at the Australian National University. Yuri Kivshar's research interests include nonlinear physics, metamaterials, and nanophotonics. He is Fellow of the Australian Academy of Science, and also Fellow of OSA, APS, SPIE, and IOP. He received several international awards including Pnevmatikos Prize in Nonlinear Science (Greece), Lyle Medal (Australia), Lebedev Medal (Russia), The State Prize in Science (Ukraine), Harrie Massey Medal (UK), and Humboldt Research Award (Germany).

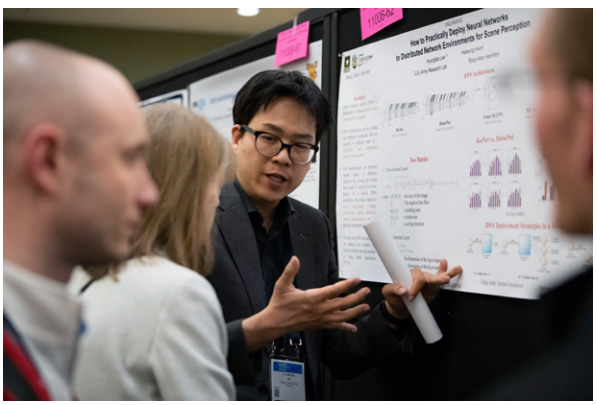
9:45 - 10:30:

SINGLE MOLECULE IMAGING OF T-CELL RECEPTOR SIGNALING

Katharina Gaus
The Univ. of New South Wales (Australia)

Single-molecule localization microscopy (SMLM) can provide a truly molecular image of complex biological processes. We aimed to better understand how the T cell receptor (TCR) translates antigen binding into intracellular signals on which T cell fate decisions are based. With SMLM and novel analyses, we determined how the spatial organization regulates signal initiation and propagation (Pageon et al. PNAS 2016). We also developed novel FRET sensors to monitor the rate of receptor clustering (Ma et al. Nat Commun 2017) and a sensor that reports membrane charges (Ma et al. Nat Biotech 2017) to understand how biophysical properties of the plasma membrane contribute to TCR signaling. More recently, we developed an improved single molecule microscope that achieves ~2-3 nm localization precisions and thus enables direct distance measurements between membrane proteins.

Scientia Prof. Katharina Gaus is an NHMRC Senior Research Fellow at the University of New South Wales and Head of the EMBL Australia Node in Single Molecule Science. She is also the Deputy Director of the ARC Centre of Excellence in Advanced Molecular Imaging (2014-2020). Katharina received her PhD from the University of Cambridge in 1999 and has led an independent research group since 2005. She was awarded the Young Investigator Award from the Australia and New Zealand Society for Cell and Developmental Biology (2010), the Gottschalk Medal from the Australian Academy of Science (2012), the New South Wales Science and Engineering Award for Excellence in Biological Sciences (2013) and the Khwarizmi International Award (2018).



Monday Poster Session

Monday 9 December 2019 • 18:00 -19:30
Location: Bldg 14.Media Portal

Conference attendees are invited to view symposium poster presentations, 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, visit http://spie.org/conferences-and-exhibitions/anzcop/for-authors/presenters/poster-presentation-guidelines for set-up instructions.

Tuesday Plenary Session

Tuesday 10 December 2019 • 9:00 - 10:30 • Location: Bldg 80.Level 2.Rm 07

Session Chairs: **John D. Harvey,** The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00 - 9:45:

NEW PERSPECTIVES FOR BIOMEDICAL IMAGING AT DEPTH

Kishan Dholakia
Univ. of St. Andrews (United Kingdom)

There has been a major upsurge in activity to realise optical imaging at depth. This is a burgeoning requirement and holds promise for moving towards new understanding of disease and biological function. I will describe new advances in light sheet imaging and wide field multiphoton imaging that use advanced photonics beam shaping to address these issues. This will include the use of propagation invariant Bessel and Airy light fields and the use of temporal focusing for multiphoton excitation combined with single pixel detection.

Prof. Kishan Dholakia is Professor at the University of St. Andrews, Scotland. His work is cited in the Guinness Book of Records. He is a Fellow of the Royal Society of Edinburgh, OSA, and SPIE. In 2016 he won the R.W. Wood Prize of the Optical Society and was the 2018 recipient of the SPIE Dennis Gabor Award.

9:45 - 10:30:

HARNESSING DISORDER FOR PHOTONIC APPLICATIONS

Hui Cao
Yale Univ. (United States)

For device applications, structural disorder and optical scattering have long been considered annoying and detrimental features that were best avoided or minimized. In this talk, I will show that disorder and complexity can be harnessed for photonic applications, in particular, to provide unique functionalities of photonic devices. We recently developed an on-chip random spectrometer that combines high resolution with small footprint. In addition, we incorporated disorder to a laser to reduce the spatial coherence for free-speckle full-field imaging.

Prof. Hui Cao is the John C. Malone Professor of Applied Physics and of Physics, and Professor of Electrical Engineering at Yale University. Her technical interests are in the areas of mesoscopic optics, complex photonic materials and devices, nanophotonics, and biophotonics. She is a Fellow of AAAS, APS, IEEE and OSA.

SPECIAL EVENTS

Wednesday Plenary Session

Wednesday 11 December 2019 • 9:00 - 10:30 • Location: Bldg 80.Level 2.Rm 07

Session Chairs: **John D. Harvey,** The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00 - 9:45:

THE JAMES WEBB SPACE TELESCOPE

Gillian S. Wright
UK Astronomy Technology Ctr. (United Kingdom)

The James Webb Space Telescope mission is designed to provide unprecedented performance at near- and mid-infrared wavelengths, and with a suite of sophisticated imagers and spectrometers it is poised to deliver revolutionary science. With a 6.5m diameter primary mirror it will be the largest and most ambitious astronomy mission launched. In this talk I will give a broad overview of the mission and its current status and scientific prospects. The expected performance and capabilities of the instruments will be presented along with the plans for early scientific observations.

Prof. Gillian Wright is Director of the UK Astronomy Technology Centre. She is the European PI for the James Webb Space Telescope Mid-IR Instrument, and a visiting professor of the Institute for Astronomy, University of Edinburgh. She has 30 years' experience of ground- and space-based instrumentation for astronomy having provided scientific, technical and management leadership for projects ranging from observatory management software, through critical mechanism subsystems, to entire instruments. Gillian was awarded an MBE for Services to Science and has served on a number of National and International Advisory Panels for astronomy and astronomical instrumentation.

9:45 - 10:30:

SUBWAVELENGTH INTEGRATED PHOTONICS

Pavel Cheben
National Research Council Canada (Canada)

The availability of nanometer scale fabrication techniques has inspired scientists to investigate subwavelength-structured metamaterials with engineered optical properties. Metamaterial waveguide devices are becoming established as fundamental building blocks for the next generation photonic integrated circuits. Here we present an overview of recent advances in this surging field, including metamaterial fiber-chip couplers, ultra-broadband telecom devices, biosensors and astrophotonic spectral filters. We will review how optical metamaterials will enhance the performance of the next generation of integrated photonic devices and we explore some of the arising challenges encountered in the transition from concept demonstration to viable technology.

Dr. Pavel Cheben is a Principal Research Officer at the National Research Council of Canada. He is best known for his work in silicon photonics, metamaterial waveguides and biochemical sensors. He introduced a new area of science that brings together metamaterial research and integrated photonics. He has co-authored more than 500 papers and book chapters, 33 patent applications and over 200 invited presentations. He is an elected Fellow of the Optical Society of America, the European Optical Society, the Institute of Physics, the Engineering Institute of Canada, and the Canadian Academy of Engineering.

Wednesday Poster Session

Wednesday 11 December 2019 • 18:00 - 19:30
Location: Bldg 14.Media Portal

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Thursday Plenary Session

Thursday 12 December 2019 • 9:00 - 10:30 • Location: Bldg 80.Level 2.Rm 07

Session Chairs: **John D. Harvey,** The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00 -9:45:

MAVIS: BEYOND HST RESOLUTION AND SENSITIVITY

François Rigaut
The Australian National Univ. (Australia)

Adaptive Optics (AO) has become a standard technology in modern ground-based astronomical telescopes, providing an order of magnitude gains in angular resolution and sensitivity. Every major observatory is equipped with first or second generation AO, often using laser guide stars. The European Southern Observatory (ESO), together with an consortium made of several European institutes and led by Australia's AAO, has embarked in the construction of MAVIS, a multi-conjugate adaptive optics system for the ground-based 8-m Very Large Telescope (VLT). MAVIS will deliver visible images and integral field spectrograph data with 2-3 times better angular resolution than the Hubble Space Telescope, making it a powerful complement at visible wavelengths to future facilities like the space-based James Webb Space Telescope and the 30 to 40m-class ground-based telescopes currently under construction, that are all targeting primarily near-infrared wavelengths. I will present an overview of the foreseen MAVIS technical capabilities and the exciting science enabled by it.

Associate Prof. Francois Rigaut is the Adaptive Optics Principal Scientist at the AAO-Stormlo (Australian National University). He has been a pioneer in adaptive optics, from being part of the first successful AO system for astronomy COME-ON in the nineties, to being lead scientist of GeMS and now principal investigator of MAVIS, two multi-conjugate AO system for 8-m ground-based telescopes.

9:45 - 10:30

FROM NANOTECH TO LIVING SENSORS: UNRAVELING THE SPIN PHYSICS OF BIOSENSING AT THE NANOSCALE

Clarice Aiello
Univ. of California, Los Angeles (United States)

Substantial in vitro and physiological experimental results suggest that similar coherent spin physics might underlie phenomena as varied as the biosensing of magnetic fields in animal navigation and the magnetosensitivity of metabolic reactions related to oxidative stress in cells. If this is correct, organisms might behave, for a short time, as "living quantum sensors" and might be studied and controlled using quantum sensing techniques developed for technological sensors. I will outline our approach towards performing coherent quantum measurements and control on proteins, cells, and organisms in order to understand how they interact with their environment and how physiology is regulated by such interactions. Can coherent spin physics be established – or refuted! – to account for physiologically relevant biosensing phenomena, and be manipulated to technological and therapeutic advantage?

Prof. Clarice D. Aiello is a quantum engineer interested in how quantum physics informs biology at the nanoscale. She is an expert on nanosensors harnessing room-temperature quantum effects in noisy environments. Aiello received her Ph.D. from MIT in Electrical Engineering and held postdoctoral appointments in Bioengineering at Stanford, and in Chemistry at Berkeley. She joined UCLA in 2019, where she leads the Quantum Biology Tech (QuBiT) Lab.

INDUSTRY EVENT

Australian Photonics Industry Survey

Thursday 12 December 2019 • 14:00 - 15:30
Location: Bldg 8.Kaleide

The Australian Optical Society and SPIE recently commissioned a survey of the photonics industry in Australia. The key findings in that national survey will be presented at this session. The speakers will also offer comparative insights into the international photonics marketplace, and provide context for start-ups and existing businesses in both New Zealand and Australia.

14:00 - 14:10:

THE AOS PERSPECTIVE AND MOTIVATION FOR THE SURVEY

John Harvey
The Univ. of Auckland (New Zealand)

14:10 - 14:20:

THE SPIE AND GLOBAL PHOTONICS PERSPECTIVE

Andrew Brown
SPIE (United States)

14:20 - 14:45:

REPORT HIGHLIGHTS AND PERSONAL PERSPECTIVE

Simon B. Poole
Finisar Australia (Australia)

1445 - 15:10:

PERSPECTIVE AS A SERIAL ENTREPRENEUR IN NEW ZEALAND

M. Cather Simpson
The Univ. of Auckland (New Zealand)

15:10 - 15:20:

FINAL REMARKS

John Harvey, The Univ. of Auckland (New Zealand)

15:20 - 15:30:

QUESTIONS WELCOME FROM THE AUDIENCE

SPECIAL EVENTS

TECHNICAL GENERAL EVENT

Equity, Diversity, and Inclusion (EDI) Workshop

Tuesday 10 December 2019 • 12:30 - 14:00
Wednesday 11 December 2019 • 12:30 - 14:00
Location: Bldg 8.Kaleide

Details will be posted online.

SOCIAL NETWORKING EVENTS

Welcome Reception

Sunday 8 December 2019 • 17:30 - 19:00
Location: Bldg 14.Media Portal

All registered conference attendees are invited to relax, socialise, and enjoy refreshments with your colleagues. The reception is open to all registered conference attendees. Tickets for guests of registered conference attendees may be purchased during the registration process or at the registration desk onsite.

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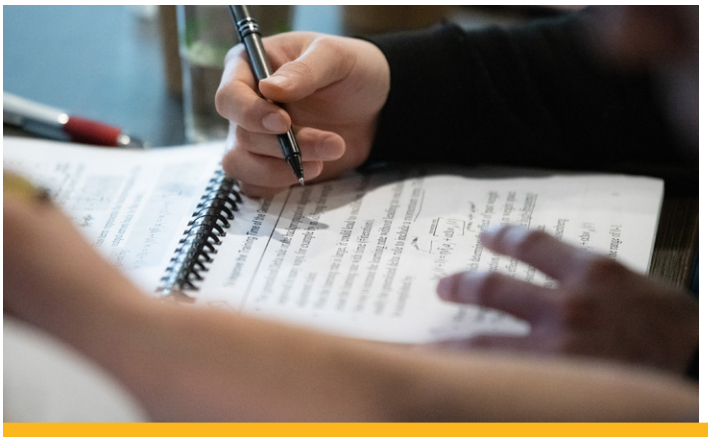
Conference Banquet Dinner

Tuesday 10 December 2019 • 18:30 - 22:00
Location: Sea Life Melbourne Aquarium

All registered attendees are invited to attend. Additional guest tickets can be purchased onsite through Monday, if space is available.

More information about Sea Life Melbourne can be found at: https://www.melbourneaquarium.com.au/

Location and transportation options to Melbourne Sea Life can be found at: https://www.melbourneaquarium.com.au/plan/getting-here/



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3D Nano-/Micro Printing

8 December 2019 • 15:00 – 17:00
SC1226: Course Level: Introductory
CEU credits are NOT available for this course.
$30.00 Members • $50.00 Non-members
$15.00 Student member price

Instructor: Saulius Juodkazis,
Swinburne Univ. of Technology (Australia)

This course explains basic experimental and theoretical principles of nanoscale 3D fabrication/printing and characterisation of nanoscale properties by light scattering and absorption using nano-sharp tip. 3D nanofabrication has become an important tool for fabrication of photonic circuitry and sensors. This course will be overviewing the current existing methods of 3D laser fabrication of photonic wire bonding and interconnects, holographic larger area patterning, focused ion and electron lithography, and thermal scanning tip writing. Students and researchers will gain better understanding of scaling properties and fabrication throughput of nanoscale devices based on modern 3D nanofabrication tools. Also, characterisation of nanoscale structures and patterns with nanoscale imaging tools will be introduced based on most recent commercial equipment.

LEARNING OUTCOMES
- describe nanoscale fabrication principles used in modern lithography tools
- describe optical characterisation and imaging at nanoscale
- recognize scalability of performance and fabrication throughput in nano-lithography
- describe 3D laser nano-/micro-printing principles in resists/resins

INTENDED AUDIENCE
Research students, scientists and engineers from government, academia and industry, who are interested in nanoscale 3D fabrication.

ABOUT THE INSTRUCTOR
Saulius Juodkazis is professor at Swinburne University of Technology, Melbourne, Australia.

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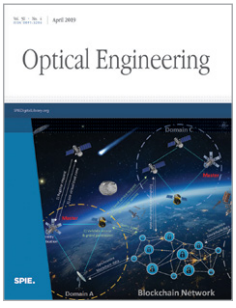

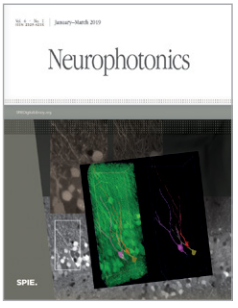

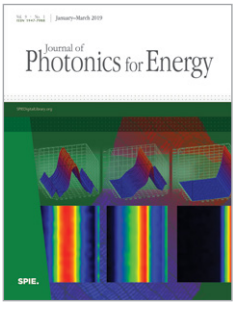

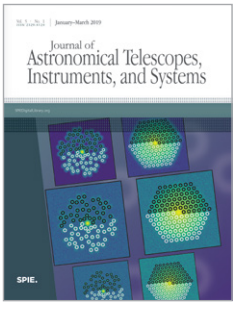

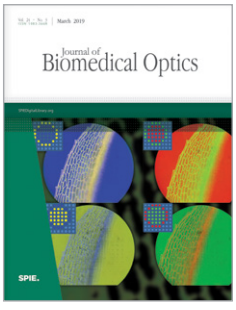

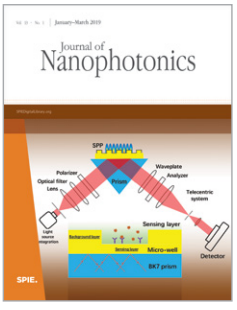

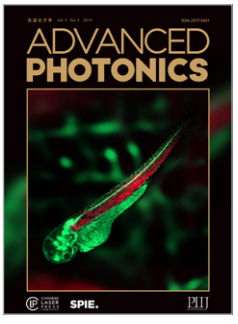

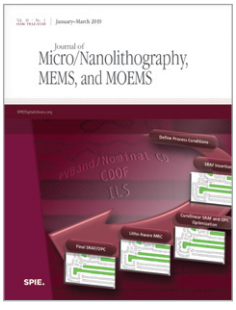

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Exhibition

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EXHIBITION HOURS

Sunday 17:30–19:00
Monday 10:00–19:00
Tuesday 10:00–16:00
Wednesday 10:00–19:00
Thursday 10:00–12:30

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Welcome Reception Sponsor

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SCHEDULE OF EVENTS

TIME	AOS Australian Conference on Optical Fibre Technology (ACOFT) and Australian Conference on Optics, Lasers, and Spectroscopy (ACOLS) 2019 CONFERENCE 11200		Micro + Nano Materials, Devices, and Applications 2019 CONFERENCE 11201	Biophotonics Australasia 2019 CONFERENCE 11202	Advances in Optical Astronomical Instrumentation 2019 CONFERENCE 11203
SUNDAY 8 DECEMBER					
AFTERNOON 17:30 - 19:00	**EXHIBITION**				
17:30 - 19:00	**Welcome Reception**				
MONDAY 9 DECEMBER					
MORNING 10:00 - 19:00	**EXHIBITION**				
9:00 - 10:30	**MONDAY PLENARY SESSION**				
10:30 - 11:00	**Tea/Coffee Break**				
11:00	**SESSION 1A** **Metasurfaces** Dragomir N. Neshev, p. 14	**SESSION 1B** **Atom Optics and Trapping** Arnan Mitchell, Halina Rubinsztein-Dunlop, p. 14	**SESSION 1** **Special Session on Photonic Crystals and Applications** Saulius Juodkazis, p. 23	**SESSION 1** **Biomedical Imaging I** Jared M. Campbell, p. 28	**SESSION 1** **Advances in Ground-based Telescopes and Instruments I** Tayyaba Zafar, p. 33
AFTERNOON	**Lunch Break**				
14:00	**SESSION 2A** **Nanophotonics and Plasmonics** Arnan Mitchell, p. 15	**SESSION 2B** **Optical Sensing I** Arnan Mitchell, p. 15	**SESSION 2** **Nonlinear Plasmonics and Photonics** Saulius Juodkazis, Cather Simpson, p. 23	**SESSION 2** **Biomedically Relevant Light Sources and Nanomaterials I** Philipp Reineck, p. 28	**SESSION 2** **Advances in Ground-based Telescopes and Instruments II** Xiangyan Yuan, p. 33
15:30 to 16:00	**Tea/Coffee Break**				
16:00	**SESSION 3A** **Novel Materials** Lan Fu, p. 15	**SESSION 3B** **Optical Sensing II** Irina V. Kabakova, p. 15	**SESSION 3** **Metasurfaces I** James W. M. Chon, p. 23	**SESSION 3** **Fibre-optic Sensing and Imaging I** Roman Kostecki, p. 28	**SESSION 2 CONTINUED** **Advances in Ground-based Telescopes and Instruments II**
18:00-19:30			**MONDAY POSTER SESSION,** p. 24	**MONDAY POSTER SESSION,** p. 29	
TUESDAY 10 DECEMBER					
MORNING 10:00 - 19:00	**EXHIBITION**				
9:00	**TUESDAY PLENARY SESSION**				
10:30 - 11:00	**Tea/Coffee Break**				
11:00	**SESSION 4A** **Quantum I** Jingbo Wang, p. 16	**SESSION 4B** **Fibre Lasers** Arnan Mitchell, Halina Rubinsztein-Dunlop, p. 16	**SESSION 4** **Metasurfaces II** Cather Simpson, Saulius Juodkazis, p. 25	**SESSION 4** **Metasurfaces I** **Biomedically Relevant Light Sources and Nanomaterials II** Wei Deng, p. 29	**SESSION 3** **Advances in Space-based Telescopes and Instruments** Zhongwen Hu, p. 34
AFTERNOON 12:30 - 14:00	**Lunch Break and Tuesday Equity, Diversity, and Inclusion (EDI) Workshop**				
14:00	**SESSION 5A** **Quantum II** Mirko Lobino, p. 17	**SESSION 5B** **Glass Lasers** Michael J. Withford, p. 17	**SESSION 5** **2D Materials** Cather Simpson, Saulius Juodkazis, p. 25	**SESSION 5** **Biomedical Imaging II** Asma Khalid, p. 30	**SESSION 4** **AO** Céline d'Orgeville, p. 35
15:30 - 16:00	**Tea/Coffee Break**				
16:00	**SESSION 6A** **Nonlinear** David J. Moss, p. 17	**SESSION 6B** **Lidar** Arnan Mitchell, p. 17	**SESSION 6** **Solar Cell Technologies** Cather Simpson, Saulius Juodkazis, p. 25	**SESSION 6** **Light-based Biosensing II** Sandhya Clement,p. 30	**SESSION 5** **Interferometry** Michael J. Ireland, p. 35
18:30-22:00	**Conference Banquet Dinner**				

TIME	AOS Australian Conference on Optical Fibre Technology (ACOFT) and Australian Conference on Optics, Lasers, and Spectroscopy (ACOLS) 2019		Micro + Nano Materials, Devices, and Applications 2019	Biophotonics Australasia 2019	Advances in Optical Astronomical Instrumentation 2019
	CONFERENCE 11200		CONFERENCE 11201	CONFERENCE 11202	CONFERENCE 11203
WEDNESDAY 11 DECEMBER					
MORNING 10:00 - 19:00	**EXHIBITION**				
9:00 - 10:30	**WEDNESDAY PLENARY SESSION**				
10:30 - 11:00	**Tea/Coffee Break**				
11:00	**SESSION 7A** **Photonic Chips I** Arnan Mitchell, p. 18	**SESSION 7B** **Microscopy and Fluorescence** Philipp Reineck, p. 18	**SESSION 7** **Direct Laser Writing I** Cather Simpson, Saulius Juodkazis, p. 26	**SESSION 7** **Light-based Biosensing III** Saabah B. Mahbub, p.31	**SESSION 6** **New Technologies I** Simon C. Ellis, p. 36
AFTERNOON 12:30 - 14:00	**Lunch Break and Wednesday Equity, Diversity, and Inclusion (EDI) Workshop**				
14:00	**SESSION 8A** **Photonic Chips II** Duk-Yong Choi, p. 19	**SESSION 8B** **Lasers** Stuart D. Jackson, p. 19	**SESSION 8** **Nanotextured Surfaces and Optical Sensors** Cather Simpson, Saulius Juodkazis, p. 26	**SESSION 8** **Biomedically Relevant Light Sources and Nanomaterials III** Qiang Sun, p. 31	**SESSION 7** **New Technologies II** Sergio G. Leon-Saval, p. 36
14:45					**SESSION 8** **Detectors** Robert G. Sharp, p. 36
16:00	**SESSION 9A** **Mid-IR** David J. Moss, p. 19	**SESSION 9B** **Interferometry and Ophthalmic Optics** Arnan Mitchell, p. 19	**SESSION 9** **Direct Laser Writing II** Cather Simpson, Saulius Juodkazis, p. 26	**SESSION 9** **Biomedical Imaging III** Saulius Juodkazis, p. 31	**SESSION 9** **Fibres I** Robert G. Sharp, p. 36
18:00-19:30	**WEDNESDAY POSTER SESSION,** p. 20				**WEDNESDAY POSTER SESSION,** p. 37
THURSDAY 12 DECEMBER					
MORNING 10:00 - 12:30	**EXHIBITION**				
9:00 - 10:30	**THURSDAY PLENARY SESSION**				
10:30-10:45	**Conference Awards**				
10:45 - 11:15	**Tea/Coffee Break**				
11:15	**SESSION 10** **Applications of Combs** Jochen B. Schroeder, p. 22		**SESSION 10** **Biosensing** Cather Simpson, Saulius Juodkazis, p. 27	**SESSION 10** **Translational Research and Clinical Technologies** Mark R. Hutchinson, p. 32	**SESSION 10** **Fibres II** Jessica Zheng, p. 38
12:00					**SESSION 11** **Data** Jessica Zheng, p. 38
AFTERNOON	**Lunch Break**				
14:00-15:30	**Australian Photonics Industry Survey**				

CONFERENCE 11200

CURRENT SESSIONS: BLDG 80.LEVEL 2.RM 02 AND RM 07

(NOTE: Check Sessions for room locations)

Monday–Thursday 9–12 December 2019 • Proceedings of SPIE Vol. 11200

AOS Australian Conference on Optical Fibre Technology (ACOFT) and Australian Conference on Optics, Lasers, and Spectroscopy (ACOLS) 2019

Conference Chairs: **Arnan Mitchell,** RMIT Univ. (Australia); **Halina Rubinsztein-Dunlop,** The Univ. of Queensland (Australia)

Program Committee: **Duk-Yong Choi,** The Australian National Univ. (Australia); **Deepak Jain,** The Univ. of Sydney (Australia); **Irina V. Kabakova,** Univ. of Technology, Sydney (Australia); **Mirko Lobino,** Griffith Univ. (Australia); **David J. Moss,** Swinburne Univ. of Technology (Australia); **Elena Ostrovskaya,** The Australian National Univ. (Australia); **Frédérique Vanholsbeeck,** The Univ. of Auckland (New Zealand); **Jingbo Wang,** The Univ. of Western Australia (Australia)

MONDAY 9 DECEMBER

MONDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . MON 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **Metaphotonics with resonant dielectric structures** *(Plenary)*
Yuri S. Kivshar, The Australian National Univ. (Australia)

9:45: **Single molecule imaging of T cell receptor signaling** *(Plenary)*
Katharina Gaus, The Univ. of New South Wales (Australia)

Tea/Coffee Break . . . . . Mon 10:30 to 11:00

Sessions 1A and 1B run concurrently

SESSION 1A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . MON 11:00 TO 12:30

Metasurfaces

Session Chair: **Dragomir N. Neshev,**
The Australian National Univ. (Australia)

11:00: **Nonlinear quantum optics on a chip** *(Invited Paper)*, Alexander S. Solntsev, Univ. of Technology, Sydney (Australia) . . . . . [11200-1]

11:30: **Second-harmonic spectroscopy with structured beams and the observation of quasi-BIC modes in all-dielectric nanoresonators**, Elizaveta V. Melik-Gaykazyan, The Australian National Univ. (Australia) and M.V. Lomonosov Moscow State Univ. (Russian Federation); Kirill L. Koshelev, The Australian National Univ. (Australia) and ITMO Univ. (Russian Federation); Jae-Hyuck Choi, Korea Univ. (Korea, Republic of); Sergey Kruk, The Australian National Univ. (Australia); Hong-Gyu Park, Korea Univ. (Korea, Republic of); Yuri Kivshar, The Australian National Univ. (Australia) . . . . . [11200-2]

11:45: **Tuning the asymmetric response of metasurfaces for optical spatial filtering**, Timothy J. Davis, The Univ. of Melbourne (Australia); Fatima Eftekhari, Melbourne Ctr. for Nanofabrication (Australia); Daniel E. Gómez, RMIT Univ. (Australia); Ann Roberts, The Univ. of Melbourne (Australia) . . . . . [11200-3]

12:00: **Multiple state thermally tunable metasurfaces**, K. Z. Kamali, The Australian National Univ. (Australia); L. Xu, A. E. Miroshnichenko, The Univ. of New South Wales (Australia); D. N. Neshev, M. Rahmani, The Australian National Univ. (Australia) . . . . . [11200-4]

12:15: **Beam shaping in nonlinear volume holograms via optically engineered ferroelectric domain patterns**, S. Liu, The Australian National Univ. (Australia); L. M. Mazur, Wroclaw Univ. of Science and Technology (Poland) and Texas A&M Univ. at Qatar (Qatar); W. Krolikowski, Australian National Univ. (Australia) and Texas A&M Univ. at Qatar (Qatar); Y. Sheng, The Australian National Univ. (Australia). . . . . [11200-310]

Lunch Break . . . . . Mon 12:30 to 14:00

SESSION 1B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . MON 11:00 TO 12:30

Atom Optics and Trapping

Session Chairs: **Arnan Mitchell,** RMIT Univ. (Australia);
Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

11:00: **Unitary spectro-temporal transform for arbitrary frequency comb modulation** *(Invited Paper)*, Jochen B. Schroeder, RMIT Univ. (Sweden) . . . . . [11200-47]

11:30: **Trapping ultracold atoms in submicron period magnetic lattices**, Tien Tran, Swinburne Univ. of Technology (Australia); Yibo Wang, Institut de physique et chimie des matériaux de Strasbourg, CNRS (France) and Institut de Science et d'Ingénierie Supramoléculaires, CNRS (France) and Univ. de Strasbourg (France); Ivan Herrera, Swinburne Univ. of Technology (Australia); A. Balcytis, Swinburne Univ. of Technology (Australia) and Victorian Node of the Australian National Fabrication Facility (Australia) and Ctr. for Physical Sciences and Technology (Lithuania); D. Nissen, M. Albrecht, Univ. of Augsburg (Germany); S. Whitlock, IPCMS, Univ. of Strasbourg, CNRS (France); Andrei Sidorov, Peter Hannaford, Swinburne Univ. of Technology (Australia) . [11200-5]

11:45: **Flat band modes and compact localised states using Bose-Einstein condensates with spin-orbit coupling in a 2D lattice**, Alexander V. H. McPhail, Maarten D. Hoogerland, The Univ. of Auckland (New Zealand) . . . . . [11200-6]

12:00: **Creating big time crystals with ultracold atoms**, Krzysztof Giergiel, Krzysztof Sacha, Jagiellonian Univ. in Krakow (Poland); Tien Tran, Ali Zaheer, Andrei Sidorov, Peter Hannaford, Swinburne Univ. of Technology (Australia) . . . . . [11200-7]

12:15: **Towards an Australian Atom-Trap Trace Analysis (ATTA) facility**, P. S. Light, R. D. Glover, The Univ. of Adelaide (Australia); M. A. Dakka, Univ. of Adelaide (Australia); G. Tsiminis, The Univ. of Adelaide (Australia); A. J. Palmer, D. Chetty, Griffith Univ. (Australia); I. Litvinyuk, Griffith Univ. (United States); R. T. Sang, Griffith Univ. (Australia); Andre N. Luiten, The Univ. of Adelaide (Australia) . . . . . [11200-8]

Lunch Break . . . . . Mon 12:30 to 14:00

Sessions 2A and 2B run concurrently

SESSION 2A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . MON 14:00 TO 15:30

Nanophotonics and Plasmonics

Session Chair: **Arnan Mitchell,** RMIT Univ. (Australia)

14:00: **InGaAs/InP quantum well nanowire surface emitting LEDs** *(Invited Paper)*, Lan Fu, The Australian National Univ. (Australia) . . . . . [11200-9]

14:30: **Tailoring directional scattering of second-harmonic generation from (111)-GaAs nanoantennas**, Jurgen Sautter, Friedrich-Schiller-Univ. Jena (Germany); Lei Xu, Andrey E. Miroshnichenko, The Univ. of New South Wales (Australia); Mykhaylo Lysevych, The Australian National Univ. (Australia); I. Volkovskaya, Institute of Applied Physics (Russian Federation); D. Smirnova, The Australian National Univ. (Australia) and Institute of Applied Physics (Russian Federation); Maria del Rocio Camacho Morales, Khosro Zangeneh Kamali, Fouad Karouta, Kaushal D. Vora, Hark Hoe Tan, The Australian National Univ. (Australia); Martti Kauranen, Tampere Univ. (Finland); Isabelle Staude, Friedrich-Schiller-Univ. Jena (Germany); Chennupati Jagadish, Dragomir N. Neshev, Mohsen Rahmani, The Australian National Univ. (Australia) . [11200-10]

14:45: **Direct plasmonic photodetection of optical angular momentum**, Benjamin P. Cumming, Jingyang Peng, RMIT Univ. (Australia); Min Gu, RMIT Univ. (Australia) and Univ. of Shanghai for Science and Technology (China) . . . . . [11200-11]

15:00: **Switchable unidirectional second-harmonic emission through GaAs nanoantennas**, Lei Xu, The Univ. of New South Wales (Australia); Grégoire Saerens, Maria Timofeeva, ETH Zurich (Switzerland); Andrey E. Miroshnichenko, The Univ. of New South Wales (Australia); Rocio Camacho-Morales, The Australian National Univ. (Australia); Irina Volkovskaya, Institute of Applied Physics of the RAS (Russian Federation); Daria A. Smirnova, Institute of Applied Physics (Russian Federation); Mykhaylo Lysevych, The Australian National Univ. (Australia); Lujun Huang, The Univ. of New South Wales (Australia); Marcus Cai, Fouad Karouta, H. Hoe Tan, The Australian National Univ. (Australia); Martti Kauranen, Tampere Univ. (Finland); Chennupati Jagadish, The Australian National Univ. (Australia); Rachel Grange, ETH Zurich (Switzerland); Dragomir N. Neshev, Mohsen Rahmani, The Australian National Univ. (Australia) . . . . . [11200-12]

15:15: **Engineering of plasmoinc nanomaterials for SERS-based liquid biopsy applications**, Yuling Wang, Macquarie Univ. (Australia) . . . . [11200-302]

Tea/Coffee Break . . . . . Mon 15:30 to 16:00

SESSION 2B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . MON 14:00 TO 15:30

Optical Sensing I

Session Chair: **Arnan Mitchell,** RMIT Univ. (Australia)

14:00: **Biomedical sensing for skin disorders, surgical performance, and prostate cancer** *(Invited Paper)*, Cather Simpson, The Univ. of Auckland (New Zealand) . . . . . [11200-13]

14:30: **A high-bandwidth atomic magnetometer**, Nathanial Wilson, Rujie Li, Christopher Perrella, Philip S. Light, The Univ. of Adelaide (Australia); Russell Anderson, La Trobe Univ. (Australia); Andre N. Luiten, The Univ. of Adelaide (Australia) . . . . . [11200-14]

14:45: **Microdiamond-doped lead-silicate glass optical fibre for remote magnetometry**, Dongbi Bai, RMIT Univ. (Australia); Hoa Huynh, The Univ. of Adelaide (Australia); David A. Simpson, The Univ. of Melbourne (Australia); Shahraam A. Vahid, Univ. of South Australia (Australia); Philipp Reineck, Andrew D. Greentree, RMIT Univ. (Australia); Scott Foster, Defence Science and Technology Group (Australia); Heike Ebendorff-Heidepriem, The Univ. of Adelaide (Australia); Brant C. Gibson, RMIT Univ. (Australia). . . . . [11200-15]

15:00: **Gamma irradiation response in photonic crystal and standard optical fiber Bragg grating sensors for radiation dosimetry**, Steven Hinckley, Desmond J. Baccini, Edith Cowan Univ. (Australia); John Canning, Kevin Cook, Univ. of Technology, Sydney (Australia); Gary Allwood, SAGE Automation Pty Ltd. (Australia); Graham Wild, RMIT Univ. (Australia); Justin Davies, Australian Nuclear Science and Technology Organisation (Australia); Connie Banos, Australian Nuclear Science and Technology Organization (Australia) . . . . . [11200-16]

15:15: **Excimer KrF laser grating imprinting for DFB FL underwater sensing using fibre stepping algorithm**, Alexei Tikhomirov, Defence Science and Technology Group (Australia); Alexander Kolodin, Qinetiq (Australia) . [11200-17]

Tea/Coffee Break . . . . . Mon 15:30 to 16:00

Sessions 3A and 3B run concurrently

SESSION 3A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . MON 16:00 TO 17:30

Novel Materials

Session Chair: **Lan Fu,** The Australian National Univ. (Australia)

16:00: **Single nanoparticle spectroscopy for heterogeneity and uniformity studies of functional nanomaterials** *(Invited Paper)*, Jiajia Zhou, Univ. of Technology, Sydney (Australia) . . . . . [11200-18]

16:30: **Orb web spider silks: how their optics affects potential visibility**, Deb M. Kane, Benjamin Snowdon, Macquarie Univ. (Australia); Sean J. Blamires, The Univ. of New South Wales (Australia); Douglas J. Little, Macquarie Univ. (Australia) . . . . . [11200-19]

16:45: **Ultra-high-resolution fluorescence images in thin phosphor films**, N. Riesen, Univ. of South Australia (Australia); K. Badek, The Univ. of New South Wales (Australia); Y. Ruan, The Univ. of Adelaide (Australia); T. M. Monro, Univ. of South Australia (Australia) and The Univ. of Adelaide (Australia); H. Riesen, The Univ. of New South Wales (Australia) . . . . . [11200-20]

17:00: **Towards the next generation of brain/machine interface**, Francois J. Ladouceur, Xinyue Lei, Yuan Wei, Josiah Firth, The Univ. of New South Wales (Australia); Alexander Fuerbach, Macquarie Univ. (Australia); Nigel Lovell, Leonardo Silvestri, The Univ. of New South Wales (Australia) . . . . . [11200-21]

17:15: **Cross-conjugated Y-shaped enediynes as emergent fluorophores**, Anuja Singh, Avik Kumar Pati, Ashok Kumar Mishra, Indian Institute of Technology Madras (India) . . . . . [11200-22]

SESSION 3B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . MON 16:00 TO 17:30

Optical Sensing II

Session Chair: **Irina V. Kabakova,** Univ. of Technology, Sydney (Australia)

16:00: **Invited talk by OSA President Elect** *(Invited Paper)*, Stephen D. Fantone, Optikos Corp. (United States) . . . . . [11200-320]

16:30: **Chalcogenide fibers for infrared sensing**, Catherine Boussard-Plédel, Shuo Cui, Claire Fourmentin, David Le Coq, Bruno Bureau, Univ. de Rennes 1 (France) . . . . . [11200-23]

16:45: **Multi-point optical fiber pressure sensor**, Linh V. Nguyen, Erik P. Schartner, The Univ. of Adelaide (Australia); Dale E. Otten, Zheng Yu, David Lancaster, Univ. of South Australia (Australia); Heike Ebendorff-Heidepriem, Stephen Warren-Smith, The Univ. of Adelaide (Australia)[11200-24]

17:00: **Micron scale thermometry using lanthanide doped tellurite glass**, Daniel Stavrevski, ARC Ctr. of Excellence for Nanoscale BioPhotonics (Australia) and RMIT Univ. (Australia); Erik P. Schartner, ARC Ctr. of Excellence for Nanoscale BioPhotonics, The Univ. of Adelaide (Australia); Amanda Abraham, ARC Ctr. of Excellence for Nanoscale BioPhotonics (Australia) and RMIT Univ. (Australia); Ivan Maksymov, Ctr. for Micro-Photonics, Swinburne Univ. of Technology (Australia); Heike Ebendorff-Heidepriem, RMIT Univ. (Australia) and The Univ. of Adelaide (Australia); Robert A. McLaughlin, ARC Ctr. of Excellence for Nanoscale BioPhotonics, The Univ. of Adelaide (Australia); Andrew D. Greentree, ARC Ctr. of Excellence for Nanoscale BioPhotonics (Australia) and RMIT Univ. (Australia) . . . . . [11200-25]

17:15: **Towards distributed humidity sensor based on segmented-coated microstructured fiber**, George Y. Chen, Haolan Xu, Tanya M. Monro, David G. Lancaster, Univ. of South Australia (Australia) . . . . . [11200-26]

TUESDAY 10 DECEMBER

TUESDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . TUE 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **New perspectives for biomedical imaging at depth** *(Plenary)*, Kishan Dholakia, Univ. of St. Andrews (United Kingdom)

9:45: **Harnessing disorder for photonic applications** (Plenary) Hui Cao, Yale Univ. (United States)

Tea/Coffee Break . . . . . Tue 10:30 to 11:00

Sessions 4A and 4B run concurrently

SESSION 4A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . TUE 11:00 TO 12:30

Quantum I

Session Chairs: **Arnan Mitchell,** RMIT Univ. (Australia); **Halina Rubinsztein-Dunlop,** The Univ. of Queensland (Australia)

11:00: **Microwave-to-optical frequency conversion using rare earth crystals** *(Invited Paper)*, Rose L. Ahlefeldt, The Australian National Univ. (Australia) . . . . . [11200-27]

11:30: **Inline multiphoton quantum state tomography**, Kai Wang, The Australian National Univ. (Australia) and Univ. Rostock (Germany); Sergey V. Suchkov, The Australian National Univ. (Australia); James G. Titchener, The Australian National Univ. (Australia) and Univ. of Bristol (United Kingdom); Alexander Szameit, Univ. Rostock (Germany); Andrey A. Sukhorukov, The Australian National Univ. (Australia). . . . . [11200-28]

11:45: **Squeezing in lithium niobate waveguides**, F. Lenzini, Griffith Univ. (Australia) and Univ. of Muenster (Germany); J. Janousek, O. Thearle, The Australian National Univ. (Australia); M. Villa, B. Haylock, Griffith Univ. (Australia); S. Kasture, Griffith Univ. (India); L. Cui, Tianjin Univ. (China); H.-P. Phan, D. V. Dao, Griffith Univ. (Australia); H. Yonezawa, The Univ. of New South Wales (Australia); P. M. Lam, E. H. Huntington, The Australian National Univ. (Australia); M. Lobino, Griffith Univ. (Australia) . . . . . [11200-29]

12:00: **Two-photon correlations in nonlinear optical systems**, M. K. Schmidt, Macquarie Univ. (Australia) and Materials Physics Ctr. (Spain); R. Esteban, G. Giedke, Donostia International Physics Ctr. (Spain); J. Aizpurua, Materials Physics Ctr. (Spain) and Ctr. de Fisica de Materiales (Spain); A. Gonzalez-Tudela, Instituto de Física Fundamental, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [11200-30]

12:15: **A quantum Bernoulli factory**, Geoff J. Pryde, Griffith Univ. (Australia); Raj B. Patel, Univ. of Oxford (United Kingdom); Terry Rudolph, Imperial College London (United Kingdom) . . . . . [11200-31]

SESSION 4B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . TUE 11:00 TO 12:30

Fibre Lasers

Session Chairs: **Arnan Mitchell,** RMIT Univ. (Australia); **Halina Rubinsztein-Dunlop,** The Univ. of Queensland (Australia)

11:00: **Mid-infrared fibre photonics** *(Invited Paper)*, Stuart D. Jackson, Macquarie Univ. (Australia) . . . . . [11200-32]

11:30: **Mode-locked Holmium fibre laser**, David M. McAfee, The Univ. of Adelaide (Australia) and Defence Science and Technology Group (Australia); Keiron Boyd, Miftar Ganija, Nikita Simakov, Neil Carmody, Defence Science and Technology Group (Australia); Jesper Munch, The Univ. of Adelaide (Australia); Alexander V. Hemming, John Haub, Defence Science and Technology Group (Australia) . . . . . [11200-33]

11:45: **GaN laser diode pumped dysprosium doped ZBLAN fibre laser for yellow emission**, Md Ziaul Amin, Matthew R. Majewski, Stuart D. Jackson, Macquarie Univ. (Australia) . . . . . [11200-34]

12:00: **Single frequency thulium fibre distributed Bragg reflector laser**, S. W. S. Ng, ARC Ctr. of Excellence for Gravitational Wave Discovery (Australia) and The Univ. of Adelaide (Australia); M. R. Oermann, Defence Science and Technology Group (Australia); P. J. Veitch, J. Munch, ARC Ctr. of Excellence for Gravitational Wave Discovery (Australia) and The Univ. of Adelaide (Australia); A. Hemming, Defence Science and Technology Group (Australia) . . . [11200-35]

12:15: **Hysteresis and bi-stability in an all-fibre laser with saturable absorber**, Robert Otupiri, Bruno Garbin, Bernd Krauskopf, Neil G. R. Broderick, The Univ. of Auckland (New Zealand) . . . . . [11200-36]

LUNCH BREAK AND TUESDAY EQUITY, DIVERSITY, AND INCLUSION (EDI) WORKSHOP

LOCATION: BLDG 8.KALEIDE . . . . . 12:30 TO 14:00

Details about the workshop will be posted online.
All interested attendees will pick up lunch in Bldg 14.Media Portal to take to the workshop located in Bldg 8.Kaleide.

Sessions 5A and 5B run concurrently

SESSION 5A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . .TUE 14:00 TO 15:30

Quantum II

Session Chair: **Mirko Lobino,** Griffith Univ. (Australia)

14:00: **Multipartite entanglement in nonlinear waveguide arrays** *(Invited Paper)*, Kamel Bencheikh, Nadia Belabas Plougonven, David Barral, Ctr. de Nanosciences et de Nanotechnologies (France); Juan Ariel Levenson, Ctr. de Nanosciences et de Nanotechnologies (France) . . . . . [11200-37]

14:30: **Using interaction-based readouts to approach the ultimate limit of detection noise robustness for quantum-enhanced metrology in collective spin systems**, Simon A. Haine, The Australian National Univ. (Australia) . . . . . [11200-38]

14:45: **Testing the reality of Wigner's friend's experience**, Kok-Wei Bong, Anibal Utreras-Alarcon, Farzad Ghafari, Griffith Univ. (Australia); Yeong-Cherng Liang, National Cheng Kung Univ. (Taiwan); Nora Tischler, Eric G. Cavalcanti, Geoff J. Pryde, Howard M. Wiseman, Griffith Univ. (Australia) . . . . . [11200-39]

15:00: **Quantum random number generation using a solid state single photon source**, Simon White, Univ. of Technology, Sydney (Australia); Friederike Klauck, Nora Schmitt, Univ. Rostock (Germany); Toan Trong Tran, Mehran Kianinia, Univ. of Technology, Sydney (Australia); Andrea Steinfurth, Univ. Rostock (Germany); Igor Aharonovich, Univ. of Technology, Sydney (Australia); Alexander Szameit, Univ. Rostock (Germany); Alexander S. Solntsev, Univ. of Technology, Sydney (Australia) . . . . . [11200-40]

15:15: **Towards long-distance quantum communication using trapped ions and frequency qubits**, M. Ghadimi, S. Connell, J. Scarabel, K. Shimizu, E. Streed, M. Lobino, Griffith Univ. (Australia). . . . . [11200-41]

Tea/Coffee Break . . . . . .Tue 15:30 to 16:00

SESSION 5B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . .TUE 14:00 TO 15:30

Glass Lasers

Session Chair: **Michael J. Withford,** Macquarie Univ. (Australia)

14:00: **Multiple ultra-short-pulse lasers on a single chip** *(Invited Paper)*, David G. Lancaster, Dale E. Otten, Univ. of South Australia (Australia); Nicolas Bourbeau Hébert, Univ. Laval (Canada); Wen Qi Zhang, F. Piantedosi, Tanya M. Monro, Univ. of South Australia (Australia); Jerome Genest, Univ. Laval (Canada) . . . . . [11200-42]

14:30: **High-power single-frequency 620 nm diamond laser**, Xuezong Yang, Ondrej Kitzler, David J. Spence, Robert J. Williams, Richard P. Mildren, Macquarie Univ. (Australia) . . . . . [11200-43]

14:45: **Passive mode-locked Yb fluorozirconate glass waveguide laser**, Fiorina Piantedosi, George Y. Chen, Univ. of South Australia (Australia); Tanya M. Monro, Defence Science and Technology Group (Australia) and Univ. of South Australia (Australia); David G. Lancaster, Univ. of South Australia (Australia) . . . . . [11200-44]

15:00: **Broadly tunable light sources using four-wave mixing in magnesium fluouride microresonators**, Vincent Ng, The Univ. of Auckland (New Zealand); Noel Lito B. Sayson, The Univ. of Auckland (New Zealand) and Mindanao State Univ. (Philippines); Luke S. Trainor, Harald G. L. Schwefel, Univ. of Otago (New Zealand); Stephane Coen, Miro Erkintalo, Stuart G. Murdoch, The Univ. of Auckland (New Zealand) . . . . . [11200-45]

15:15: **Intracavity adaptive compensation of a QCW unidirectional unstable Nd: YAG slab ring laser**, Lizhi Dong, Institute of Optics and Electronics, Chinese Academy of Sciences (China); Boheng Lai, Institute of Optics and Electronics (China); Xun Wang, Institute of Optics and Electronics (China) and Univ. of Chinese Academy of Sciences (China); Shuai Meng, Univ. of Chinese Academy of Sciences (China) and Technical Institute of Physics and Chemistry (China); Shanqiu Chen, Institute of Optics and Electronics (China); Yading Guo, Univ. of Chinese Academy of Sciences (China) and Technical Institute of Physics and Chemistry (China); Lixia Xue, Guomao Tang, Institute of Optics and Electronics (China); Chunxuan Su, Institute of Optics and Electronics (China) and Univ. of Chinese Academy of Sciences (China); Ping Yang, Shuai Wang, Bing Xu, Institute of Optics and Electronics (China). . . . . [11200-46]

Tea/Coffee Break . . . . . .Tue 15:30 to 16:00

Sessions 6A and 6B run concurrently

SESSION 6A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . .TUE 16:00 TO 17:15

Nonlinear

Session Chair: **David J. Moss,**
Swinburne Univ. of Technology (Australia)

16:00: **Polarized spatio-spectral mapping of supercontinua generated in microstructured optical fibre** *(Invited Paper)*, John Holdsworth, Luke McCourt, The Univ. of Newcastle (Australia); Samuel Legge, The Australian National Univ. (Australia). . . . . [11200-48]

16:30: **Pure-quartic solitons from a fibre laser with intracavity pulse-shaper** *(Invited Paper)*, A. F. J. Runge, The Univ. of Sydney (Australia); D. D. Hudson, Miriad Technologies Pty Ltd. (Australia); K. K. K. Tam, The Univ. of Sydney (Australia); C. M. de Sterke, The Univ. of Sydney (Australia) and The Univ. of Sydney Nano Institute (Australia); A. Blanco-Redondo, The Univ. of Sydney (Australia) and Nokia Bell Labs. (United States) . . . . . [11200-49]

17:00: **Enhanced Kerr optical nonlinearity of integrated waveguides incorporating layered GO films**, Yang Qu, Jiayang Wu, Yunyi Yang, Xingyuan Xu, Linnan Jia, Yuning Zhang, Yao Liang, Swinburne Univ. of Technology (Australia); Sai Tak Chu, City Univ. of Hong Kong (Hong Kong, China); Brent E. Little, Xi'an Institute of Optics and Precision Mechanics (China); Roberto Morandotti, Ctr. Énergie Matériaux Télécommunications, Institut National de la Recherche Scientifique (Canada); Baohua Jia, David J. Moss, Swinburne Univ. of Technology (Australia) . . . . . [11200-50]

SESSION 6B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . .TUE 16:00 TO 17:30

Lidar

Session Chair: **Arnan Mitchell,** RMIT Univ. (Australia)

16:00: **LiDAR eyes for autonomous vehicles** *(Invited Paper)*, Trina T. Thakker, Cibby Pulikkaseril, Stanley Lam, Baraja Pty Ltd. (Australia) . . . . . [11200-51]

16:30: **Fast beam steering and agile wavefront control with an optical phased array**, David R. Gozzard, James T. Spollard, Lyle E. Roberts, Paul G. Sibley, David E. McClelland, Daniel A. Shaddock, The Australian National Univ. (Australia) . . . . . [11200-52]

16:45: **Discrete electro-optic beam steering for LIDAR**, B. Haylock, Griffith Univ. (Australia); M. A. Baker, T. M. Stace, The Univ. of Queensland (Australia); M. Lobino, Griffith Univ. (Australia) . . . . . [11200-53]

17:00: **Continuous-wave light detection and ranging (LiDAR) using image-reject homodyne detection and PRBS modulation**, Katie Ward, James T. Spollard, Lyle E. Roberts, David E. McClelland, Daniel A. Shaddock, The Australian National Univ. (Australia) . . . . . [11200-54]

17:15: **Time reversal of optical waves**, Mickael Mounaix, Univ. of Queensland (Australia); Nicolas K Fontaine, Haoshuo Chen, Nokia Bell Laboratories (United States); Roland Ryf, Nokia Bell Labs. (United States); David T Neilson, Nokia Bell Laboratories (United States); Joel Carpenter, Univ. of Queensland (Australia) . . . . . [11200-314]

CONFERENCE BANQUET DINNER

LOCATION: SEA LIFE MELBOURNE AQUARIUM . . . . . 18:30 TO 22:00

All registered attendees are invited to attend. Additional guest tickets can be purchased through registration.

WEDNESDAY 11 DECEMBER

WEDNESDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . WED 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **The James Webb Space Telescope** *(Plenary)*
Gillian S. Wright, UK Astronomy Technology Ctr. (United Kingdom)

9:45: **Subwavelength integrated photonics** *(Plenary)*
Pavel Cheben, National Research Council Canada (Canada)

Tea/Coffee Break . . . . . Wed 10:30 to 11:00

Sessions 7A and 7B run concurrently

SESSION 7A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . WED 11:00 TO 12:30

Photonic Chips I

Session Chair: **Arnan Mitchell,** RMIT Univ. (Australia)

11:00: **Technologies for large-scale programmable photonic circuits** *(Invited Paper)*, Wim Bogaerts, Ghent University - IMEC (Belgium); Antonio Ribeiro, Mi Wang, Lukas Van Iseghem, Hong Deng, Iman Zand, Xiangfeng Chen, Muhammad Umar Khan, Univ. Gent (Belgium) . . . . . [11200-55]

11:30: **CMOS-compatible, plasma beam assisted reactive magnetron sputtered silicon nitride films for photonic integrated circuits**, Andreas Frigg, Andreas Boes, Guanghui Ren, RMIT Univ. (Australia); Duk-Yong Choi, The Australian National Univ. (Australia); Silvio Gees, Evatec Ltd. (Switzerland); Arnan Mitchell, RMIT Univ. (Australia) . . . . . [11200-56]

11:45: **Direct quantum error detection in multiplexed photonic transmission channels**, Kai Wang, The Australian National Univ. (Australia) and Univ. Rostock (Germany); Falk Eilenberger, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany) and Max Planck School of Photonics (Germany); Alexander Szameit, Univ. Rostock (Germany); Andrey A. Sukhorukov, The Australian National Univ. (Australia) . . . . . [11200-57]

12:00: **Advanced multi-functional photonic filters based on integrated cascaded Sagnac loop reflectors**, Yuning Zhang, Swinburne Univ. of Technology (Australia); Jiayang Wu, Tania Moein, Hamed Arianfard, Xingyuan Xu, Yang Qu, Linnan Jia, David J. Moss, Ctr. for Micro-Photonics, Swinburne Univ. of Technology (Australia) . . . . . [11200-58]

12:15: **Vertical directional coupler network using a-Si slope waveguides**, Vinita Mittal, Univ. of Southampton (United Kingdom); Rafidah Petra, Univ. of Southampton (United Kingdom) and Univ. Teknologi Brunei (Brunei Darussalam); Antulio Tarazona, Nicholas J. Dinsdale, Ali Z. Khokhar, Mehdi Banakar, David J. Thomson, Otto Musken, Graham T. Reed, Harold M. H. Chong, Univ. of Southampton (United Kingdom) . . . . . [11200-59]

SESSION 7B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . WED 11:00 TO 12:30

Microscopy and Fluorescence

Session Chair: **Philipp Reineck,** RMIT Univ. (Australia)

11:00: **New windows to the body: towards research translation of hyperspectral autofluorescence imaging** *(Invited Paper)*, Ewa M. Goldys, The Univ. of New South Wales (Australia) . . . . . [11200-60]

11:30: **High-resolution molecular spectroscopy and biological applications**, Sarah K. Scholten, Joshua Whitaker-Lockwood, Christopher Perrella, Faisal Karim, Andre N. Luiten, The Univ. of Adelaide (Australia) . . . . . [11200-61]

11:45: **Tomography of quantum dots in a non-hermitian photonic chip**, Simon White, Univ. of Technology, Sydney (Australia); Kai Wang, The Australian National Univ. (Australia); Toan Trong Tran, Mehran Kianinia, Univ. of Technology, Sydney (Australia); James G. Titchener, The Australian National Univ. (Australia); Markus Graefe, Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany); Sarah Fischbach, Sven Rodt, Technische Univ. Berlin (Germany); Jin Dong Song, Korea Institute of Science and Technology (Australia); Stephan Reitzenstein, Technische Univ. Berlin (Germany); Igor Aharonovich, Univ. of Technology, Sydney (Australia); Andrey A. Sukhorukov, The Australian National Univ. (Australia); Alexander Szameit, Univ. Rostock (Germany); Alexander S. Solntsev, Univ. of Technology, Sydney (Australia) . . . . . [11200-62]

12:00: **Multiple-pass configuration for improved reflection mode confocal system**, K. U. Hii, Swinburne Univ. of Technology Sarawak Campus (Malaysia) . . . . . [11200-63]

12:15: **Mapping DNA target search in live cell chromatin organisation by fluorescence fluctuation analysis**, Elizabeth Hinde, The Univ. of Melbourne (Australia) . . . . . [11200-301]

LUNCH BREAK AND WEDNESDAY EQUITY, DIVERSITY, AND INCLUSION (EDI) WORKSHOP

LOCATION: BLDG 8.KALEIDE . . . . . 12:30 TO 14:00

Details about the workshop will be posted online.
All interested attendees will pick up lunch in Bldg 14.Media Portal to take to the workshop located in Bldg 8.Kaleide.

Sessions 8A and 8B run concurrently

SESSION 8A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . WED 14:00 TO 15:30

Photonic Chips II

Session Chair: **Duk-Yong Choi,** The Australian National Univ. (Australia)

14:00: Techniques to combat SBS for power scaling in narrow linewidth amplifiers (Invited Paper), Arti Agrawal, Univ. of Technology Sydney Chapter (Australia) . . . . . [11200-323]

14:30: **Sensing and signal processing based on microwave photonics** *(Invited Paper)*, Xiaoke Yi, Suen Xin Chew, Liwei Li, Shijie Song, Linh Nguyen, Robert A. Minasian, The Univ. of Sydney (Australia) . . . . . [11200-65]

15:00: **Novel designs of optoacoustic waveguides**, M. K. Schmidt, M. O'Brien, Macquarie Univ. (Australia); C. G. Poulton, Univ. of Technology, Sydney (Australia); G. Z. Mashanovich, G. T. Reed, Univ. of Southampton (United Kingdom); B. J. Eggleton, The Univ. of Sydney Nano Institute (Australia) and The Univ. of Sydney (Australia); M. J. Steel, Macquarie Univ. (Australia) . . . . . [11200-66]

15:15: **Graphene oxide waveguide and micro-ring resonator polarizers**, Yang Qu, Jiayang Wu, Yunyi Yang, Xingyuan Xu, Yao Liang, Swinburne Univ. of Technology (Australia); Sai Tak Chu, City Univ. of Hong Kong (Hong Kong, China); Brent E. Little, Xi'an Institute of Optics and Precision Mechanics (China); Roberto Morandotti, Ctr. Énergie Matériaux Télécommunications, Institut National de la Recherche Scientifique (Canada); Baohua Jia, David J. Moss, Swinburne Univ. of Technology (Australia) . . . . . [11200-67]

Tea/Coffee Break . . . . . Wed 15:30 to 16:00

SESSION 8B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . WED 14:00 TO 15:30

Lasers

Session Chair: **Stuart D. Jackson,** Macquarie Univ. (Australia)

14:00: **III-V Semiconductor Nanostructures for Optoelectronic Device and Energy Applications** *(Invited Paper)*, Hark Hoe Tan, The Australian National Univ. (Australia). . . . . [11200-318]

14:30: **Intra-cavity semiconductor laser tuning using a frequency compensating acousto-optic tunable filter pair**, Adam Gambell, Defence and Science Technology Group (Australia); Nikita Simakov, Defence Science and Technology Group (Australia); Miftar Ganija, Defence Science Technology Group (DST Group) (Australia); Alexander V. Hemming, Defence Science and Technology Group (Australia); Jae M.O Daniel, Aether Photonics (Australia); Peter C. Shardlow, W. Andrew Clarkson, Optoelectronics Research Ctr. (United Kingdom); Jon Ward, Gooch & Housego (UK) Ltd. (United Kingdom); Peter J. Veitch, Jesper Munch, The Univ. of Adelaide (Australia); John Haub, Defence Science and Technology Group (Australia). . . . . [11200-68]

14:45: **Femtosecond laser inscribed waveguide and micro-chip laser operation at 1.07µm in Yb^{3+} doped germanate glass**, Mamoona Khalid, George Y. Chen, Univ. of South Australia (Australia); Jiafang Bei, Heike Ebendorff-Heideprem, The Univ. of Adelaide (Australia); David G. Lancaster, Univ. of South Australia (Australia) . . . . . [11200-69]

15:00: **Compact design of Q-switched laser systems based on liquid crystal transducers**, Xinyue Lei, The Univ. of New South Wales (Australia); Victor Karaganov, Lastek Pty Ltd. (Australia); Francois J. Ladouceur, Leonardo Silvestri, The Univ. of New South Wales (Australia); Alex Fuerbach, Macquarie Univ. (Australia) . . . . . [11200-70]

15:15: **Ultrafast π-pulses for strong coherent excitation of a $^{171}Yb^{+}$ ion**, K. Shimizu, J. Scarabel, S. Connell, E. W. Streed, M. Lobino, Griffith Univ. (Australia) . . . . . [11200-71]

Tea/Coffee Break . . . . . Wed 15:30 to 16:00

Sessions 9A and 9B run concurrently

SESSION 9A

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . WED 16:00 TO 17:30

Mid-IR

Session Chair: **David J. Moss,**
Swinburne Univ. of Technology (Australia)

16:00: **Mode-locked mid-IR fibre laser based on 2D nanomaterials**, Gayathri Bharathan, Macquarie Univ. (Australia); Xiantao Jiang, Han Zhang, Shenzhen Univ. (China); Feng Chen, Ziqi Li, Shandong Univ. (China); Stuart Jackson, Alex Fuerbach, Macquarie Univ. (Australia) . . . . . [11200-73]

16:15: **Mid-IR laser for wavefront correction in gravitational wave detectors**, Deeksha Beniwal, Huy T. Cao, Sebastian W. S. Ng, The Univ. of Adelaide (Australia); Aidan F. Brooks, California Institute of Technology (United States); Gayathri Bharathan, Alex Fuerbach, Macquarie Univ. (Australia); Peter J. Veitch, David J. Ottaway, The Univ. of Adelaide (Australia) . . [11200-74]

16:30: **Mid-infrared supercontinuum generation in hybrid chalcogenide/ silicon-germanium waveguides** *(Invited Paper)*, Alberto Della Torre, Institut des Nanotechnologies de Lyon (France); Milan Sinobad, Institut des Nanotechnologies de Lyon (France) and RMIT Univ. (Australia); Rémi Armand, Institut des Nanotechnologies de Lyon (France); Barry Luther-Davies, Pan Ma, Stephen Madden, Sukanta Debbarma, Khu Vu, The Australian National Univ. (Australia); David J. Moss, Swinburne Univ. of Technology (Australia); Arnan Mitchell, RMIT Univ. (Australia); Jean-Michel Hartmann, Jean-Marc Fedeli, CEA-LETI (France); Christelle Monat, Christian Grillet, Institut des Nanotechnologies de Lyon (France). . . . . [11200-75]

17:00: **Cascaded Mid-IR Supercontinuum generation in chalcogenide microstructured optical fibers from 2 to 10 µm** *(Invited Paper)*, Johann Troles, Univ. de Rennes 1 (France); Sebastien Venck, SelenOptics (France); Solenn Cozic, Le Verre Fluoré (France); Marcello Meneghetti, Univ. de Rennes 1 (France); Laurent Brilland, Radwan Chahal, SelenOptics (France); Jean Luc Adam, Univ. de Rennes 1 (France); Samuel Poulain, Laurine Bodin, Franck Joulain, Le Verre Fluoré (France); Marcel Poulain, Univ. de Rennes 1 (France) and Le Verre Fluoré (France) . . . . . [11200-76]

SESSION 9B

LOCATION: BLDG 80.LEVEL 2.RM 02 . . . . . WED 16:00 TO 17:00

Interferometry and Ophthalmic Optics

Session Chair: **Arnan Mitchell,** RMIT Univ. (Australia)

16:00: **Invited talk by SPIE President Elect** *(Invited Paper)*, John E. Greivenkamp, Wyant College of Optical Sciences (United States) . . . . . [11200-319]

16:30: **Integrated color centers in arrays of silicon carbide micropillars**, S. Castelletto, RMIT Univ. (Australia) and Swinburne Univ. of Technology (Australia); F. A. Inam, Aligarh Muslim Univ. (India); A. Boretti, Prince Mohammad Bin Fahd Univ. (Saudi Arabia) and Ton Duc Thang Univ. (Viet Nam) . . . . . [11200-311]

16:45: **Precision measurement of weak transitions from excited states in helium by counting ultracold atoms**, J. A. Ross, K. F. Thomas, Bryce M. Henson, Sean S. Hodgman, Andrew G. Truscott, Kenneth G. H. Baldwin, The Australian National Univ. (Australia) . . . [11200-317]

POSTERS-WEDNESDAY

LOCATION: BLDG 14.MEDIA PORTAL . . . . . WED 18:00 TO 19:30

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.

Design of CMOS compatible plasmonic color filter for high selectivity, Khalid Arif, Ayesha Shaukat, Massey Univ. Albany (New Zealand) . . . [11200-82]

NIR performance comparison of Bi/Er and Yb/Er co-doped fibres as pumped at 808 nm and 830 nm, Muhammad Talal A. Khan, Shuen Wei, Gang-Ding Peng, The Univ. of New South Wales (Australia) . . . . . [11200-83]

Distributed fibre optic pressure sensors designed for composite propeller integration, Tim Booker, Claire E. Davis, Defence Science and Technology Group (Australia); John W. Arkwright, Flinders Univ. (Australia) . . . . . [11200-84]

Nonlinear Fourier transform of second order solitons with closely packed eigenvalues, Wen Qi Zhang, Terence Chan, Shahraam Afshar Vahid, Univ. of South Australia (Australia) . . . . . [11200-85]

Mode matching error signal from radio frequency waist size and position modulation, Alexei Ciobanu, Daniel D. Brown, David Ottaway, The Univ. of Adelaide (Australia). . . . . [11200-86]

A THz Single-Polarization-Single-Mode (SPSM) photonic crystal fiber based on epsilon-near-zero material, Tianyu Yang, Can Ding, Richard W. Ziolkowski, Y. Jay Guo, Univ. of Technology, Sydney (Australia) . . . . . [11200-87]

Relationship between threshold gain and Bragg detuning in photonic-crystal surface-emitting lasers, Zong-Lin Li, Shen-Chieh Lin, Yu-Chen Chen, Gray Lin, National Chiao Tung Univ. (Taiwan) . . . . . [11200-88]

Fabry-Perot interferometric fibre optic temperature sensor with polyvinylidene fluoride (PVDF) coating, Fairuza Faiz, Marlene Cran, S. F. Collins, G. W. Baxter, Fotios Sidiroglou, Victoria Univ. (Australia)[11200-89]

Eigenvalue analysis of time separated signals using layer-peeling property, Terence Chan, Wen Qi Zhang, Shahraam Afshar Vahid, Univ. of South Australia (Australia) . . . . . [11200-90]

Standardization of FBG sensors in dual-bus fiber networks, Gary Allwood, SAGE Automation Pty Ltd. (Australia); Steven Richardson, Edith Cowan Univ. (Australia); Graham Wild, RMIT Univ. (Australia); Steven Hinckley, Edith Cowan Univ. (Australia). . . . . [11200-91]

New approach to find nonlinear Fourier transform of optical signals, Shahraam Afshar Vahid, Wen Qi Zhang, Terence H. Chan, Univ. of South Australia (Australia). . . . . [11200-92]

Control of nonlinear processes in two-photon excited rubidium vapour by resonant laser light, N. Rahaman, R. J. McLean, Swinburne Univ. of Technology (Australia); A. M. Akulshin, Swinburne Univ. of Technology (Australia) and Johannes Gutenberg Univ. (Germany) . . . . . [11200-93]

Toward a new sensing platform based on conducting polymer: thickness measurement and the effect of different oxidant solution on damage threshold, Soroush Shahnia, Junaiz Rehmen, David G. Lancaster, Drew Evans, Shahraam Afshar, Univ. of South Australia (Australia) . . . . . [11200-94]

High precision measurement of optical absorption in low-OH fused silica at 2 micron, Craig Ingram, Huy Tuong Cao, Sebastian W. S. Ng, Daniel D. Brown, David Ottaway, Peter J. Veitch, The Univ. of Adelaide (Australia); Adam Gambell, Nikita Simakov, Alexander Hemming, DST Group (Australia) . . . . . [11200-95]

True time delays for phased array antennas based on a microcomb, Mengxi Tan, Xingyuan Xu, Jiayang Wu, Swinburne Univ. of Technology (Australia); Thach G. Nguyen, RMIT Univ. (Australia); Sai Tak Chu, City Univ. of Hong Kong (Hong Kong, China); Brent E. Little, Univ. of Chinese Academy of Sciences (China); Roberto Morandotti, Institut National de la Recherche Scientifique (Canada); Arnan Mitchell, RMIT Univ. (Australia); David J. Moss, Swinburne Univ. of Technology (Australia) . . . . . [11200-96]

Fabrication tolerant planar directional couplers, Choon Kong Lai, Yile Zhong, T. Han, The Australian National Univ. (Australia); Wu Yi Chong, Univ. of Malaya (Malaysia); Duk-Yong Choi, Harry-Dean Kenchington Goldsmith, Pan Ma, The Australian National Univ. (Australia); H. Ahmad, Univ. of Malaya (Malaysia); Stephen Madden, The Australian National Univ. (Australia) . . . . . [11200-97]

Photonic circuits with time delays and quantum feedback using nanofibres and long coupling fibres, M. Sadeghi Sr., S. Parkins, M. D. Hoogerland, The Univ. of Auckland (New Zealand) and The Dodd-Walls Ctr. for Photonic and Quantum Technologies (New Zealand). . . . . [11200-98]

Optomechanical micro-structures for single-crystal diamond, Shuo Li, RMIT Univ. (Australia); Yangfan Li, Fei Meng, Baohua Jia, Swinburne Univ. of Technology (Australia); Andrew D. Greentree, RMIT Univ. (Australia); Xiaodong Huang, Swinburne Univ. of Technology (Australia) . . . . . [11200-99]

Parametric design study of monolayer graphene based TeO_2 waveguide saturable absorber, Yile Zhong, Dige Wang, Harry-Dean Kenchington Goldsmith, Steve Madden, The Australian National Univ. (Australia) [11200-100]

Unidimensional continuous-variable quantum key distribution with imperfect detector, Yichen Zhang, Luyu Huang, Song Yu, Beijing Univ. of Posts and Telecommunications (China); Hong Guo, Peking Univ. (China) . . . . . [11200-101]

Multi-point high temperature optical fiber sensor, Erik P. Schartner, Linh V. Nguyen, The Univ. of Adelaide (Australia); Dale E. Otten, Univ. of South Australia (Australia); Zheng Yu, The Univ. of Adelaide (Australia); David G. Lancaster, Univ. of South Australia (Australia); Heike Ebendorff-Heidepriem, Stephen Warren-Smith, The Univ. of Adelaide (Australia) . . . . . [11200-102]

Thermally drawn polycaprolactone fibres with customised cross sections, Syamak Farajikhah, Ivan D. Rukhlenko, The Univ. of Sydney (Australia); Alessio Stefani, The Univ. of Sydney (Australia) and Technical Univ. of Denmark (Denmark); Maryanne Large, Wojciech Chrzanowski, Simon Fleming, The Univ. of Sydney (Australia). . . . . [11200-103]

High Q RF transversal filter based on an 80-channel integrated microcomb source, Xingyuan Xu, Mengxi Tan, Jiayang Wu, Swinburne Univ. of Technology (Australia); Thach G. Nguyen, RMIT Univ. (Australia); Sai T. Chu, City Univ. of Hong Kong (Hong Kong, China); Brent E. Little, Xi'an Institute of Optics and Precision Mechanics (China); Roberto Morandotti, INRS-Énergie, Matériaux et Télécommunications (Canada) and National Research University of Information Technologies, Mechanics and Optics, St. Petersburg (Russian Federation) and Univ. of Electronic Science and Technology of China (China); Arnan Mitchell, RMIT Univ. (Australia); David J. Moss, Swinburne Univ. of Technology (Australia) . . . . . [11200-104]

Full-field deformation measurement of a large-rotation object using digital image correlation, Lianpo Wang, Yonggang Gu, Chao Zhai, Univ. of Science and Technology of China (China). . . . . [11200-105]

Nanostructured all-silicon photodetector pixels with tailored responsivity spectra, Jasper J. Cadusch, Jiajun Meng, Kenneth B. Crozier, The Univ. of Melbourne (Australia) . . . . . [11200-106]

Distributed fibre optic sensors for the alpine fault of New Zealand, James Loveday, Shahna Haneef, Neil G. R. Broderick, Kasper van Wijk, The Univ. of Auckland (New Zealand). . . . . [11200-108]

Parametric design study for waveguide-based graphene MIR photodetectors, Dige Wang, Steve Madden, The Australian National Univ. (Australia) . . . . . [11200-109]

Compact stable fibre-based optical frequency filter, Jonathan P. Hedger, Andre N. Luiten, Benjamin M. Sparkes Jr., The Univ. of Adelaide (Australia) . . . . . [11200-110]

Injection locking of a pulsed VCSEL, J. Rowland III, P. S. Light, A. N. Luiten, C. Perrella, B. M. Sparkes Jr., The Univ. of Adelaide (Australia) . . . . [11200-111]

Single frequency holmium-doped DBR fibre laser at 2.1 µm, Lily E. Taylor, The Univ. of Adelaide (Australia) and Defence Science and Technology Group (Australia); Michael R. Oermann, Miftar Ganija, Defence Science and Technology Group (Australia); Jesper Munch, The Univ. of Adelaide (Australia); David M. McAfee, The Univ. of Adelaide (Australia) and Defence Science and Technology Group (Australia); Alexander V. Hemming, Defence Science and Technology Group (Australia) . . . . . [11200-112]

Improved location algorithm for high-spatial-resolution in fiber optic line-based sensor, Qiuheng Song, Jingwei Huang, Peng Huang, Qian Xiao, Bo Jia, Fudan Univ. (China) . . . . . [11200-113]

Design algorithm for compact low-reflection adiabatic photonic mode converters based on constant coupling, Islam Abdo, Andreas Boes, Thach G. Nguyen, Guanghui Ren, Arnan Mitchell, RMIT Univ. (Australia) . . . . . [11200-114]

Photoluminescence properties of Er doped AS_2S_3 films deposited using RF co-sputtering and the impact of rapid thermal annealing, Huma Latif, Kunlun Yan, Steve Madden, The Australian National Univ. (Australia) [11200-115]

Cold atom loaded hollow core fibre for quantum applications, Ashby P. Hilton, Jonathan Hedger, Christopher Perrella, Ben M. Sparkes Jr., Andre N. Luiten, Philip S. Light, The Univ. of Adelaide (Australia) . . . [11200-116]

Transmission enhancement in plasmonic nanohole array for colour imaging applications, Xin He, Yajing Liu, The Univ. of Melbourne (Australia); Paul Beckett, RMIT Univ. (Australia); Hemayet Uddin, Melbourne Ctr. for Nanofabrication (Australia); Ampalavanapillai T. Nirmalathas, Ranjith Rajasekharan Unnithan, The Univ. of Melbourne (Australia) . . . . . [11200-117]

The microscope type spectral reflectometry design for large dynamic range thin film thickness measurement in RDL processes, Hsiang-Chun Wei, Chung-Lun Kuo, Chih-Shang Liu, Industrial Technology Research Institute (Taiwan). . . . . [11200-118]

Linear quadratic Gaussian controller design based on subspace identification for adaptive optics, Haiqi Lin, Ping Yang, Shuai Wang, Lizhi Dong, Qingfeng Kong, Bing Xu, Institute of Optics and Electronics, Chinese Academy of Sciences (China) . . . . . [11200-119]

Feasibility study of THz multiplexer and demultiplexer employing arrayed waveguide gratings, Syed Daniyal Ali Shah, Shaghik Atakaramiansa, Francois J. Ladouceur, The Univ. of New South Wales (Australia) . . . . . [11200-120]

Submicron simultaneous IR and Raman microscopy (IR+Raman): breakthrough developments in Optical Photothermal IR (O-PTIR) combined with Raman provide new capabilities, M. Kansiz, Photothermal Spectroscopy Corp. (United States); C. Marcott, Light Light Solutions, LLC (United States) . . . . . [11200-121]

Measurement of THz index of refraction and absorption coefficient of 2-methoxy- 4(phenyliminomethyl)phenol, K.M. Hijas, National Institute of Technology, Tiruchirappalli (India) and Univ. of Pécs (Hungary); József András Fülöp, Univ. of Pécs (Hungary); R. Nagalakshmi, National Institute of Technology, Tiruchirappalli (India). . . . . [11200-122]

Further design of LAPAN's MWIR camera module, Bustanul Arifin, Moedji Soedjarwo, Irwan Priyanto, Andi Mukhtar Tahir, Indonesian National Institute of Aeronautics and Space (Indonesia) . . . . . [11200-123]

Optical fiber transmission quality analysis based on FPGA, Zhanchao Wang, Academy of Opto-Electronics CAS (China); MIn Huang, Lulu Qian, Guifeng Zhang, Academy of Opto-Electronics, Chinese Academy of Sciences (China). . . . . [11200-124]

Testing QED by measuring a He* tune-out wavelength, Bryce M. Henson, Jacob A. Ross, Kieran F. Thomas, The Australian National Univ. (Australia); Carlos N. Kuhn, Swinburne Univ. of Technology (Australia); Dongki Shin, Sean S. Hodgman, The Australian National Univ. (Australia); Li-Yan Tang, Wuhan Institute of Physics and Mathematics, Chinese Academy of Sciences (China); Gordon W. F. Drake, Univ. of Windsor (Canada); Andrew G Truscott, Kenneth G. H. Baldwin, The Australian National Univ. (Australia) . . . [11200-315]

Symmetry breaking: balancing asymmetries, Bruno Garbin, The Univ. of Auckland (New Zealand) and The Dodd-Walls Ctr. for Photonic and Quantum Technologies (New Zealand); Julien Fatome, Lab. Interdisciplinaire Carnot de Bourgogne (France); Gian-Luca Oppo, Univ. of Strathclyde (United Kingdom); Stuart G. Murdoch, Miro Erkintalo, Stephane Coen, The Univ. of Auckland (New Zealand) . . . . . [11200-316]

THURSDAY 12 DECEMBER

THURSDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . THU 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **MAVIS: beyond HST resolution and sensitivity** *(Plenary)*, François Rigaut, The Australian National Univ. (Australia)

9:45: **From nanotech to living sensors: unraveling the spin physics of biosensing at the nanoscale** *(Plenary)*, Clarice Aiello, Univ. of California, Los Angeles (United States)

CONFERENCE AWARDS

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . 10:30 TO 10:45

Tea/Coffee Break . . . . . .Thu 10:45 to 11:15

SESSION 10

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . THU 11:15 TO 12:45

NOTE ROOM LOCATION

Applications of Combs

Session Chair: **Jochen B. Schroeder,** RMIT Univ. (Sweden)

11:15: **Ultra-high data rate communications with a single soliton crystal micro-comb** *(Invited Paper)*, Bill Corcoran, Monash Univ. (Australia) [11200-77]

11:45: **Reconfigurable microwave signal processor for fractional and regular Hilbert transform based on a microcomb**, Mengxi Tan, Xingyuan Xu, Jiayang Wu, Swinburne Univ. of Technology (Australia); Andy Boes, RMIT Univ. (Australia); Bill Corcoran, Monash Univ. (Australia); Thach G. Nguyen, RMIT Univ. (Australia); Sai T. Chu, City Univ. of Hong Kong (Hong Kong, China); Brent E. Little, State Key Lab. of Transient Optics and Photonics (China); Roberto Morandotti, INRS-Énergie, Matériaux et Télécommunications (Canada) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and Univ. of Electronic Science and Technology of China (China); Arnan Mitchell, RMIT Univ. (Australia); David J. Moss, Swinburne Univ. of Technology (Australia). . . . . [11200-78]

12:00: **Continuously tunable orthogonally polarized RF optical single sideband generator based on cascaded micro-ring resonators**, Yuning Zhang, Swinburne Univ. of Technology (Australia); Xingyuan Xu, Jiayang Wu, Linnan Jia, Mengxi Tan, Ctr. for Micro-Photonics, Swinburne Univ. of Technology (Australia); Thach G. Nguyen, RMIT Univ. (Australia); Sai T. Chu, City Univ. of Hong Kong (Hong Kong, China); Brent E. Little, Xi'an Institute of Optics and Precision Mechanics (China); Roberto Morandotti, INRS-Énergie, Matériaux et Télécommunications (Canada) and ITMO Univ. (Russian Federation) and Univ. of Electronic Science and Technology of China (China); Arnan Mitchell, RMIT Univ. (Australia); David J. Moss, Swinburne Univ. of Technology (Australia) . . . . . [11200-79]

12:15: **Broadband Photonic RF channelization based on an integrated optical micro-comb source**, Linnan Jia, Swinburne Univ. of Technology (Australia); Xingyuan Xu, Jiayang Wu, Mengxi Tan, Ctr. for Micro-Photonics, Swinburne Univ. of Technology (Australia); Thach G. Nguyen, RMIT Univ. (Australia); Sai Tak Chu, City Univ. of Hong Kong (Hong Kong, China); Brent E. Little, Xi'an Institute of Optics and Precision Mechanics (China); Roberto Morandotti, INRS-Énergie, Matériaux et Télécommunications (Canada) and ITMO Univ. (Russian Federation) and Univ. of Electronic Science and Technology of China (China); Arnan Mitchell, RMIT Univ. (Australia); David J. Moss, Swinburne Univ. of Technology (Australia) . . . . . [11200-80]

12:30: **Photonic wideband RF mixer based on an integrated microcomb source**, Xingyuan Xu, Mengxi Tan, Jiayang Wu, Swinburne Univ. of Technology (Australia); Thach G. Nguyen, RMIT Univ. (Australia); Sai T. Chu, City Univ. of Hong Kong (Hong Kong, China); Brent E. Little, Xi'an Institute of Optics and Precision Mechanics (China); Roberto Morandotti, INRS-Énergie, Matériaux et Télécommunications (Canada) and National Research Univ. of Information Technologies (Russian Federation) and Univ. of Electronic Science and Technology of China (China); Arnan Mitchell, RMIT Univ. (Australia); David J. Moss, Swinburne Univ. of Technology (Australia) . . . . . [11200-81]

Lunch Break . . . . . Thu 12:45 to 14:00

NOTE: No lunch provided on Thursday - open time for attendees to explore local restaurants and area.

AUSTRALIAN PHOTONICS INDUSTRY SURVEY

LOCATION: BLDG 8.KALEIDE . . . . . 14:00 TO 15:30

The Australian Optical Society and SPIE recently commissioned a survey of the photonics industry in Australia. The key findings in that national survey will be presented at this session. The speakers will also offer comparative insights into the international photonics marketplace, and provide context for start-ups and existing businesses in both New Zealand and Australia.

CONFERENCE 11201
LOCATION: BLDG 80.LEVEL 4.RM 06

Monday–Thursday 9–12 December 2019 • Proceedings of SPIE Vol. 11201

Micro + Nano Materials, Devices, and Applications 2019

Conference Chairs: **M. Cather Simpson,** The Univ. of Auckland (New Zealand); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

Program Committee: **James W. M. Chon,** Swinburne Univ. of Technology (Australia); **Hong-Bo Sun,** Tsinghua Univ. (China)

MONDAY 9 DECEMBER

MONDAY PLENARY SESSION
LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . MON 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **Metaphotonics with resonant dielectric structures** *(Plenary)*
Yuri S. Kivshar, The Australian National Univ. (Australia)

9:45: **Single molecule imaging of T cell receptor signaling** *(Plenary)*
Katharina Gaus, The Univ. of New South Wales (Australia)

Tea/Coffee Break . . . . . Mon 10:30 to 11:00

SESSION 1
LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . MON 11:00 TO 12:30

Special Session on Photonic Crystals and Applications
Session Chair: **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

11:00: **Photonic crystal light trapping: the key to breaking photovoltaic efficiency barriers** *(Invited Paper)*, Sajeev John, Univ. of Toronto (Canada). . . . . [11201-1]

11:30: **Femtosecond laser 3D nanoprinting for functional devices** *(Invited Paper)*, Hong-Bo Sun, Bing Han, Tsinghua Univ. (China) . . . . . [11201-2]

12:00: **Graphene on silicon-nitride photodetection**, Tania Moein, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Darius Gailevicius, Vilnius Univ. (Lithuania); Tomas Katkus, Soon Hock Ng, Stefan Lundgaard, Swinburne Univ. of Technology (Australia); Simonas Varapnickas, Swinburne Univ. of Technology (Lithuania); David J. Moss, Swinburne Univ. of Technology (Australia); Hamza Kurt, TOBB ETÜ (Turkey); Vygantas Mizeikis, Shizuoka Univ. (Japan); Kestutis Staliunas, Univ. Politècnica de Catalunya (Spain) and Institucio Catalana de Recerca i Estudis Avancats (ICREA) (Spain); Mangirdas Malinauskas, Vilnius Univ. (Lithuania) and Tokyo Institute of Technology (Japan). . . . . [11201-3]

12:15: **Ablation control by applying magnetic and electric fields**, Jovan Maksimovic, Tomas Katkus, Soon Hock Ng, Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia). . . . . [11201-4]

Lunch Break . . . . . Mon 12:30 to 14:30

SESSION 2
LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . MON 14:30 TO 15:30

Nonlinear Plasmonics and Photonics
Session Chairs: **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia); **Cather Simpson,** The Univ. of Auckland (New Zealand)

14:30: **Nonlinear plasmonics of NLO polymer/Au nanoparticle hybrid systems** *(Invited Paper)*, A. Sugita, T. Makiyama, R. Aoshima, A. Ono, W. Inami, Y. Kawata, Shizuoka Univ. (Japan). . . . . [11201-5]

15:00: **Frequency mixing in nonlinear interaction of one-way edge-modes of topological photonic crystals**, Zhihao Lan, Jian Wei You, Nicolae C. Panoiu, Univ. College London (United Kingdom) . . . . . [11201-6]

15:15: **Laser-induced reversible graphenes**, Litty V. Thekkekara, RMIT Univ. (Australia); Zibo Cai, Daniel Lai, Victoria Univ. (Australia); Ivan Cole, RMIT Univ. (Australia) . . . . . [11201-7]

Tea/Coffee Break . . . . . Mon 15:30 to 16:00

SESSION 3
LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . MON 16:00 TO 17:45

Metasurfaces I
Session Chair: **James W. M. Chon,** Swinburne Univ. of Technology (Australia)

16:00: **Mid infrared metasurfaces for photo-thermal energy conversion** *(Invited Paper)*, Yoshiaki Nishijima, Naoki To, Takuhiro Kumagai, Yokohama National Univ. (Japan). . . . . [11201-8]

16:30: **Engineering nanoscale assemblies with ultra-high spatial resolutions for plasmonic biosensing** *(Invited Paper)*, Sivashankar Krishnamoorthy, Luxembourg Institute of Science and Technology (Luxembourg) . . . . . [11201-44]

17:00: **A simple and robust surface integral method to model light and matter interactions** *(Invited Paper)*, Qiang Sun, RMIT Univ. (Australia); Evert Klaseboer, A*STAR Institute of High Performance Computing (Singapore); Alex Yuffa, National Institute of Standards and Technology (United States); Derek Y. C. Chan, The Univ. of Melbourne (Australia) and Swinburne Univ. of Technology (Australia) . . . . . [11201-10]

17:30: **Nonlinear response of surface plasmon polaritons: a systematic comparison with new insights**, Gordon Han Ying Li, Alessandro Tuniz, C. Martijn de Sterke, The Univ. of Sydney (Australia) . . . . . [11201-11]

CONFERENCE 11201

POSTERS-MONDAY

LOCATION: BLDG 14.MEDIA PORTAL . . . . . .MON 18:00 TO 19:30

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.

Curcumin-nanodiamond-silk wound dressings for sensing infection, Amanda N. Abraham, Asma Khalid, RMIT Univ. (Australia); Huu Khuong Duy Nguyen, Denver P. Linklater, Swinburne Univ. of Technology (Australia); Elena Ivanova, Sarah J. Spencer, Brant C. Gibson, RMIT Univ. (Australia) . . [11201-36]

Machine learning in the optimization of laser-induced graphene energy storages, Litty V. Thekkekara, Jeffery Chan, RMIT Univ. (Australia) . [11201-48]

Nonlinear imaging through magnetic dipole quasi-BIC ultra-thin resonators, Lei Xu, The Univ. of New South Wales (Australia); Khosro Zangeneh Kamali, The Australian National Univ. (Australia); Lujun Huang, The Univ. of New South Wales (Australia); Mohsen Rahmani, The Australian National Univ. (Australia); Alexander Smirnov, Institute of Applied Physics (Russian Federation); Rocio Camacho-Morales, The Australian National Univ. (Australia); Yixuan Ma, Guoquan Zhang, Nankai Univ. (China); Matt Woolley, The Univ. of New South Wales (Australia); Dragomir N. Neshev, The Australian National Univ. (Australia); Andrey E. Miroshnichenko, The Univ. of New South Wales (Australia) . . . . . [11201-49]

Solid-state light-emitting devices using novel green luminescent material of semiconductive nanoporous ZnMnO, Sejoon Lee, Youngmin Lee, Deuk Young Kim, Woochul Yang, Dongguk Univ. (Korea, Republic of); Moon-Deock Kim, Chungnam National Univ. (Korea, Republic of) . . . . . [11201-50]

Dielectric function of 2D hole gas on hydrogen terminated diamond surface, Xinxin Peng, La Trobe Univ. (Australia) . . . . . [11201-51]

Antireflective surfaces for astro-photonic applications, Dainel Smith, Nguyen Hoai An Le, Soon Hock Ng, Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia) . . . . . [11201-52]

Enhancement of photocurrent in InGaN/pseudo-AlIGaN multi quantum wells by surface acoustic wave, Byung-Guon Park, Reddeppa Maddaka, Moon-Deock Kim, Chungnam National Univ. (Korea, Republic of); Woo-Chul Yang, Deuk-Young Kim, Sejoon Lee, Dongguk Univ. (Korea, Republic of). . . . . [11201-53]

Black metals, Stefan Lundgaard, Soon Hock Ng, Swinburne Univ. of Technology (Australia); Michael Mazilu, Univ. of St. Andrews (United Kingdom); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) . . . . . [11201-54]

Scalable and consistent fabrication of plasmonic colors via nanoimprint lithography, M. Faris Shahin Shahidan, Jingchao Song, The Univ. of Melbourne (Australia); Timothy D. James, Reserve Bank of Australia (Australia); Paul Mulvaney, Ann Roberts, The Univ. of Melbourne (Australia) . . . . . [11201-55]

Large-area mask patterning for solar cell applications, Jingwen Hu, Jovan Maksimovic, Soon Hock Ng, Stefan Lundgaard, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Yoshiaki Nishijima, Yokohama National Univ. (Japan); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia) and Yokohama National Univ. (Japan) . . . . . [11201-56]

Design and optimization of broadband and transparent SERS based on transformation optics, Mohammadrahim Kazemzadeh, Neil Broderick, Weiliang Xu, Kamran Zargar Shoshtari, The Univ. of Auckland (New Zealand) . . . . . [11201-57]

Ultraviolet light emitting diode lamp for color perception research, Charitha Weerasuriya, William Woods, Swinburne Univ. of Technology (Australia); Soon Hock Ng, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Tom Johnstone, Swinburne Univ. of Technology (Australia); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia). . . . . [11201-58]

Formation of micro-groove on diamond by femtosecond laser micromachining, Ryoji Maruyama, Ritsumeikan Univ. (Japan); Takayuki Tamaki, Nara National College of Technology (Japan); Wataru Watanabe, Ritsumeikan Univ. (Japan) . . . . . [11201-59]

ZnO nanorods based random lasers for optical strain gauges applications, Wu Pei-Jung, National Taiwan Normal Univ. (Taiwan) . [11201-60]

Silicon nitride based fluidically tuned photonic crystal for bio-sensing application, Manoranjan Kumar, Shwetha M., Sai Vidya Institute of Technology (India); Poojith Thummala, Deakin Univ. (Australia); Narayan K., Sai Vidya Institute of Technology (India) . . . . . [11201-61]

Strong Kerr nonlinearity in BiOBr nanoflakes, Linnan Jia, Swinburne Univ. of Technology (Australia); Dandan Cui, Beihang Univ. (China); Jiayang Wu, Swinburne Univ. of Technology (Australia); Haifeng Feng, Univ. of Wollongong (Australia); Tieshan Yang, Yunyi Yang, Swinburne Univ. of Technology (Australia); Yi Du, University of Wollongong (Australia); Weichang Hao, Beihang Univ. (China); Baohua Jia, David J. Moss, Swinburne Univ. of Technology (Australia) . . . . . [11201-62]

Deep-subwavelength metamaterial resonators operating at dual frequency regions, Shridhar Manjunath, Mingkai Liu, Vidur Raj, Rifat A. Aoni, The Australian National Univ. (Australia); David A. Powell, UNSW Canberra (Australia); Ilya V. Shadrivov, Mohsen Rahmani, The Australian National Univ. (Australia) . . . . . [11201-63]

Infrared imaging in nonlinear GaAs metasurfaces, Rocio Camacho-Morales, The Australian National Univ. (Australia); Davide Rocco, Univ. degli Studi di Brescia (Italy); Lei Xu, The Univ. of New South Wales (Australia); Mohsen Rahmani, The Australian National Univ. (Australia); Valerio Flavio Gili, Friedrich-Schiller-Univ. Jena (Germany); Andrei Komar, The Australian National Univ. (Australia); Nikolay Dimitrov, Lyubomir Stoyanov, Sofia Univ. "St. Kliment Ohridski" (Bulgaria); Mykhaylo Lysevych, Fouad Karouta, The Australian National Univ. (Australia); Alexander Dreischuh, Sofia Univ. "St. Kliment Ohridski" (Bulgaria); H. Hoe Tan, The Australian National Univ. (Australia); Giuseppe Leo, Lab. Matériaux et Phénomènes Quantiques, Univ. Paris Diderot (France); Costantino De Angelis, Univ. degli Studi di Brescia (Italy); Chennupati Jagadish, The Australian National Univ. (Australia); Andrey E. Miroshnichenko, The Univ. of New South Wales (Australia); Dragomir N. Neshev, The Australian National Univ. (Australia) . . . . . [11201-64]

Silicon-based metasurfaces for vortex beam generation, Raghu Dharmavarapu, Indian Institute of Technology Madras (India) and Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Soon Hock Ng, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Shanti Bhattacharya, Indian Institute of Technology Madras (India); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia). . . . . [11201-65]

Black phosphorus-molybdenum disulfide nanoparticle hybrid photodetector, Jingyuan Jia, Dalian Univ. of Technology (China) . . . [11201-66]

Optical frequency comb by giant nonlinear capillary waves, Ivan S. Maksymov, Andrey Pototsky, Swinburne Univ. of Technology (Australia); Andrew D. Greentree, RMIT Univ. (Australia) . . . . . [11201-67]

Measuring absorption coefficient of excised animal skin exposed to THz radiation, Alireza Lajevardipour, Zoltan Vilagosh, Andrew W. Wood, Swinburne Univ. of Technology (Australia) and Australian Ctr. for Electromagnetic Bioeffects Research (Australia) . . . . . [11201-68]

Non-linear absorption coefficient measurement of thin films by Z-scan in near- and mid-infrared range, Stuart J. Flanders, James W. M. Chon, Swinburne Univ. of Technology (Australia) . . . . . [11201-69]

Uptake study of gold nanoparticles into cancer cells using high-order image correlation spectroscopy, Delaram Katoozi, James W. M. Chon, Swinburne Univ. of Technology (Australia) . . . . . [11201-70]

Towards a deep submicron CMOS image sensor on a standard FDSOI process, Paul Beckett, RMIT Univ. (Australia); Ranjith Rajasekharan Unnithan, The Univ. of Melbourne (Australia). . . . . [11201-71]

TUESDAY 10 DECEMBER

TUESDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . TUE 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **New perspectives for biomedical imaging at depth** *(Plenary)*, Kishan Dholakia, Univ. of St. Andrews (United Kingdom)

9:45: **Harnessing disorder for photonic applications** (Plenary) Hui Cao, Yale Univ. (United States)

Tea/Coffee Break . . . . . .Tue 10:30 to 11:00

SESSION 4

LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . .TUE 11:00 TO 12:30

Metasurfaces II

Session Chairs: **Cather Simpson,** The Univ. of Auckland (New Zealand); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

11:00: **Beyond photovoltaics: the nano-rectenna approach** *(Invited Paper)*, Remo Proietti Zaccaria, Istituto Italiano di Tecnologia (Italy) and Cixi Institute of BioMedical Engineering, Chinese Academy of Sciences (China); Joao Cunha, Cixi Institute of BioMedical Engineering, CNITECH, CAS (China) . . . . [11201-12]

11:30: **Plasmonic metasurfaces for optical information processing**, L. Wesemann, E. Panchenko, K. Singh, The Univ. of Melbourne (Australia); D. E. Gomez, RMIT Univ. (Australia); T. J. Davis, A. Roberts, The Univ. of Melbourne (Australia) . . . . . [11201-13]

11:45: **Photon-pair generation via bound states in the continuum in nonlinear metasurfaces**, Matthew Parry, Yifei Xing, The Australian National Univ. (Australia); Lei Xu, The Univ. of New South Wales (Australia); Alexander Poddubny, The Australian National Univ. (Russian Federation) and Ioffe Physical-Technical Institute (Australia); Dragomir N. Neshev, Andrey A. Sukhorukov, The Australian National Univ. (Australia). . . . . [11201-14]

12:00: **Nonresonant ENZ metamaterial at visible wavelength for superior refractive index matching sensing**, Zelio Fusco, Mahdiar Taheri, Mohsen Rahmani, Dragomir N. Neshev, Thomas White, Antonio Tricoli, The Australian National Univ. (Australia). . . . . [11201-15]

12:15: **Dielectric metasurface based advanced image processing**, Andrei Komar, Rifat A. Aoni, The Australian National Univ. (Australia); Lei Xu, The Univ. of New South Wales (Australia); Mohsen Rahmani, The Australian National Univ. (Australia); Andrey E. Miroshnichenko, The Univ. of New South Wales (Australia); Dragomir N. Neshev, The Australian National Univ. (Australia) . . . . . [11201-16]

LUNCH BREAK AND TUESDAY EQUITY, DIVERSITY, AND INCLUSION (EDI) WORKSHOP

LOCATION: BLDG 8.KALEIDE . . . . . 12:30 TO 14:00

Details about the workshop will be posted online. All interested attendees will pick up lunch in Bldg 14.Media Portal to take to the workshop located in Bldg 8.Kaleide.

SESSION 5

LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . .TUE 14:15 TO 15:30

2D Materials

Session Chairs: **Cather Simpson,** The Univ. of Auckland (New Zealand); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

14:15: **Second harmonic generation from multilayer hexagonal boron nitride**, Sejeong Kim, Johannes E. Fröch, Augustine Gardner, Chi Li, Igor Aharonovich, Alexander S. Solntsev, Univ. of Technology, Sydney (Australia) . . . . . [11201-17]

14:30: **Engineering and application of quantum emitters in hexagonal boron nitride**, M. Kianinia, Univ. of Technology, Sydney (Australia). . [11201-19]

14:45: **Tuning the properties of flash-reduced graphene oxide electrodes for supercapacitor applications**, Shao Ing Wong, Han Lin, Swinburne Univ. of Technology (Australia); Jaka Sunarso, Basil T. Wong, Swinburne Univ. of Technology Sarawak Campus (Malaysia); Baohua Jia, Swinburne Univ. of Technology (Australia) . . . . . [11201-20]

15:00: **Optomechanical tension and crumpling of 2D semiconductors**, Alexander V. Poshakinskiy, Ivan D. Avdeev, Alexander N. Poddubny, Ioffe Institute (Russian Federation) . . . . . [11201-21]

15:15: **Electronic and optical properties of Dirac semimetals in InAs/GaInSb superlattice nanostructures**, Mikhail Patrashin, Norihiko Sekine, Kouichi Akahane, Akifumi Kasamatsu, Iwao Hosako, National Institute of Information and Communications Technology (Japan) . . . [11201-22]

Tea/Coffee Break . . . . . .Tue 15:30 to 16:00

SESSION 6

LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . .TUE 16:00 TO 17:30

Solar Cell Technologies

Session Chairs: **Cather Simpson,** The Univ. of Auckland (New Zealand); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

16:00: **Development of plasmonic photocatalysts for inactivation of microorganisms and decomposition of organic compounds** *(Invited Paper)*, Ewa Kowalska, Hokkaido Univ. (Japan). . . . . [11201-23]

16:30: **Utilizing fluorescence-lifetime imaging spectroscopy to monitor light soaking in perovskite solar cells**, Thi Hai Yen Vu, Weijian Chen, Xiaofan Deng, Cho Fai Jonathan Lau, Baohua Jia, Xiaoming Wen, Swinburne Univ. of Technology (Australia). . . . . [11201-24]

16:45: **Tuning the florescence color of gradient bandgap perovskite nanoplate by direct laser writing**, Chunhua Zhou, Guiyuan Cao, Swinburne Univ. of Technology (Australia); Zhixing Gan, Nanjing Normal Univ. (China); Qingdong Ou, Qiaoliang Bao, Monash Univ. (Australia); Baohua Jia, Xiaoming Wen, Swinburne Univ. of Technology (Australia). . . . . [11201-25]

17:00: **Estimation of refractive index profiles of vertically aligned disordered silicon nanowires for photon management applications**, Sudhir Kumar Saini, Rajesh V. Nair, Indian Institute of Technology Ropar (India). . . . . [11201-26]

17:15: **Light soak study of perovskite-based materials via scanning imaging spectroscopy**, Weijian Chen, Yến Vũ, Chunhua Zhou, Baohua Jia, Xiaoming Wen, Swinburne Univ. of Technology (Australia) . . . . . [11201-27]

CONFERENCE BANQUET DINNER

LOCATION: SEA LIFE MELBOURNE AQUARIUM . . . . . 18:30 TO 22:00

All registered attendees are invited to attend. Additional guest tickets can be purchased onsite through Monday, if space is available.

WEDNESDAY 11 DECEMBER

WEDNESDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . WED 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **The James Webb Space Telescope** *(Plenary)*
Gillian S. Wright, UK Astronomy Technology Ctr. (United Kingdom)

9:45: **Subwavelength integrated photonics** *(Plenary)*
Pavel Cheben, National Research Council Canada (Canada)

Tea/Coffee Break . . . . . Wed 10:30 to 11:00

SESSION 7

LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . WED 11:00 TO 12:30

Direct Laser Writing I

Session Chairs: **Cather Simpson,** The Univ. of Auckland (New Zealand); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

11:00: **Femtosecond laser writing of metallic nanostructures using silver photo-reduction** *(Invited Paper)*, Atsushi Ono, Seiya Toriyama, Vygantas Mizeikis, Shizuoka Univ. (Japan) . . . . . [11201-28]

11:30: **Tightly-focused femtosecond laser interaction with water** *(Invited Paper)*, Koji Hatanaka, Academia Sinica (Taiwan) and Chang Gung Univ. (Taiwan) and National Dong-Hwa Univ. (Taiwan) . . . . . [11201-29]

12:00: **Response of natural muscovite to a single femtosecond laser pulse**, Saurabh Awasthi, Douglas J. Little, Alex Fuerbach, Macquarie Univ. (Australia); Chris Marjo, Bill Gong, The Univ. of New South Wales (Australia); Deb M. Kane, Macquarie Univ. (Australia) . . . . . [11201-30]

12:15: **Direct femtosecond laser writing of low-loss waveguides in chalcogenide glasses for mid-infrared applications**, D. Le Coq, J. Carcreff, Univ. de Rennes 1 (France); P. Masselin, Univ. du Littoral Côte d'Opale (France) . . . . . [11201-31]

LUNCH BREAK AND WEDNESDAY EQUITY, DIVERSITY, AND INCLUSION (EDI) WORKSHOP

LOCATION: BLDG 8.KALEIDE . . . . . 12:30 TO 14:00

Details about the workshop will be posted online.
All interested attendees will pick up lunch in Bldg 14.Media Portal to take to the workshop located in Bldg 8.Kaleide.

SESSION 8

LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . WED 14:15 TO 15:30

Nanotextured Surfaces and Optical Sensors

Session Chairs: **Cather Simpson,** The Univ. of Auckland (New Zealand); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

14:15: **Hybrid two-dimensional nanostructured hydrogen gas sensors**, Hanie Hashtroudi, Swinburne Univ. of Technology (Australia); Raluca Savub, Univ. Estadual de Campinas (Brazil); Rajesh Kumar, Univ. Estadual de Campinas (Brazil) and Toyohashi Univ. of Technology (Japan); Stanislav A. Moshkalev, Univ. Estadual de Campinas (Brazil); Mahnaz Shafiei, Swinburne Univ. of Technology (Australia) . . . . . [11201-32]

14:30: **Thermal radiation control structure obtained by anisotropic anode etching of Al**, Toshiaki Kondo, Aichi Univ. of Technology (Japan); Takashi Yanagishita, Hideki Masuda, Tokyo Metropolitan Univ. (Japan). . . . . [11201-33]

14:45: **Technology for chip based optical gyroscope**, Muhammad Hassan Iqbal, Stephen Madden, Harry-Dean Kenchington Goldsmith, Choon Kong Lai, The Australian National Univ. (Australia) . . . . . [11201-34]

15:00: **Revisiting high order anapole mode in single dielectric nanostructure with high refractive index**, Lujun Huang, Lei Xu, Andrey Miroshnichenko, The Univ. of New South Wales (Australia) . . [11201-35]

15:15: **Optical metagrating for one-shot polarization measurements**, Shaun Lung, Nicolas R. H. Pedersen, Kai Wang, Khosro Zangeneh Kamali, The Australian National Univ. (Australia); Frank Setzpfandt, Friedrich-Schiller-Univ. Jena (Germany); Andrey A. Sukhorukov, The Australian National Univ. (Australia) . . . . . [11201-37]

Tea/Coffee Break . . . . . Wed 15:30 to 16:00

SESSION 9

LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . WED 16:00 TO 17:30

Direct Laser Writing II

Session Chairs: **Cather Simpson,** The Univ. of Auckland (New Zealand); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

16:00: **Direct laser writing of colour centres in silicon carbide** *(Invited Paper)*, S. Castelletto, RMIT Univ. (Australia); T. Katkus, S. Juodkazis, Swinburne Univ. of Technology (Australia) . . . . . [11201-38]

16:30: **The double-edged sword of femtosecond laser-induced periodic surface structures for sub-diffraction and high-efficient nanotexturing** *(Invited Paper)*, Lei Wang, Zhen-Ze Li, Hua Fan, Yan-Hao Yu, Qi-Dai Chen, Jilin Univ. (China); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Hong-Bo Sun, Tsinghua Univ. (China) . . . . . [11201-39]

17:00: **Femtosecond laser fabrication of hybrid optical element in glass: volume grating embedded inside refractive lens**, Wataru Watanabe, Seiya Terai, Ritsumeikan Univ. (Japan) . . . . . [11201-40]

17:15: **Evolution of femtosecond laser-induced periodic structures: from nanoholes to regular structures**, Zhen-Ze Li, Lei Wang, Hua Fan, Yan-Hao Yu, Qi-Dai Chen, Jilin Univ. (China); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Hong-Bo Sun, Tsinghua Univ. (China). . . . . [11201-41]

THURSDAY 12 DECEMBER

THURSDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . THU 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **MAVIS: beyond HST resolution and sensitivity** *(Plenary)*, François Rigaut, The Australian National Univ. (Australia)

9:45: **From nanotech to living sensors: unraveling the spin physics of biosensing at the nanoscale** *(Plenary)*, Clarice Aiello, Univ. of California, Los Angeles (United States)

CONFERENCE AWARDS

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . 10:30 TO 10:45

Tea/Coffee Break . . . . . Thu 10:45 to 11:15

SESSION 10

LOCATION: BLDG 80.LEVEL 4.RM 06 . . . . . THU 11:15 TO 12:30

Biosensing

Session Chairs: **Cather Simpson,** The Univ. of Auckland (New Zealand); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia)

11:15: **Towards an active micropump-mixer for rapid anti-platelet drug screening in whole blood**, Crispin Szydzik, Monash Univ. (Australia) and RMIT Univ. (Australia); Rose J. Brazilek, Monash Univ. (Australia); Farzan Akbaridoust, RMIT Univ. (Australia) and The Univ. of Melbourne (Australia); Charitha de Silva, The Univ. of Melbourne (Australia) and The Univ. of New South Wales (Australia); Mitchell Moon, Monash Univ. (Australia); Ivan Marusic, The Univ. of Melbourne (Australia); Harshal H. Nandurkar, Justin R. Hamilton, Monash Univ. (Australia); Arnan Mitchell, RMIT Univ. (Australia); Warwick S. Nesbitt, Monash Univ. (Australia) and RMIT Univ. (Australia) . . . . . [11201-42]

11:30: **Pneumatic conveying aided inkjet printing (PCAIJP) for bioprinting**, Yanzhen Zhang, Swinburne Univ. of Technology (Australia); Dege Li, Yonghong Liu, China Univ. of Petroleum (China); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) . . . . . [11201-43]

11:45: **An optical fiber microprobe for surface-enhanced Raman scattering sensing with enhanced signal-to-background ratio**, Md Abdullah Al Mamun, Tomas Katkus, Saulius Juodkazis, Paul R. Stoddart, Swinburne Univ. of Technology (Australia) . . . . . [11201-45]

12:00: **Plasmonic tweezers based on connected nanoring apertures**, Xue Han, Dalian Univ. of Technology (China); Viet Giang Truong, Síle Nic Chormaic, Okinawa Institute of Science and Technology Graduate Univ. (Japan). . . . . [11201-46]

12:15: **Ultrasensitive biosensing based on plasmonic nanostructures**, P. Venugopalan, New York Univ. Abu Dhabi (United Arab Emirates); N.S. Susan Mousavi, New York Univ. (United States) and Institute for Research in Fundamental Sciences (Iran, Islamic Republic of); A. Dabirian, Institute for Research in Fundamental Sciences (Iran, Islamic Republic of); S. Kumar, New York Univ. Abu Dhabi (United Arab Emirates) and New York Univ. (United States) . . . . . [11201-47]

Lunch Break . . . . . Thu 12:30 to 14:00

NOTE: No lunch provided on Thursday - open time for attendees to explore local restaurants and area.

AUSTRALIAN PHOTONICS INDUSTRY SURVEY

LOCATION: BLDG 8.KALEIDE . . . . . 14:00 TO 15:30

The Australian Optical Society and SPIE recently commissioned a survey of the photonics industry in Australia. The key findings in that national survey will be presented at this session. The speakers will also offer comparative insights into the international photonics marketplace, and provide context for start-ups and existing businesses in both New Zealand and Australia.

CONFERENCE 11202
LOCATION: BLDG 80.LEVEL 4.RM 11

Monday–Thursday 9–12 December 2019 • Proceedings of SPIE Vol. 11202

Biophotonics Australasia 2019

Conference Chairs: **Ewa M. Goldys,** The Univ. of New South Wales (Australia); **Brant C. Gibson,** RMIT Univ. (Australia)

MONDAY 9 DECEMBER

MONDAY PLENARY SESSION
LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . MON 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **Metaphotonics with resonant dielectric structures** *(Plenary)*
Yuri S. Kivshar, The Australian National Univ. (Australia)

9:45: **Single molecule imaging of T cell receptor signaling** *(Plenary)*
Katharina Gaus, The Univ. of New South Wales (Australia)

Tea/Coffee Break . . . . . Mon 10:30 to 11:00

SESSION 1
LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . MON 11:00 TO 12:30

Biomedical Imaging I
Session Chair: **Jared M. Campbell,**
The Univ. of New South Wales (Australia)

11:00: **Applications for compressed ultrafast photography to biological imaging and sensing**, Joel N. Bixler, Air Force Research Lab. (United States) . . . . . [11202-2]

11:15: **Ocular surface squamous neoplasia detection using non-invasive multispectral autofluorescence imaging**, Abbas Habibalahi Sr., The Univ. of New South Wales (Australia); Chandra Bala, Macquarie Univ. (Australia); Alexandra Allende, Douglass Hanly Moir Pathology (Australia); Ayad G. Anwer, Ewa M. Goldys, The Univ. of New South Wales (Australia). . . . . [11202-3]

11:30: **Unexpectedly low phenotypic plasticity in the actin cytoskeleton revealed by unbiased chemical perturbation** *(Invited Paper)*, John Lock, The Univ. of New South Wales (Australia). . . . . [11202-4]

12:00: **In toto label free method for quantitative bioimaging**, Yujie Zheng, Woei Ming Lee, The Australian National Univ. (Australia). . . . . [11202-46]

12:15: **Speckle noise reduction in digital holographic microscopy via supervised machine learning**, Zhiduo Zhang, Steve Lee, Lexing Xie, Alexander Mathews, Xuefei He, The Australian National Univ. (Australia) . . . . . [11202-48]

Lunch Break . . . . . Mon 12:30 to 14:00

SESSION 2
LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . MON 14:00 TO 15:30

Biomedically Relevant Light Sources and Nanomaterials I
Session Chair: **Philipp Reineck,** RMIT Univ. (Australia)

14:00: **Biodegradable containers for drug delivery to tumours based on the enhanced vessel adherence** *(Invited Paper)*, Andrei V. Zvyagin, Macquarie Univ. (Australia). . . . . [11202-5]

14:30: **Hybrid plasmonic-semiconducting fractal metamaterials for superior sensing of volatile compounds**, Zelio Fusco, Mohsen Rahmani, The Australian National Univ. (Australia); Nunzio Motta, Queensland Univ. of Technology (Australia); Mikael Kall, Chalmers Univ. of Technology (Sweden); Dragomir Neshev, Antonio Tricoli, The Australian National Univ. (Australia) . . . . . [11202-6]

14:45: **Interrogation of photonic biosensors using optical frequency combs**, Markus Knoerzer, RMIT Univ. (Australia); Crispin Szydzik, Australian Ctr. for Blood Diseases (Australia); Guanghui Ren, Cesar S. Huertas, Sonya Palmer, RMIT Univ. (Australia); Phuong Tang, RMIT Univ. Vietnam (Australia); Thach G. Nguyen, RMIT Univ. (Australia); Lam Bui, Central Queensland Univ. (Australia); Andreas Boes, Arnan Mitchell, RMIT Univ. (Australia) . . . . . [11202-7]

15:00: **Modelling of heat transfer in a laser irradiated eye retina**, Linh T. Truong, Peter Lesniewski, Timothy J. Dixon, Bruce A. Wedding, Univ. of South Australia (Australia) . . . . . [11202-8]

15:15: **Highly parallelized optical coherence tomography for ocular metrology and imaging**, Trevor B. Anderson, Cylite Pty Ltd. (Australia) . . . . . [11202-9]

Tea/Coffee Break . . . . . Mon 15:30 to 16:00

SESSION 3
LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . MON 16:00 TO 17:30

Fibre-optic Sensing and Imaging I
Session Chair: **Roman Kostecki,**
Institute for Photonics and Advanced Sensing (Australia)

16:00: **Teaching optical systems by example** *(Invited Paper)*, Demetri Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland). . . . . [11202-10]

16:30: **High precision pH measurements in biological environments using a portable optical fibre pH sensor**, Georgina Maree Sylvia, Erik P. Schartner, Hanna J. McLennan, Avishkar Saini, Kylie R. Dunning, Malcolm S. Purdey, Andrew D. Abell, Jeremy G. Thompson, The Univ. of Adelaide (Australia) . . . . . [11202-11]

16:45: **Chemical sensing based on silk coated exposed-core fibers**, Lu Peng, The Univ. of Adelaide (Australia); Asma Khalid, RMIT Univ. (Australia); Stephen C. Warren-Smith, Azim Arman, Erik P. Schartner, Georgina Maree Sylvia, Mark R. Hutchinson, Heike Ebendorff-Heidepriem, Robert A. McLaughlin, The Univ. of Adelaide (Australia); Brant C. Gibson, RMIT Univ. (Australia); Jiawen Li, The Univ. of Adelaide (Australia) . . . . . [11202-12]

17:00: **Optical elastography: imaging the micro-mechanical properties of tissue** *(Invited Paper)*, Brendan F. Kennedy, Harry Perkins Institute of Medical Research (Australia) . . . . . [11202-13]

POSTERS-MONDAY

LOCATION: BLDG 14.MEDIA PORTAL . . . . . MON 18:00 TO 19:30

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.

Software package for off-axis digital holographic microscopy imaging processing, Tienan Xu, Xuefei He, Zhiduo Zhang, Samantha Montague, Elizabeth Gardiner, Woie Ming Lee, The Australian National Univ. (Australia) . . . . . [11202-47]

Structured Back Focal Plane Interferometry (S-BFPI), Avinash Upadhya, Yujie Zheng, The Australian National Univ. (Australia); Li Li, The State Key Lab. of Optoelectronic Materials and Technologies, Sun Yat-Sen Univ. (China); Woei Ming Lee, The Australian National Univ. (Australia). . . . . [11202-49]

Real-time adaptive optics for laser scanning microscope, Yongxiao Li, The Australian National Univ. (Australia). . . . . [11202-50]

A highly sensitive opto-mechanical ultrasound sensor based on a novel photonic waveguide, Md. Mahmud-Ul-Hasan, Wouter J. Westerveld, Xavier Rottenberg, Simone Severi, Veronique Rochus, IMEC (Belgium) . . . . . [11202-51]

Exploring the temperature dependent dielectric properties of adipose tissue in the THz range, Zoltan Vilagosh, Alireza Lajevardipour, Andrew W. Wood, Swinburne Univ. of Technology (Australia) . . . . . [11202-52]

Optical imaging of organic pollutants: real time detection and identification, Farah Qazi, The Univ. of Melbourne (Australia); Esmaeil Shahsavari, RMIT Univ. (Australia); Steven Prawer, The Univ. of Melbourne (Australia); Andy Ball, RMIT Univ. (Australia); Snjezana Tomljenovic-Hanic, The Univ. of Melbourne (Australia) . . . . . [11202-53]

Upright aNd Inverted polygon microscope (UNI-SCOPE), Tao Xu, The Australian National Univ. (Australia). . . . . [11202-54]

Towards bi-directional electro-optic neuronal interfaces, Han Wang, The Univ. of New South Wales (Australia). . . . . [11202-55]

Optically measuring nerve activity based on an electro-optical detection system, Yuan Wei, The Univ. of New South Wales (Australia) . . . . . [11202-56]

New perspectives for biomedical imaging at depth, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) . . . . . [11202-57]

Higher order correlation scaling for optical super-resolution imaging: implications of photon counting and quantum imaging for practical nanoscopy, Joshua Gray, Josef G. Worboys, Daniel W. Drumm, Shuo Li, Andrew D. Greentree, RMIT Univ. (Australia) . . . . . [11202-59]

Quantum diffraction unlimited protocol for single-photon fluorophores, Josef G. Worboys, RMIT Univ. (Australia); Daniel W. Drumm, RMIT Univ (Australia); Andrew D. Greentree, RMIT Univ. (Australia) . . . . . [11202-60]

The effect of nitrogen concentration on quantum sensing with nitrogen-vacancy centres, Marco Capelli, ARC Ctr. of Excellence for Nanoscale Biophotonics, RMIT Univ. (Australia); Hiroshi Abe, Takeshi Ohshima, National Institutes for Quantum and Radiological Science and Technology (Japan); Brett C. Johnson, David A. Simpson, The Univ. of Melbourne (Australia); Jan Jeske, Fraunhofer-Institut für Angewandte Festkörperphysik IAF (Germany); Andrew D. Greentree, Philipp Reineck, Brant C. Gibson, ARC Ctr. of Excellence for Nanoscale BioPhotonics, RMIT Univ. (Australia). . . . . [11202-61]

Bright upconversion nanoparticles under light-emitting diode excitation, Yueying Cao, Xianlin Zheng, James A. Piper, Nicolle H. Packer, Yiqing Lu, ARC Ctr. of Excellence for Nanoscale BioPhotonics (Australia) and Macquarie Univ. (Australia) . . . . . [11202-62]

Optimisation of plasmonic nanohole array sensor for enhance sensitivity in cancer detection, Mansoor Ali Khan, The Univ. of New South Wales (Australia) . . . . . [11202-322]

TUESDAY 10 DECEMBER

TUESDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . TUE 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **New perspectives for biomedical imaging at depth** *(Plenary)*, Kishan Dholakia, Univ. of St. Andrews (United Kingdom)

9:45: **Harnessing disorder for photonic applications** (Plenary) Hui Cao, Yale Univ. (United States)

Tea/Coffee Break . . . . . .Tue 10:30 to 11:00

SESSION 4

LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . .TUE 11:00 TO 12:30

Biomedically Relevant Light Sources and Nanomaterials II

Session Chair: **Wei Deng,** Macquarie Univ. (Australia)

11:00: **The future of brain health needs convergent and translational biophotonics: are you looking in the right places?** *(Invited Paper)*, Mark R. Hutchinson, The Univ. of Adelaide (Australia) and Australian Research Council Centre of Excellence for Nanoscale BioPhotonics (Australia) [11202-14]

11:30: **Multicolor fluorescent nanodiamonds for bioimaging**, Philipp Reineck, Amanda Abraham, RMIT Univ. (Australia); Nicholas Nunn, Marco Torelli, Adámas Nanotechnologies, Inc. (United States); Alexander Zaitsev, College of Staten Island (United States); Adam Dalis, Hyperion Materials & Technologies (United States); Neeraj Prabhakar, Åbo Akademi Univ. (Finland); Olga Shenderova, Adámas Nanotechnologies, Inc. (United States); Brant C. Gibson, RMIT Univ. (Australia) . . . . . [11202-15]

11:45: **Targeted drug delivery with PLGA nanoparticles for x-ray activated photodynamic therapy**, Sandhya Clement, The Univ. of New South Wales (Australia); Layla Pires, Univ. Health Network (Canada); Ayad G. Anwer, Wei Deng, The Univ. of New South Wales (Australia); Brian Wilson, Univ. of Toronto, Univ. Health Network (Canada); Ewa M. Goldys, The Univ. of New South Wales (Australia) . . . . . [11202-16]

12:00: **Computational and experimental evaluation of the mechanism of infrared neural inhibition** *(Invited Paper)*, E. Duco Jansen, Mohit Ganguly, Jeremy B Ford, Vanderbilt Univ (United States); Junqi Zhuo, Michael W Jenkins, Hillel J Chiel, Case Western Reserve University (United States) . . . . . [11202-17]

LUNCH BREAK AND TUESDAY EQUITY, DIVERSITY, AND INCLUSION (EDI) WORKSHOP

LOCATION: BLDG 8.KALEIDE . . . . . 12:00 TO 14:00

Details about the workshop will be posted online.
All interested attendees will pick up lunch in Bldg 14.Media Portal to take to the workshop located in Bldg 8.Kaleide.

CONFERENCE 11202

SESSION 5

LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . .TUE 14:15 TO 15:30

Biomedical Imaging II

Session Chair: **Asma Khalid,** RMIT Univ. (Australia)

14:15: **Investigating malaria cell biology using correlative super-resolution and electron microscopy** *(Invited Paper)*, Oliver Looker, The Univ. of Melbourne (Australia) and The Univ. of New South Wales (Australia); Adam Blanch, Boyin Liu, The Univ. of Melbourne (Australia); Juan Nunez-Iglesias, Monash Univ. (Australia); Paul J McMillan, University of Melbourne (Australia); Matthew Dixon, Leann M. Tilley, The Univ. of Melbourne (Australia) . . [11202-18]

14:45: **Multispectral microscopy of autofluorescence for the non-destructive, label free identification of cell cycle phase in cancer cells**, Jared M. Campbell, The Univ. of New South Wales (Australia); Abbas Habibalahi Sr., The Univ. of New South Wales (Australia); Saabah Mahbub, The Univ. of New South Wales (Australia); Martin E. Gosnell, The Univ. of New South Wales (Australia) and Quantitative Pty Ltd. (Australia); Ayad G. Anwer, The Univ. of New South Wales (Australia); Sharon Paton, The Univ. of Adelaide, Adelaide Medical School (Australia) and South Australian Health & Medical Research Institute (Australia); Stan Gronthos, The Univ. of Adelaide, Adelaide Medical School (Australia) and South Australian Health and Medical Research Institute (Australia); Ewa M. Goldys, The Univ. of New South Wales (Australia) . . . . . [11202-19]

15:00: **Optical tools box for structural and functional assessment of murine embryonic development** *(Invited Paper)*, Kirill V. Larin, Univ. of Houston (United States) . . . . . [11202-21]

Tea/Coffee Break . . . . . .Tue 15:30 to 16:00

SESSION 6

LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . .TUE 16:00 TO 17:30

Light-based Biosensing II

Session Chair: **Sandhya Clement,** The Univ. of New South Wales (Australia)

16:00: **An activity-based fluorogen for quantifying intracellular polarity of protein environment** *(Invited Paper)*, Yuning Hong, La Trobe Univ. (Australia); Tze Cin Owyong, Wallace W. H. Wong, The Univ. of Melbourne (Australia) . . . . . [11202-22]

16:30: **Optical fiber based in-vivo oxidative stress biosensor**, Roman Kostecki, ARC Ctr. of Excellence for Nanoscale BioPhotonics, The Univ. of Adelaide (Australia); Bin Zhang, Joint Dept. of Biomedical Engineering, The Univ. of North Carolina at Chapel Hill & North Carolina State Univ. (United States); Abdeljalil El Habti, ARC Industrial Transformation Research Hub, The Univ. of Adelaide (Australia); Azim Arman, Mark R. Hutchinson, ARC Ctr. of Excellence for Nanoscale BioPhotonics, The Univ. of Adelaide (Australia); Penny Tricker, Delphine Fleury, ARC Industrial Transformation Research Hub, The Univ. of Adelaide (Australia); Roger J. Narayan, Joint Dept. of Biomedical Engineering, The Univ. of North Carolina & North Carolina State Univ. (United States); Heike Ebendorff-Heidepriem, ARC Ctr. of Excellence for Nanoscale BioPhotonics, The Univ. of Adelaide (Australia) . . . . . [11202-23]

16:45: **Nitrogen vacancy centres in diamond for laser threshold magnetometry**, Zahraa Al-Baiaty, RMIT Univ. (Australia); Felix Hahl, Fraunhofer-Institut für Angewandte Festkörperphysik IAF (Germany); Sarath Nair, Lachlan Rogers, Macquarie Univ. (Australia); Brant C. Gibson, RMIT Univ. (Australia); Rich Mildren, Thomas Volz, Macquarie Univ. (Australia); Jan Jeske, Fraunhofer-Institut für Angewandte Festkörperphysik IAF (Germany); Andrew D. Greentree, RMIT Univ. (Australia) . . . . . [11202-24]

17:00: **Visualizations and direct measurements of local absorption coefficients of single bilayer phospholipid membranes using scanning near-field optical microscopy**, Arif M. Siddiquee, La Trobe Univ. (Australia) . . . . . [11202-25]

17:15: **Understanding the input-output transfer function of cortical neurons**, Vincent R. Daria, Michael Castanares, The Australian National Univ. (Australia) . . . . . [11202-26]

CONFERENCE BANQUET DINNER

LOCATION: SEA LIFE MELBOURNE AQUARIUM . . . . . 18:30 TO 22:00

All registered attendees are invited to attend. Additional guest tickets can be purchased onsite through Monday, if space is available.

WEDNESDAY 11 DECEMBER

WEDNESDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . WED 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **The James Webb Space Telescope** *(Plenary)*
Gillian S. Wright, UK Astronomy Technology Ctr. (United Kingdom)

9:45: **Subwavelength integrated photonics** *(Plenary)*
Pavel Cheben, National Research Council Canada (Canada)

Tea/Coffee Break . . . . . Wed 10:30 to 11:00

SESSION 7

LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . WED 11:00 TO 12:30

Light-based Biosensing III

Session Chair: **Saabah B. Mahbub,**
The Univ. of New South Wales (Australia)

11:00: **Engineering of plasmoinc nanomaterials for SERS-based liquid biopsy applications** *(Invited Paper)*, Yuling Wang, Macquarie Univ. (Australia) . . . . . [11202-27]

11:30: **Quantitative biosensing by surface-enhanced Raman scattering**, Md Abdullah Al Mamun, Nerida A. Cole, Saulius Juodkazis, Paul R. Stoddart, Swinburne Univ. of Technology (Australia) . . . . . [11202-28]

11:45: **Non-invasive assessment of meat freshness utilizing visible to near-infrared spectroscopy**, Motahareh Peyvasteh, Alexey Popov, Alexander Bykov, Univ. of Oulu (Finland); Igor V. Meglinski, Univ. of Oulu (Finland) and Aston Univ. (United Kingdom) . . . . . [11202-29]

12:00: **Discovery of a robust optical fibre pH sensor based using polymer microarrays**, Jingjing Gong, Seshasailam Venkateswaran, The Univ. of Edinburgh (United Kingdom); Michael G Tanner, Heriot-Watt University (United Kingdom); James M Stone, University of Bath (United Kingdom); Mark Bradley, The Univ. of Edinburgh (United Kingdom) . . . . . [11202-30]

12:15: **Cardiac troponin detection using silicon photonic biosensor for the accurate and timely diagnosis and prognosis of acute myocardial infarction**, Siew Joo Beh, RMIT Univ. (Australia) . . . . . [11202-31]

LUNCH BREAK AND WEDNESDAY EQUITY, DIVERSITY, AND INCLUSION (EDI) WORKSHOP

LOCATION: BLDG 8.KALEIDE . . . . . 12:30 TO 14:00

Details about the workshop will be posted online.
All interested attendees will pick up lunch in Bldg 14.Media Portal to take to the workshop located in Bldg 8.Kaleide.

SESSION 8

LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . WED 14:00 TO 15:30

Biomedically Relevant Light Sources and Nanomaterials III

Session Chair: **Qiang Sun,** RMIT Univ. (Australia)

14:00: **Orientation information added to IR hyperspectral imaging: silk and paracetamol** *(Invited Paper)*, Meguya Ryu, Tokyo Institute of Technology (Japan); Soon Hock Ng, Swinburne Univ. of Technology (Australia); Jitraporn Vongsvivut, Mark J. Tobin, Australian Synchrotron (Australia); Junko Morikawa, Tokyo Institute of Technology (Japan); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) . . . . . [11202-32]

14:30: **Electrospun diamond-silk membranes for biosensing applications**, Asma Khalid, Amanda Abraham, Dongbi Bai, Amit Jadhav, RMIT Univ. (Australia); Denver Linklater, Duy Nguyen, RMIT Univ. (Australia); Alex Matusica, The Univ. of Adelaide (Australia); Chaitali Dekiwadia, RMIT Univ. (Australia); Achini Vidanapathirana, South Australian Health & Medical Research Institute (Australia); Philipp Reineck, RMIT Univ. (Australia); Christina Bursill, The Univ. of Adelaide (Australia); Elena Ivanova, Shadi Houshyar, RMIT Univ. (Australia); Andrew D. Greentree, Brant C. Gibson, RMIT Univ. (Australia) . . . . . [11202-33]

14:45: **How deep are your centres? Probing the distance of nitrogen vacancy centres from the surface of nanodiamonds**, Qiang Sun, Brant C. Gibson, Andrew D. Greentree, RMIT Univ. (Australia) . . . . . [11202-34]

15:00: **Exploiting optical properties of lanthanide-doped upconversion nanoparticles for super-resolution imaging and high-dimensional lifetime-based multiplexing in biomedical diagnostics** *(Invited Paper)*, James A. Piper, Macquarie Univ. (Australia) . . . . . [11202-35]

Tea/Coffee Break . . . . . Wed 15:30 to 16:00

SESSION 9

LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . WED 16:00 TO 17:30

Biomedical Imaging III

Session Chair: **Saulius Juodkazis,**
Swinburne Univ. of Technology (Australia)

16:00: **New insights into the biophysical remodelling of red blood cell membrane during malaria parasite invasion are revealed by lattice light sheet microscopy** *(Invited Paper)*, Kelly L. Rogers, The Walter and Eliza Hall Institute of Medical Research (Australia) . . . . . [11202-36]

16:30: **New directions in quantum optical coherence tomography**, Sylwia M. Kolenderska, The Univ. of Auckland (New Zealand); Piotr Kolenderski, Nicolaus Copernicus University (Poland); Frédérique Vanholsbeeck, The Univ. of Auckland (New Zealand) . . . . . [11202-37]

16:45: **Light source spectra effects on optical coherence tomography A-scans**, Anna GUAN, Steven Hinckley, Steven Richardson, Edith Cowan Univ. (Australia) . . . . . [11202-38]

17:00: **Achieving 3D FRAP using multiphoton polygon scanning microscopy**, Yean Jin Lim, Yongxiao Li, Woei Ming Lee, The Australian National Univ. (Australia) . . . . . [11202-39]

17:15: **Label-free monitoring of functional state of human articular cartilage tissue in osteoarthritis and rheumatoid arthritis with hyperspectral imaging**, Saabah B. Mahbub, The Univ. of New South Wales (Australia) and Australian Research Council Ctr. of Excellence for Nanoscale Biophotonics (Australia); Florence Jade Lees, The Univ. of Adelaide (Australia) and Australian Research Council Ctr. of Excellence for Nanoscale Biophotonics (Australia); Jared M. Campbell, Anna Guller, The Univ. of New South Wales (Australia) and Australian Research Council Ctr. of Excellence for Nanoscale Biophotonics (Australia); Martin E. Gosnell, Australian Research Council Ctr. of Excellence for Nanoscale Biophotonics (Australia); Ayad G. Anwer, The Univ. of New South Wales (Australia) and Australian Research Council Ctr. of Excellence for Nanoscale Biophotonics (Australia); Tania Crotti, The Univ. of Adelaide (Australia); Mihir Wechalekar, Flinders Medical Ctr. (Australia); Mark R. Hutchinson, The Univ. of Adelaide (Australia) and Australian Research Council Ctr. of Excellence for Nanoscale BioPhotonics (Australia); Ewa M. Goldys, The Univ. of New South Wales (Australia) and Australian Research Council Ctr. of Excellence for Nanoscale BioPhotonics (Australia) . . . . . [11202-40]

THURSDAY 12 DECEMBER

THURSDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . THU 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **MAVIS: beyond HST resolution and sensitivity** *(Plenary)*, François Rigaut, The Australian National Univ. (Australia)

9:45: **From nanotech to living sensors: unraveling the spin physics of biosensing at the nanoscale** *(Plenary)*, Clarice Aiello, Univ. of California, Los Angeles (United States)

CONFERENCE AWARDS

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . 10:30 TO 10:45

Tea/Coffee Break . . . . . Thu 10:45 to 11:15

SESSION 10

LOCATION: BLDG 80.LEVEL 4.RM 11 . . . . . THU 11:15 TO 12:45

Translational Research and Clinical Technologies

Session Chair: **Mark R. Hutchinson,** The Univ. of Adelaide (Australia)

11:15: **Clinical translation of near infrared autofluorescence for identification of the parathyroid gland during endocrine surgery: navigating the leap from lab to market** *(Invited Paper)*, Anita Mahadevan-Jansen, Vanderbilt Univ. (United States) . . . . . [11202-41]

11:45: **UV-plasmonic germicidal radiation beams enabled by sonoluminescence of air bubbles near liquid-metal particles**, Bradley Boyd, Univ. of Canterbury (New Zealand); Sergey Suslov, Swinburne Univ. of Technology (Australia); Sid Becker, Univ. of Canterbury (New Zealand); Andrew D. Greentree, RMIT Univ. (Australia); Ivan S. Maksymov, Ctr. for Micro-Photonics, Swinburne Univ. of Technology (Australia) . . . . . [11202-42]

12:00: **Hyperspectral imaging of the early embryo: can it detect chromosome abnormalities and predict IVF success?**, Tiffany C. Y. Tan, Carl Campugan, The Univ. of Adelaide (Australia); Saabah B. Mahbub, Jared M. Campbell, Abbas Habibalahi Sr., The Univ. of New South Wales (Australia); Sanam Mustafa, The Univ. of Adelaide (Australia); Ewa M. Goldys, The Univ. of New South Wales (Australia); Jeremy G. Thompson, Kylie R. Dunning, The Univ. of Adelaide (Australia). . . . . [11202-43]

12:15: **CRISPR gene editing via a light-triggered liposome system** *(Invited Paper)*, Wei Deng, The Univ. of New South Wales (Australia) . [11202-44]

Lunch Break . . . . . Thu 12:45 to 14:00

NOTE: No lunch provided on Thursday - open time for attendees to explore local restaurants and area.

AUSTRALIAN PHOTONICS INDUSTRY SURVEY

LOCATION: BLDG 8.KALEIDE . . . . . 14:00 TO 15:30

The Australian Optical Society and SPIE recently commissioned a survey of the photonics industry in Australia. The key findings in that national survey will be presented at this session. The speakers will also offer comparative insights into the international photonics marketplace, and provide context for start-ups and existing businesses in both New Zealand and Australia.

CONFERENCE 11203
LOCATION: BLDG 80.LEVEL 5.RM 12

Monday–Thursday 9–12 December 2019 • Proceedings of SPIE Vol. 11203

Advances in Optical Astronomical Instrumentation 2019

Conference Chairs: **Simon C. Ellis,** Macquarie Univ. (Australia); **Céline d'Orgeville,** The Australian National Univ. (Australia)

Program Committee: **Michael C. B. Ashley,** The Univ. of New South Wales (Australia); **Zhongwen Hu,** Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China); **Michael J. Ireland,** The Australian National Univ. (Australia); **Sergio G. Leon-Saval,** The Univ. of Sydney (Australia); **Christian Schwab,** Macquarie Univ. (Australia); **Robert G. Sharp,** The Australian National Univ. (Australia); **Xiangyan Yuan,** Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China); **Tayyaba Zafar,** Macquarie Univ. (Australia); **Jessica Zheng,** Macquarie Univ. (Australia)

MONDAY 9 DECEMBER

MONDAY PLENARY SESSION
LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . MON 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **Metaphotonics with resonant dielectric structures** *(Plenary)*
Yuri S. Kivshar, The Australian National Univ. (Australia)

9:45: **Single molecule imaging of T cell receptor signaling** *(Plenary)*
Katharina Gaus, The Univ. of New South Wales (Australia)

Tea/Coffee Break . . . . . Mon 10:30 to 11:00

SESSION 1
LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . MON 11:00 TO 12:45

Advances in Ground-based Telescopes and Instruments I

Session Chair: **Tayyaba Zafar,** Macquarie Univ. (Australia)

11:00: **The ESO Extremely Large Telescope instrumentation programme** *(Invited Paper)*, Suzanne K. Ramsay, Michele Cirasuolo, Roberto Tamai, European Southern Observatory (Germany) . . . . . [11203-1]

11:30: **The VLT in 2030** *(Invited Paper)*, Antoine Mérand, Bruno Leibundgut, Luca Pasquini, Norbert Hubin, European Southern Observatory (Germany) . . . . . [11203-2]

12:00: **Conceptual design of high resolution optical spectrograph for Thirty Meter Telescope**, Sripadmanaban Nadar Sriram, Devika K. Divakar, Amirul Hasan, Arun Surya, Sivarani Thirupathi, Indian Institute of Astrophysics (India) . . . . . [11203-3]

12:15: **The Huntsman Telescope: lessons learned from building an autonomous telescope from COTS components**, Anthony J. Horton, Australian Astronomical Optics, Macquarie Univ. (Australia); Lee R. Spitler, Wilfred T. Gee, Fergus Longbottom, Jaime A. Alvarado-Montes, Amir E. Bazkiaei, Sarah Caddy, Macquarie Univ. (Australia); Steven Lee, The Australian National Univ. (Australia) . . . . . [11203-4]

12:30: **Wide-field dynamic astronomy in the near-infrared with Palomar Gattini-IR and DREAMS**, Jamie Soon, The Australian National Univ. (Australia) . . . . . [11203-5]

Lunch Break . . . . . Mon 12:45 to 14:15

SESSION 2
LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . MON 14:15 TO 17:30

Advances in Ground-based Telescopes and Instruments II

Session Chair: **Xiangyan Yuan,** Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China)

14:15: **Giant Magellan Telescope Multi-object Astronomical and Cosmological Spectrograph (GMACS): conceptual design** *(Invited Paper)*, Soojong Pak, Kyung Hee Univ (Korea, Republic of); Darren L. DePoy, Jennifer L. Marshall, Luke M. Schmidt, Casey Papovich, Texas A&M Univ. (United States); Cynthia S. Froning, The Univ. of Texas at Austin (United States); Daniel M. Faes, Claudia M. de Oliveira, Univ. de São Paulo (Brazil); Aline Souza, GMTO Corp. (United States); Rafael Alves de Souza Ribeiro, Univ. de São Paulo (Brazil); Keith Taylor, Instruments4 (United States); Damien J. Jones, Prime Optics (Australia); Travis Prochaska, Erika Cook, Texas A&M Univ. (United States); Hye-In Lee, Tae-Geun Ji, Kyung Hee Univ. (Korea, Republic of); Paul A. Scowen, Arizona State Univ. (United States) . . . . . [11203-6]

14:45: **Maunakea Spectroscopic Explorer (MSE): Instrumentation for a massively multiplexed spectroscopic survey facility** *(Invited Paper)*, Alexis Hill, Canada-France-Hawaii Telescope (United States) and NRC - Herzberg Astronomy & Astrophysics (Canada); Kei Szeto, Nicolas Flagey, Andreea Petric, Canada-France-Hawaii Telescope (United States); Rick Murowinski, Alan McConnachie, Canada-France-Hawaii Telescope (United States) and NRC - Herzberg Astronomy & Astrophysics (Canada); Jennifer Marshall, Canada-France-Hawaii Telescope (United States) and Texas A&M Univ. (United States); Andrew Sheinus, Canada-France-Hawaii Telescope (United States) . . . . . [11203-7]

15:15: **Active alignment metrology for multi-channel photometric survey telescope**, Zhengyang Li, Xiangyan Yuan, Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China); Kaiyuan Zhang, Zhejiang Sunny Optics Co., Ltd. (China); Bo Li, Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China) . . . . . [11203-8]

Tea/Coffee Break . . . . . Mon 15:30 to 16:00

16:00: **Hector: a new multi-object integral field spectrograph instrument for the Anglo-Australian Telescope** *(Invited Paper)*, Julia J. Bryant, The Univ. of Sydney (Australia); Sudharshan Venkatesan, Mahesh Mohanan, Macquarie Univ. (Australia); Rebecca Brown, Adeline Haobing Wang, Barnaby Norris, Seong-Sik Minh, The Univ. of Sydney (Australia); Peter R. Gillingham, Ross Zhelem, Naveen Pai, Helen McGregor, Macquarie Univ. (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Jon S. Lawrence, Jessica Zheng, Will Saunders, Robert Content, Macquarie Univ. (Australia) . . . . . [11203-9]

16:30: **The TAIPAN Starbugs fibre positioner and spectrograph: integration, commissioning, and initial performance**, Nuria P. F. Lorente, Jon S. Lawrence, Rebecca A. Brown, Scott Case, Australian Astronomical Optics, Macquarie Univ. (Australia); Steve Chapman, The Australian National Univ. (Australia); Vladimir Churilov, Tony Farrell, Nuwanthika Fernando, Michael Goodwin, Anthony J. Horton, Urs Klauser, Kyler Kuehn, Slavko Mali, Helen McGregor, Rolf Muller, Vijay Nichani, Naveen Pai, Scott Smedley, Minh V. Vuong, Lewis G. Waller, Ross Zhelem, Australian Astronomical Optics, Macquarie Univ. (Australia) . . . . . [11203-10]

16:45: **Design concept for Pocket GMT**, Marcus Lingham, Tony Travouillon, The Australian National Univ. (Australia) . . . . . [11203-12]

17:00: **Mirror segment error budget development for Mauna Kea Spectroscopic Explorer**, Janani Varadhachari, Sripadmanaban Nadar Sriram, Gajendra Pandey, Gadiyara C. Anupama, Indian Institute of Astrophysics (India). . . . . [11203-13]

17:15: **A UV-visible prime focus camera for the Keck telescopes**, Peter R. Gillingham, Australian Astronomical Observatory (Australia); Jeff Cooke, Karl Glazebrook, Jeremy Mould, Swinburne Univ. of Technology (Australia); Charles C. Steidel, Caltech (Australia); Roger M. Smith, Caltech (United States) . . . . . [11203-14]

TUESDAY 10 DECEMBER

TUESDAY PLENARY SESSION

LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . TUE 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **New perspectives for biomedical imaging at depth** *(Plenary)*, Kishan Dholakia, Univ. of St. Andrews (United Kingdom)

9:45: **Harnessing disorder for photonic applications** (Plenary) Hui Cao, Yale Univ. (United States)

Tea/Coffee Break . . . . . .Tue 10:30 to 11:00

SESSION 3

LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . .TUE 11:00 TO 12:30

Advances in Space-based Telescopes and Instruments

Session Chair: **Zhongwen Hu,** Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China)

11:00: **Emu: a near-infrared wide-field photometer for space** *(Invited Paper)*, James Gilbert, Alexey Grigoriev, Shanae King, Robert G. Sharp, Annino Vaccarella, David Chandler, The Australian National Univ. (Australia) . . . . . [11203-15]

11:30: **CubeSat based Far-UV spectrograph for investigating nebular gas**, Shanti Prabha C, Binukumar G. Nair, Bharat P. Chandra, Ambily Suresh, Indian Institute of Astrophysics (India); Joice Mathew, The Australian National Univ. (Australia); Nirmal Kaipachery, Rekhesh Mohan, Margarita Safonova, Jayant Murthy, Indian Institute of Astrophysics (India); Mayuresh Sarpotdar, Nanyang Technological University (Singapore) . . . . . [11203-16]

11:45: **GLUV pathfinder mission**, Nirmal Kaipachery, Indian Institute of Astrophysics (India); Joice Mathew, James Gilbert, Robert G. Sharp, Harrison Abbot, R. Ridden-Harper, Bradley Tucker, The Australian National Univ. (Australia) . . . . . [11203-17]

12:00: **A flexible cost-effective detector controller for space**, Shanae King, James Gilbert, David Chandler, Michael Ellis, Annino Vaccarella, The Australian National Univ. (Australia) . . . . . [11203-18]

12:15: **Alignment errors correction of segmented membrane diffractive optical telescope in extended imaging**, Licheng Zhu, Ping Yang, Shuai Wang, Lizhi Dong, Lianghua Wen, Zhenghua Guo, Institute of Optics and Electronics, Chinese Academy of Sciences (China). . . . . [11203-19]

LUNCH BREAK AND TUESDAY EQUITY, DIVERSITY, AND INCLUSION (EDI) WORKSHOP

LOCATION: BLDG 8.KALEIDE . . . . . 12:30 TO 14:00

Details about the workshop will be posted online.
All interested attendees will pick up lunch in Bldg 14.Media Portal to take to the workshop located in Bldg 8.Kaleide.

SESSION 4

LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . .TUE 14:00 TO 16:15

AO

Session Chair: **Céline d'Orgeville,**
The Australian National Univ. (Australia)

14:00: **Space-situational awareness adaptive optics at Mount Stromlo: data analysis of the first results** *(Invited Paper)*, Visa A. Korkiakoski, Michael Copeland, Francis H. Bennet, Marcus Lingham, Doris Grosse, The Australian National Univ. (Australia); Jesse Cranney, The Univ. of Newcastle (Australia); Ian Price, Francois Rigaut, Céline d'Orgeville, The Australian National Univ. (Australia) . . . . . [11203-20]

14:30: **Application of the PPPP method for the determination of DLR pointing, tip/tilt, and wavefront errors**, James Webb, The Australian National Univ. (Australia); Nazim A. Bharmal, Durham Univ. (United Kingdom); Craig H. Smith, EOS Defence Systems Pty. Ltd. (Australia); Huizhe Yang, Durham Univ. (United Kingdom); Mark Blundell, EOS Space Systems Pty. Ltd. (Australia) . . . . . [11203-21]

14:45: **GNAO: an MCAO facility for Gemini North**, Gaetano Sivo, Gemini Observatory (Chile); David Palmer, Julia Scahrwächter, Gemini Observatory (United States); Morten Andersen, Natalie Provost, Eduardo Marin, Gemini Observatory (Chile); Marcos A. van Dam, Flat Wavefronts (New Zealand); Brian Chinn, Emmanuel Chirre, Gemini Observatory (Chile); Charles Cavedoni, Tom Schneider, Stacy Kang, Paul Hirst, William N. Rambold, Angelic Ebbers, Gemini Observatory (United States); Pedro Gigoux, Gemini Observatory (Chile); Laure Catala, Gemini Observatory (United States); Thomas L. Hayward, John P. Blakeslee, Henry Roe, Gemini Observatory (Chile); Jennifer Lotz, Scot J. Kleinman, Gemini Observatory (United States); Suresh Sivanandam, Univ. of Toronto (Canada); Anja Feldmeier-Krause, The Univ. of Chicago (United States); S. Mark Ammons, Lawrence Livermore National Lab. (United States); Chad Trujillo, Northern Arizona Univ. (United States); Chris Packham, The Univ. of Texas at San Antonio (United States); Franck Marchis, SETI Institute (United States); Julian C. Christou, Large Binocular Telescope Observatory (United States); James Jee, Younsei Univ. (Korea, Republic of); John Bally, Univ. of Colorado Boulder (United States); Mike J. Pierce, Univ. of Wyoming (United States); Thomas Puzia, Pontificia Univ. Católica de Chile (Chile); Paolo Turri, Univ. of California, Berkeley (United States); Hwihyun Kim, Gemini Observatory (Chile); Meg Schwamb, Trent J. Dupuy, Gemini Observatory (United States); Ruben Diaz, Rodrigo Carrasco, Gemini Observatory (Chile); Benoit Neichel, Lab. d'Astrophysique de Marseille (France); Carlos Correia, W. M. Keck Observatory (United States); Eric Steinbring, NRC - Herzberg Astronomy & Astrophysics (Canada); Francois Rigaut, The Australian National Univ. (Australia); Jean-Pierre Veran, NRC - Herzberg Astronomy & Astrophysics (Canada); Mark R. Chun, Institute for Astronomy (United States); Masen P. Lamb, Univ. of Toronto (Canada); Scott C. Chapman, Dalhousie Univ. (Canada); Simone Esposito, Istituto Nazionale di Astrofisica (Italy); Thierry Fusco, ONERA (France) . . . . . [11203-22]

15:00: **A prototype experiment of the adaptive deformable mirror based on voice coil and Eddy Current Sensor**, Heng Zuo, Hao A. Li, Guohua Zhou, Guoping Li, Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China) . . . . . [11203-23]

15:15: **Active and adaptive CFRP mirror using MFC piezoeletric actuator for thermal deformation and atmospheric aberration correction**, Hadi Baghsiahi, Univ. College London (United Kingdom); Martyn L. Jones, Glyndwr Univ. (United Kingdom); Peter Doel, David D. Brooks, Univ. College London (United Kingdom) . . . . . [11203-24]

Tea/Coffee Break . . . . . .Tue 15:30 to 16:00

16:00: **Astronomical image restoration and point spread function estimation with deep neural networks**, Jia Peng, Taiyuan Univ. of Technology (China) and Durham Univ. (United Kingdom); Yi Huang, Xuebo Wu, Bojun Cai, Xiaoshan Yang, Dongmei Cai, Taiyuan Univ. of Technology (China) . . [11203-25]

SESSION 5

LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . .TUE 16:15 TO 17:45

Interferometry

Session Chair: **Michael J. Ireland,**
The Australian National Univ. (Australia)

16:15: **Imaging exoplanets with nulling interferometry using integrated-photonics: the GLINT project** *(Invited Paper)*, Marc-Antoine Martinod, Barnaby Norris, The Univ. of Sydney (Australia); Simon Gross, Alexander Arriola, Thomas Gretzinger, Michael J. Withford, Macquarie Univ. (Australia); Tiphaine Lagadec, Peter G. Tuthill, The Univ. of Sydney (Australia) . . [11203-26]

16:45: **Diffraction-limited polarimetric imaging of protoplanetary disks and mass-loss shells with VAMPIRES**, Barnaby Norris, Peter G. Tuthill, The Univ. of Sydney (Australia); Nemanja Jovanovic, Caltech (United States); Julien Lozi, Olivier Guyon, Subaru Telescope, NAOJ (United States); Nick Cvetojevic, Frantz Martinache, Observatoire de la Côte d'Azur (France) . . . . . [11203-27]

17:00: **A photonic solution to exoplanet direct imaging via nulling interferometry**, Harry-Dean Kenchington Goldsmith, Michael J. Ireland, The Australian National Univ. (Australia); Nick Cvetojevic, Observatoire de la Côte d'Azur (France); Pan Ma, The Australian National Univ. (Australia); Frantz Martinache, Observatoire de la Côte d'Azur (France); Steve J. Madden, The Australian National Univ. (Australia) . . . . . [11203-28]

17:15: **Kernel nulling: fundamental limitations and technological pathways from ground and space**, Michael J. Ireland, The Australian National Univ. (Australia) . . . . . [11203-29]

17:30: **Integrated optics-interferometry using pupil remapping and beam combination at astronomical H-band**, Abani Shankar Nayak, Leibniz-Institut für Astrophysik Potsdam (Germany); Simone Piacentini, Politecnico di Milano (Italy); Tarun Kumar Sharma, Univ. zu Köln (Germany); Giacomo Corrielli, Roberto Osellame, Politecnico di Milano (Italy); Lucas Labadie, Univ. zu Köln (Germany); Stefano Minardi, Ettore Pedretti, Kalaga V. Madhav, Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany) . . . . . [11203-30]

CONFERENCE BANQUET DINNER

LOCATION: SEA LIFE MELBOURNE AQUARIUM . . . . . 18:30 TO 22:00

All registered attendees are invited to attend. Additional guest tickets can be purchased onsite through Monday, if space is available.

WEDNESDAY 11 DECEMBER

WEDNESDAY PLENARY SESSION
LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . WED 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **The James Webb Space Telescope** *(Plenary)*
Gillian S. Wright, UK Astronomy Technology Ctr. (United Kingdom)

9:45: **Subwavelength integrated photonics** *(Plenary)*
Pavel Cheben, National Research Council Canada (Canada)

Tea/Coffee Break . . . . . Wed 10:30 to 11:00

SESSION 6
LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . WED 11:00 TO 12:30

New Technologies I

Session Chair: **Simon C. Ellis,** Macquarie Univ. (Australia)

11:00: **Ultrafast laser inscription of astrophotonic integrated optical circuits** *(Invited Paper)*, Simon Gross, Thomas Gretzinger, Alexander Arriola, Glen Douglass, Andrew Ross-Adams, Toney T. Fernandez, Michael J. Withford, Macquarie Univ. (Australia) . . . . . [11203-31]

11:30: **Recent advances in astrophotonics: integrated spectrometers and photonic filters** *(Invited Paper)*, Sylvain Veilleux, Pradip R. Gatkine, Mario Dagenais, Univ. of Maryland, College Park (United States) . . . . . [11203-32]

12:00: **Photonic ring resonator notch filters for astronomical OH line suppression**, Pufan Liu, Northwestern Univ. (United States); Stephen E Kuhlmann, Argonne National Lab. (United States); Simon C. Ellis, Kyler Kuehn, Australian Astronomical Observatory (Australia); Hal Spinka, David Underwood, Leonidas E. Ocola, Argonne National Lab. (United States); Ravi R. Gupta, Lawrence Berkeley National Lab. (United States); Nathaniel P. Stern, Northwestern Univ. (United States) . . . . . [11203-33]

12:15: **Integrated echélle gratings for astrophotonics**, Andreas Stoll, Yu Wang, Madhav V. Madhav, Leibniz-Institut für Astrophysik Potsdam (Germany); Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany) and Univ. Potsdam (Germany) . . . . . [11203-34]

LUNCH BREAK AND WEDNESDAY EQUITY, DIVERSITY, AND INCLUSION (EDI) WORKSHOP
LOCATION: BLDG 8.KALEIDE . . . . . 12:00 TO 14:00

Details about the workshop will be posted online.
All interested attendees will pick up lunch in Bldg 14.Media Portal to take to the workshop located in Bldg 8.Kaleide.

SESSION 7
LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . WED 14:00 TO 14:45

New Technologies II

Session Chair: **Sergio G. Leon-Saval,** The Univ. of Sydney (Australia)

14:00: **New opportunities for VPHGs in astronomy**, Alessio Zanutta, Andrea Bianco, Istituto Nazionale di Astrofisica (Italy); Robert J. Harris, Landessternwarte Heidelberg (Germany); Sebastiaan Y. Haffert, Leiden Observatory (Germany); Fraser Pike, Heriot-Watt Univ. (United Kingdom); Edoardo Redaelli, Istituto Nazionale di Astrofisica (Italy); Robert R. Thomson, Aurélien Benoit, Heriot-Watt Univ. (United Kingdom); Giulio Riva, Politecnico di Milano (Italy) . . . . . [11203-35]

14:15: **Research progress of 698nm narrow-linewidth lasers for Sr atom optical clocks at NTSC**, Long Chen, National Time Service Center, CAS (China); Jun Liu, Linbo Zhang, Guanjun Xu, Tao liu, National Time Service Ctr., Chinese Academy of Sciences (China) . . . . . [11203-36]

14:30: **PRAXIS: an OH suppression optimised near infrared spectrograph**, Simon C. Ellis, Macquarie Univ. (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Svend-Marian Bauer, Leibniz-Institut für Astrophysik Potsdam (Germany); Scott Case, Macquarie Univ. (Australia); Robert Content, Australian Astronomical Observatory (Australia); Thomas Fechner, Domenico Giannone, Leibniz-Institut für Astrophysik Potsdam (Germany); Roger Haynes, The Australian National Univ. (Australia); Eloy Hernandez, Leibniz-Institut für Astrophysik Potsdam (Germany); Anthony J. Horton, Urs Klauser, Jon S. Lawrence, Macquarie Univ. (Australia); Sergio G. Leon-Saval, The Univ. of Sydney (Australia); Hans-Gerd Löhmannsröben, Univ. Potsdam (Germany); Seong-Sik Min, The Univ. of Sydney (Australia); Naveen Pai, Macquarie Univ. (Australia); Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany); Lew G. Waller, Ross Zhelem, Macquarie Univ. (Australia) . . . . . [11203-37]

SESSION 8
LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . WED 14:45 TO 15:15

Detectors

Session Chair: **Robert G. Sharp,**
The Australian National Univ. (Australia)

14:45: **Lucky imaging with the Leonardo SAPHIRA at Siding Spring Observatory**, Annino Vaccarella, Robert G. Sharp, Michael Ellis, James Gilbert, Shanae King, David Adams, The Australian National Univ. (Australia) [11203-38]

15:00: **Vibration measurement and mount design for cryocoolers on GMT and large telescopes**, David Adams, Annino Vaccarella, Warrick Schofield, Robert G. Sharp, Gaston Gausachs, Jamie Gilbert, The Australian National Univ. (Australia). . . . . [11203-39]

Tea/Coffee Break . . . . . Wed 15:15 to 15:45

SESSION 9
LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . WED 15:45 TO 17:00

Fibres I

Session Chair: **Robert G. Sharp,**
The Australian National Univ. (Australia)

15:45: **Fiber positioner system selection for the Maunakea Spectroscopic Explorer (MSE)** *(Invited Paper)*, Nicolas Flagey, Kei Szeto, Maunakea Spectroscopic Explorer (United States) . . . . . [11203-40]

16:15: **Steering Starbugs: routing autonomous fibre positioners for TAIPAN**, Nuwanthika Fernando, Nuria P. F. Lorente, Australian Astronomical Optics (Australia); Tony J. Farrell, Australian Astronomical Optics, Macquarie Univ. (Australia); Carlos Bacigalupo, Australian Astronomical Optics, Macquarie Univ. (Australia) and maxon motor Australia Pty Ltd (Australia). . . . . [11203-42]

16:30: **Hexabundle optical fibre imaging devices for the Hector instrument**, Haobing Wang, Rebecca A. Brown, Julia J. Bryant, Sergio G. Leon-Saval, The Univ. of Sydney (Australia) . . . . . [11203-43]

16:45: **Optical performance of the GHOST fiber cable**, Ross Zhelem, Vladimir Churilov, Scott Case, Yuriy Kondrat, Australian Astronomical Optics, Macquarie Univ. (Australia); Kristin Fiegert, The Australian National Univ. (Australia); Lewis G. Waller, Jonathan S. Lawrence, Tony J. Farrell, Australian Astronomical Optics, Macquarie Univ. (Australia); Michael J. Ireland, The Australian National Univ. (Australia). . . . . [11203-44]

POSTERS-WEDNESDAY

LOCATION: BLDG 14.MEDIA PORTAL . . . . . WED 18:00 TO 19:30

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.

Maunakea Spectrographic Explorer (MSE): progress on preliminary design of multi-object high resolution spectrograph, Kai Zhang, Zhen Tang, Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China); Will Saunders, Australian Astronomical Observatory (Australia); Jianrong Shi, National Astronomical Observatories, Chinese Academy of Sciences (China); Jennifer Marshall, Kei Szeto, Canada-France-Hawaii Telescope (United States); Kim A. Venn, Univ. of Victoria (Canada); Lei Wang, Yongtian Zhu, Zhongwen Hu, Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China) . . . . . [11203-11]

The impact of fiber fusion splicing on the focal ratio degradation and transmission of LAMOST fiber system, Jian Li, National Astronomical Observatories of the CAS (China) . . . . . [11203-41]

Optical frequency comb generated in micro-ring resonators by modulated pump light, Daniel Bodenmüller, Jose Manuel Chavez Boggio, Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany) . . . . . [11203-49]

Design and development of stress relieving support system for TMT primary mirror segments, Alikhan Basheer, Sripadmanaban Nadar Sriram, Kambhala Sudharsan, Viswanatha Narasimhiah, Mahesh Panangattukara, Indian Institute of Astrophysics (India); Vineeth Valsan, CHRIST (Deemed to be Univ.) (India); Krishna Murthy Thoutam, Indian Institute of Space Science and Technology (India); Gadiyara C. Anupama, Indian Institute of Astrophysics (India). . . . . [11203-50]

A LGS testing system for LAMOST, Hua Bai, Nanjing Institute of Astronomical Optics & Technology, NAO, CAS (China). . . . . [11203-51]

The spectroscopic investigation of nebular gas(SING): a dedicated NUV spectrograph to study extended objects, Bharat P. Chandra, Binukumar G. Nair, Ambily Suresh, Indian Institute of Astrophysics (India); Joice Mathew, The Australian National Univ. (Australia); Nirmal Kaipachery, Indian Institute of Astrophysics (India); Mayuresh N. Sarpotdar, Nanyang Technological Univ. (Malaysia); Shanti Prabha, Rekhesh Mohan, Margarita Safonova, Jayant Murthy, Sriram Sripadmanaban, Indian Institute of Astrophysics (India) . . . . . [11203-52]

Suitability of COTS InGaAs detectors for ground based exoplanet transit detections around nearby M-dwarfs, Blaise Anthony C. Kuo Tiong, Christian Schwab, Macquarie Univ. (Australia) . . . . . [11203-53]

Comet interceptor's EnVisS camera sky mapping function, Claudio Pernechele, INAF - Osservatorio Astronomico di Padova (Italy); Vania Da Deppo, CNR-Istituto di Fotonica e Nanotecnologie (Italy); George Brydon, UCL MullardSpace Science Laboratory (United Kingdom) and UCL (United Kingdom); Geraint H Jones, UCL Mullard Space Science Laboratory (United Kingdom) and UCL (United Kingdom); Luisa Lara, Instituo de Astrofisica de Andalusia (Spain); Harald Michaelis, DLR (Germany) . . [11203-54]

Rubidium transitions as wavelength reference for astronomical Doppler spectrographs, Dmytro Rogozin, KU Leuven (Belgium) and Macquarie Univ. (Australia); Tobias Feger, Christian Schwab, Macquarie Univ. (Australia); Gert Raskin, KU Leuven (Belgium); David W. Coutts, Macquarie Univ. (Australia) . . . . . [11203-55]

Modal noise mitigation by a rotating double scrambler, Gert Raskin, KU Leuven (Belgium); Christian Schwab, Australian Astronomical Optics, Macquarie Univ. (Australia); David W. Coutts, Macquarie Univ. (Australia) . . . . . [11203-56]

Design of an optical surveillance system for balloon-base load cabin in near space, Zhanchao Wang, Academy of Opto-Electronics CAS (China); Min Huang, Lulu Qian, Baowei Zhao, Academy of Opto-Electronics, Chinese Academy of Sciences (China) . . . . . [11203-57]

THURSDAY 12 DECEMBER

THURSDAY PLENARY SESSION
LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . THU 9:00 TO 10:30

Session Chairs: **John Harvey**, The Univ. of Auckland (New Zealand) and **Arnan Mitchell**, RMIT Univ. (Australia)

9:00: **MAVIS: beyond HST resolution and sensitivity** *(Plenary)*, François Rigaut, The Australian National Univ. (Australia)

9:45: **From nanotech to living sensors: unraveling the spin physics of biosensing at the nanoscale** *(Plenary)*, Clarice Aiello, Univ. of California, Los Angeles (United States)

CONFERENCE AWARDS
LOCATION: BLDG 80.LEVEL 2.RM 07 . . . . . 10:30 TO 10:45

Tea/Coffee Break . . . . . Thu 10:45 to 11:15

SESSION 10
LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . THU 11:15 TO 12:00

Fibres II

Session Chair: **Jessica Zheng,** Macquarie Univ. (Australia)

11:15: **Experimental testbed for coupling into few-mode fibers in the presence of partial adaptive optics correction**, Momen Diab, Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany) . [11203-45]

11:30: **Novel metrology for tilting spine multi-fibre positioners**, Peter R. Gillingham, Australian Astronomical Observatory (Australia) and Macquarie Univ. (Australia) . . . . . [11203-46]

11:45: **MANIFEST metrology toolkit**, Michael Goodwin, Australian Astronomical Observatory (Australia); Sungwook E. Hong, The Univ. of Seoul (Korea, Republic of) . . . . . [11203-47]

SESSION 11
LOCATION: BLDG 80.LEVEL 5.RM 12 . . . . . THU 12:00 TO 12:15

Data

Session Chair: **Jessica Zheng,** Macquarie Univ. (Australia)

12:00: **Building a re-deployable astronomy archive: challenges and solutions**, Simon O'Toole, Elizabeth Mannering, Lloyd Harischandra, Katrina Sealey, Australian Astronomical Optics, Macquarie Univ. (Australia) . . . . . [11203-48]

Lunch Break . . . . . Thu 12:15 to 14:00

NOTE: No lunch provided on Thursday - open time for attendees to explore local restaurants and area.

AUSTRALIAN PHOTONICS INDUSTRY SURVEY
LOCATION: BLDG 8.KALEIDE . . . . . 14:00 TO 15:30

The Australian Optical Society and SPIE recently commissioned a survey of the photonics industry in Australia. The key findings in that national survey will be presented at this session. The speakers will also offer comparative insights into the international photonics marketplace, and provide context for start-ups and existing businesses in both New Zealand and Australia.

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Worboys, Josef G. [11202-59] SPMon, [11202-60] SPMon
Wright, Gillian S. [11203-500] SPlen
Wu, Jiayang [11200-104] SPWed, [11200-50] S6A, [11200-58] S7A, [11200-67] S8A, [11200-78] S10, [11200-79] S10, [11200-80] S10, [11200-81] S10, [11200-96] SPWed, [11201-62] SPMon
Wu, Pei-Jung [11201-60] SPMon
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Xie, Lexing [11202-48] S1
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Xu, Guanjun [11203-36] S7
Xu, Haolan [11200-26] S3B
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Xu, Tao [11202-54] SPMon
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Yuan, Xiangyan 11203 Program Committee, 11203 S2 Session Chair, [11203-8] S2
Yuffa, Alex [11201-10] S3

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Zafar, Tayyaba 11203 Program Committee, 11203 S1 Session Chair
Zaheer, Ali [11200-7] S1B
Zaitsev, Alexander [11202-15] S4
Zand, Iman [11200-55] S7A
Zangeneh Kamali, Khosro [11200-10] S2A, [11200-4] S1A, [11201-37] S8, [11201-49] SPMon
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Zhai, Chao [11200-105] SPWed
Zhang, Bin [11202-23] S6
Zhang, Guifeng [11200-124] SPWed
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Zhang, Han [11200-73] S9A
Zhang, Kai [11203-11] SPWed
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Zhang, Yanzhen [11201-43] S10
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Zhao, Baowei [11203-57] SPWed
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Zheng, Jessica 11203 Program Committee, 11203 S10 Session Chair, 11203 S11 Session Chair
Zheng, Jessica R. [11203-9] S2
Zheng, Xianlin [11202-62] SPMon
Zheng, Yujie [11202-46] S1, [11202-49] SPMon
Zhong, Yile [11200-100] SPWed, [11200-97] SPWed
Zhou, Chunhua [11201-25] S6, [11201-27] S6
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Zhou, Jiajia [11200-18] S3A
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Zhu, Yongtian [11203-11] SPWed
Zhuo, Junqi [11202-17] S4
Ziolkowski, Richard W. [11200-87] SPWed
Zuo, Heng [11203-23] S4
Zvyagin, Andrei V. [11202-5] S2

GENERAL INFORMATION

Registration

ONSITE REGISTRATION AND BADGE PICK-UP HOURS

Bldg. 14.Media Portal

Sunday 8 December . . . . . 14:30 - 17:00
Monday 9 December . . . . . 08:00 - 16:00
Tuesday 10 December . . . . . 08:30 - 16:00
Wednesday 11 December . . . . . 08:30 - 16:00
Thursday 12 December . . . . . 08:30 - 12:30

CONFERENCE REGISTRATION

Includes admission to all conference sessions and online summaries, plenaries, technical events, poster sessions, workshops, lunches Monday-Wednesday, coffee breaks, and Welcome Reception. Conference Dinner is also included in your registration.

COURSE REGISTRATION

Courses are priced separately, and advance registration is required. Course-only registration includes your selected course(s), and the course notes (pdf). Onsite, please go to Registration Desk to pick-up your badge and course information.

EARLY REGISTRATION PRICING AND DATES

Conference registration prices increase by USD$100 (students USD$60) after 22 November 2019. The online form will automatically display the increased prices.

SPIE AND AOS MEMBER, SPIE AND AOS STUDENT MEMBER, AND STUDENT PRICING

- SPIE and AOS Members receive conference registration discounts. Discounts are applied at the time of registration.
- Student registration rates are available only to undergraduate and graduate students who are enrolled full time and have not yet received their Ph.D. Post-docs may not register as students. A student ID number or proof of student status is required with your registration.

PRESS REGISTRATION

For credentialed press and media representatives only; see our press registration page for SPIE policy. Please email contact information, title, and organization to media@spie.org. (check with AOS for press coverage too)

REGISTRATION PAYMENTS

If you are paying by cash or cheque as part of your onsite registration, wish to add a course, workshop, or special event requiring payment, or have questions regarding your registration, visit the onsite Cashier.

RECEIPT AND CERTIFICATE OF ATTENDANCE

Preregistered attendees who did not receive a receipt, or attendees who need a Certificate of Attendance may obtain those from the onsite Registration Desk.

BADGE CORRECTIONS

Badge corrections can be made by the onsite Registration Desk. Please have your badge removed from the badge holder and marked with your changes before approaching the counter.

REFUND INFORMATION

There is a $USD50 service charge for processing refunds. Requests for refunds must be received by 27 November 2019; all registration fees will be forfeited after this date. Membership dues, SPIE Digital Library subscriptions or Special Events purchased are not refundable.

U.S. GOVERNMENT CREDIT CARDS

U.S. Government credit card users: have your purchasing officer contact the credit card company and get prior authorization before attempting to register. Advise your purchasing agent that SPIE is considered a 5968 company for authorization purposes.

Onsite Services

INTERNET ACCESS

Bldg. 14.Media Portal

Complimentary wireless Internet is available on the RMIT University campus; Use event code **935966**.

SPIE CONFERENCE AND EXHIBITION APP

Download the free SPIE Conference App, available for iPhone and Android phones.

URGENT MESSAGE LINE

An urgent message line is available during registration hours: +1 360 510 6268.

NURSING ROOMS AND QUIET ROOMS

Open during registration hours. Please see registration desk for access key. The Quiet room is intended for silent meditation, reflection or prayer, and the Nursing Room is privacy for nursing mothers.

Author / Presenter Information

SPEAKER UPLOAD INFORMATION

All conference rooms have a computer workstation, projector, screen, lapel microphone, and laser pointer. Load presentations before the conference starts or during coffee or lunch breaks.

POSTERS

Poster presenters will be provided with a space 33 inches x 46 inches (84 cm x 118 cm) on which to display each poster. Velcro will be provided near the poster boards. The entire poster layout should be readable from six to ten feet away. Please note that no additional equipment (tables, etc) or multimedia support will be available for poster presentations.

POSTER SETUP INSTRUCTIONS

Bldg. 14.Media Portal

Monday 9 December and Wednesday 11 December

Set up: 10:00 to 16:30, Session: 18:00 to 19:30

Poster presenters must set up their posters between 10:00 to 16:30 on their presentation date.

- Paper numbers will be posted on the poster boards in numerical order; please find your paper number and post your poster in the designated space.
- A poster author or coauthor is required to stand by the poster during the scheduled poster session to answer questions from attendees.
- Presenters who have not placed their papers on their assigned board by 16:30 on the day of their presentation will be considered a "no show" and their manuscript will not be published.
- Presenters must remove their posters immediately after the poster session. Posters not removed will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of each poster session.

ABOUT MELBOURNE

Melbourne is the coastal capital of the southeastern Australian state of Victoria. At the city's centre is the modern Federation Square development, with plazas, bars, and restaurants by the Yarra River. In the Southbank area, the Melbourne Arts Precinct is the site of Arts Centre Melbourne – a performing arts complex – and the National Gallery of Victoria, with Australian and indigenous art.

Melbourne has something for everyone to enjoy food, wine, sports and arts is just the beginning of what you can experience in this exciting city centre.

AIRPORT INFORMATION

Melbourne International Airport is 22 km from the RMIT University.

TRANSPORTATION FROM THE AIRPORT

Bus connections operate from Melbourne International Airport and Avalon Airport (Geelong) direct to Southern Cross Station on Spencer Street.

SHUTTLES AND PUBLIC TRANSPORTATION

Most north-south Yarra Trams run along Swanston Street (routes 1, 3, 5, 6, 8, 16, 64, 67 and 72). For Elizabeth Street services (routes 19, 57, 59), get off at Melbourne Central and walk one block to Swanston Street.

If you're travelling east-west along Flinders Street (routes 48, 70 and 75), Collins Street (routes 109 and 12) or Bourke Street (routes 86 and 96) alight at Swanston Street for connecting trams.

DRIVING DIRECTIONS AND PARKING

There is no on-campus parking available for visitors to the University. However, there are a number of commercial car parks within a very short walk. Metered street parking is also available around the City campus. Please note, time limits and clearway restrictions apply.

Food and Beverage Services

COFFEE BREAKS

Swanston Academic Bldg 80.Levels 2 and 5 Foyers

Monday - Thursday

Complimentary coffee will be served twice daily, at 10:30 and 15:30 hrs. Check individual conference listings for exact times and locations.

DAILY LUNCHES

Bldg 14.Media Portal

Monday through Wednesday lunches will be provided during the daily scheduled lunch breaks. Thursday lunch is not included; the scheduled lunch break time is open for attendees to explore some of Melbourne restaurants and the local area.

Acceptance of Policies and Registration Conditions

The following Policies and Conditions apply to all SPIE Events. As a condition of registration, you will be required to acknowledge and accept the SPIE Policies and Conditions contained herein.

Agreement to Hold Harmless

Attendee agrees to release and hold harmless SPIE from any and all claims, demands, and causes of action arising out of or relating to your participation in the event you are registering to participate in and use of any associated facilities or hotels.

Anti-Harassment Policy

It is SPIE policy that all employees, volunteers, and participants are entitled to respectful treatment. Any form of bullying, discrimination, harassment, sexual or otherwise, is unacceptable and will not be tolerated. This policy applies to all locations and situations where SPIE business is conducted and to all SPIE-sponsored activities and events.

Read complete policy: **http://spie.org/harassment**

Attendee Registration and Admission Policies

SPIE, or their officially designated event management, in their sole discretion, reserves the right to accept or decline an individual's registration for an event. Further, SPIE, or event management, reserves the right to prohibit entry of or to remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, whose conduct is not in keeping with the character and purpose of the event. Without limiting the foregoing, SPIE and event management reserve the right to remove or refuse entry to anyone who has registered or gained access under false pretenses, provided false information, or for any other reason whatsoever that they deem is cause under the circumstances.

Capture and Use of a Person's Image

By registering for an SPIE event, you grant full permission to SPIE to capture, store, use, and/or reproduce your image or likeness by any audio and/or visual recording technique and create derivative works of these images and recordings in any SPIE media now known or later developed, for any legitimate SPIE marketing or promotional purpose. By registering for an SPIE event, you waive any right to inspect or approve the use of the images or recordings or of any written copy. You also waive any right to royalties or other compensation arising from or related to the use of the images, recordings, or materials. By registering, you release, defend, indemnify and hold harmless SPIE from and against any claims, damages or liability arising from or related to the use of the images, recordings or materials, including but not limited to claims of defamation, invasion of privacy, or rights of publicity or copyright infringement, or any misuse, distortion, blurring, alteration, optical illusion or use in composite form that may occur or be produced in taking, processing, reduction or production of the finished product, its publication or distribution.

Code of Conduct

SPIE is committed to providing a harassment- and discrimination-free experience for everyone at our events, an experience that embraces the richness of diversity where participants may exchange ideas, learn, network, and socialize in the company of colleagues in an environment of mutual respect.

Read complete Code: **http://spie.org/conduct**

Event Cancellation Policy

If for some unforeseen reason SPIE should have to cancel an event, processed registration fees will be refunded to registrants. Registrants will be responsible for cancellation of travel arrangements or housing reservations and the applicable fees.

Family-Friendly Policy

Conference Events: All conference technical and networking events require a badge for admission. Registered attendees may bring children with them if they have been issued a badge. Registration badges for children under 18 are free and available at the SPIE registration desk onsite. Children under 14 years of age must be accompanied by an adult at all times, and guardians are asked to help maintain a professional, disturbance-free conference environment.

Exhibition Hall: Everyone who attends the exhibition must be registered and have a badge. Badges for children are free and available onsite at the registration desk. Children under 14 years of age must be accompanied by an adult at all times. Guardians are asked to help maintain a professional, disturbance-free exhibition environment. Children under 18 are not allowed in the exhibition area during exhibition move-in and move-out.

Identification Requirement

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued photo identification at registration to collect registration materials. Individuals are not allowed to pick up badges for other attendees. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

Laser Pointer Safety Policy

SPIE supplies tested and safety-approved laser pointers for all conference meeting rooms. For safety reasons, SPIE requests that presenters use provided laser pointers. Use of a personal laser pointer represents the user's acceptance of liability for use of a non-SPIE-supplied laser pointer.

No-Smoking Policy

Attendees will observe all non-smoking regulations that are publicly posted by the facilities used by the event.

Payment Policy

Registrations must be fully paid before access to the conference is allowed. SPIE accepts VISA, MasterCard, American Express, Discover, Diner's Club, checks and wire transfers. Onsite registrations can also be paid with cash.

Recording Policy

Conferences, courses, and poster sessions: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter or instructor. Attendees may not capture or use materials presented in any meeting/course room or in course notes on display without written permission. Consent forms are available at Speaker Check-In or SPIE Registration. Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media. Refusal to comply with such requests is grounds for expulsion from the event. Exhibition Hall: Recordings of any kind are prohibited without explicit permission from on-site company representatives. Individuals not complying with this policy will be asked to surrender their recording media and to leave the exhibition hall. Refusal to comply with such requests is grounds for expulsion from the event.

Reporting of Unethical or Inappropriate Behavior

Onsite at an SPIE meeting, contact any SPIE Staff with concerns or questions. If you feel in immediate danger, please dial the local emergency number for police intervention. SPIE has established a confidential reporting system for staff and all meeting participants to raise concerns about possible unethical or inappropriate behavior within our community. Complaints may be filed by phoning toll-free to +1-888-818-6898 from within the United States and Canada or online at www.SPIE.ethicspoint.com and may be made anonymously.

Unauthorized Solicitation

Unauthorized solicitation in the Exhibition Hall is prohibited. Any non-exhibiting manufacturer or supplier observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Unsecured Items

Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

Wireless Internet Service

At most events, SPIE provides wireless access for attendees. Properly secure your computer before accessing the public wireless network. SPIE is not responsible for computer viruses or other kinds of computer damage.

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Fax: +44 29 2089 4750
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AOS Membership

Discounted registration at our biennial, stand alone AOS conferences, and notices of combined meetings as part of the ACOLS conference series.

Subscription to AOS News, our quarterly journal, which will keep you in touch with optics in the region, including:

- research in topical areas
- optics and science policy
- meetings calendars
- job markets and advertisements
- commercial optics developments
- member contacts

Each member of the AOS contributes, through their subscription, to STA (the peak science lobby group in Canberra)

Joint Membership Agreements with the SPIE and OSA assist us in being part of the wider international optics community via news-letters, conference notices and journals.

For more membership information go to:

http://www.optics.org.au/join-us

THE AUSTRALIAN OPTICAL SOCIETY

Photo Credit: Stephane Coen,
The first winner of the AOS photo competition.

NOTES