Optical Sensors (Sensors)

12 June - 15 June 2011, The Westin Harbour Castle, Toronto, Canada

APC Workshop: Biomedical Optical Sensors – Differentiators for Winning Technologies
Sunday, 12 June
14:00-18:00

In this workshop, experts will highlight developments in pertinent fields - and a panel discussion will tackle the question: 'What are the key differentiators for winning biosensor technologies?'
APC Workshop Schedule and Speaker Abstracts

Sensors addresses all aspects of optical fiber sensors from fiber based signal sources and sensor fibers to detection schemes and applications.

Optical Sensors are used in numerous research, and commercial applications today. These sensors are used for quality and process control, medico technologies, metrology, imaging, and remote sensing to mention a few examples. Today there are many types of optical sensors; many based on the use of lasers, imaging systems, and/or fibers. In addition, novel sensor methods that enable more advanced sensing are continuously being developed for example by using novel materials, such as meta materials, micro and nano structured materials or by employing new frequency bands as for example THz radiation. In this meeting, papers reporting the development of devices to implement the various sensor types and their configuration into sensing elements will be presented. Some of the enabling technologies to be discussed include advances in short pulsed high power lasers, imaging methods, micro and nano-structured optical sensing systems, and THz sensing. This topical meeting will address various sensor types, and include all aspects of optical sensors from the components employed, their configuration through detection schemes and algorithms, and application of sensors.

Papers are being considered in the following topic categories:

- **Micro and Nano-Engineered Sensors**
  - Integrated Optical Waveguide Sensors
  - Microstructured Fiber Sensors
  - Microfiber and Nanowire Optical Sensors
  - Optical Resonant Microsensors
  - Nanoplasmonic Sensors
  - Photonic Crystal Biosensors
  - Photonics Crystal Enhanced Fluorescence
  - Surface Enhanced Raman Spectroscopy
  - Micro/Nanofluidic Optical Sensors
- **THz sensing**
  - Sources and Detectors for THz Radiation
  - THz Spectroscopy for Sensing
  - THz Imaging
  - THz Gas Sensing
  - THz Sensing for Safety and Security Applications
  - THz Sensing in Industrial Environments
  - THz Optical Components and Devices
- **Imaging**
  - Bio-Imaging
  - Quantum Imaging
  - Nonlinear Imaging
  - Nanoscopy
  - Functional Imaging
  - Speckles
  - Opto-Acoustocs

View the conference program and plan your itinerary for the conference

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General Chairs

Karsten Rottwitt, *Danmarks Tekniske Univ., Denmark*
Ishwar Aggarwal, *US NRL, USA*

The 2010 meeting featured 62 presentations, with speakers representing 28 countries. In addition, nearly 51% of the contributed presentations were submitted by students.

Advanced Photonics Congress

- Access Networks & In-house Communications (ANIC)
- Integrated Photonics Research, Silicon and Nano-Photonics (IPR)
- Optical Sensors (Sensors)
- Signal Processing in Photonics Communications (SPPCom)
- Slow and Fast Light (SL)
- **New!** Specialty Optical Fibers

Sponsor:

OSA

Advanced Photonics Congress

June 12-15 2011, The Westin Harbour Castle, Toronto, Canada

The Advanced Photonics 2011 Congress will be held 12-16 June 2011 at The Westin Harbour Castle in Toronto, Canada. This year's congress consists of six collocated meetings including one new meeting and five veteran meetings.

Each meeting consists of invited and contributed presentations. There are three Joint Plenary Sessions and one Joint Poster Session. Be sure to check back for updates on the Plenary speakers. For a complete list of invited speakers, please visit the meetings' Conference Program.

Several exciting special events are planned for the 2011 Advanced Photonics congress including a Welcome Reception, Banquet Dinner and "Optics Olympics" Student Event.

All of the technical sessions will be held at the The Westin Harbour Castle is located near the theater district, waterfront and popular attractions such as Harbourfront Centre, Queens Quay, the Hockey Hall of Fame, and the Toronto Island Ferry. For more information on Toronto and housing at the meeting, please visit Housing and Travel.

Want to start planning your trip today? View the congress' Meetings-at-a-Glance. Please remember that times listed below are not final, so check back often for updates.

NEW!

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View the conference program and plan your itinerary for the conference

- Browse speakers and the agenda of sessions
- Browse sessions by type or day.
- Search by author, title, OCIS code and more.
- Plan and print your personal itinerary before coming to the conference

Submit a Paper

Are you ready to submit a paper? Please visit the Author Information page for your desired meeting.

More information about the individual meetings in the 2011 Advanced Photonics Congress can be found by clicking on the links below:

Advanced Photonics Congress

- Integrated Photonics Research, Silicon and Nano-Photonics (IPR)
  IPR covers all aspects of research in integrated photonics and nano-photonics, featuring innovative science and engineering results.
- Slow and Fast Light (SL)
  This topical meeting will bring together physicists and engineers in order to present and discuss the latest achievements within the area of light-speed control
- Access Networks & In-house Communications (ANIC)
  ANIC addresses all relevant research challenges and open research issues for FTTx technologies.

- [Signal Processing in Photonics Communications (SPPComm)]
  SPPCom is your home to learn about the photonic transmission technology required in communication networks of all kind - from access to long haul and submarine.
- [Optical Sensors (Sensors)]
  Sensors addresses all aspects of optical fiber sensors from fiber based signal sources and sensor fibers to detection schemes and applications.
- **New!** [Specialty Optical Fibers (SOF)]
  SOF – the meeting to discuss synthesis, processing, characterization, modeling, physical properties and applications of specialty and novel optical fibers with high technological impact potential.

Advanced Photonics Local Organizing Committee

Dan-Xia Xu, *Inst. for Microstrutual Sciences, National Research Council Canada, Canada*

Joyce Poon, *Univ. of Toronto, Canada*

Ted Sargent, *Univ. of Toronto, Canada*

OSA Student Chapter President:
Fei Ye, Ph.D. candidate, *University of Toronto, Canada*

SPIE Student Chapter President:
Jason Grenier, *University of Toronto, Canada*

Special Events

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Please visit the Workshop page for the full scope and list of speakers.

Optics Olympics
Sunday, 12 June 2011
16:30-21:00
Metro Ballroom West, Westin Harbour Castle

The OSA and SPIE Student Chapters at University of Toronto are pleased to invite all attendees (i.e., students, postdoctoral fellows, and all other researchers) of the 2011 Advance Photonics Congress to participate in the Optics Olympics competition on Sunday June 12th, 2011. The competition will have participants work together in teams of 4, to compete in 5 events designed to test and expand your optics skills. The Optics Olympics is an opportunity for conference attendees to meet each other at the start of the conference, have some fun applying their optics skills, and expand their professional network. Food and refreshments will be provided, and cash prizes will be awarded to the winners. Winners will be announced during the conference reception banquet on June 14th. Register early to avoid disappointment as the competition is limited to 64 participants. Registration is done individually and teams will be formed on-site at the beginning of the competition. We are looking forward to your participation in the Optics Olympics!

To register or for more information go to: http://osa.braveline.com/osautoronto/index.asp

FREE to Congress Registrants!
OIDA Workshop on Photonic Integration for High-Capacity Data Transport: Commercial Needs, Opportunities and Deployment
Monday, 13 June
08:00 - 17:00

Advanced Photonics Congress registrants are invited to attend the OIDA Workshop on Photonic Integration for High-Capacity Data Transport: Commercial Needs, Opportunities and Deployment on Monday, 13 June at the Westin Harbour Castle Hotel. To learn more about the workshop program and register visit the OIDA Workshop website.

OIDA Workshop Luncheon
Monday, 13 June
12:00 - 13:30

Congress registrants are invited to attend the OIDA Workshop Luncheon. The featured speaker will be announced shortly on the OIDA Workshop website. The fee is $25 USD and may be added to your congress registration.

Advance Photonics Congress Welcome Reception
Monday, 13 June 2011
18:30 - 20:00
Metro Ballroom West, Westin Harbour Castle

Free to all Technical Attendees of the Congress: Get the meeting off to a great start by attending the welcome reception after a full day of technical sessions! Meet with colleagues from around the world and enjoy light hors d'oeuvres.

Advance Photonics Congress Reception and Banquet Dinner
Tuesday, 14 June 2011
18:30 - 21:30
Location: Hart House, Univ. of Toronto
Tickets: $25 USD per person

Come join us at this great event! The Hart House was completed in 1919, Hart House is a crown jewel in the University of Toronto's architectural, academic and social history. Designed by architect Henry Sproatt, one of the last North American masters of the Gothic form, and engineer Ernest Rolph, the building is named for Vincent Massey's grandfather, Hart. Hart House was gifted to the University of Toronto by the Massey Foundation as a gathering place for students. Today, Hart House enjoys a reputation as a signature arts, creativity and event destination in the City of Toronto. The Hart House permanent art collection comprises nearly six-hundred works by renowned Canadian artists, including works considered national treasures by the Group of Seven, major works by the Automatistes and Painters Eleven, as well as contemporary works by artists from across the country.

Transportation WILL be provided. Shuttle transportation to the Hart House will pick up outside of the main Westin Harbour Castle entrance at 18.15. Buses will be available between 21.15 - 21.45 outside of the Hart House entrance to transport guests back to the Westin Harbour Castle. Please note that the Westin Harbour Castle and the Hart House are the only two destination points the shuttle transportation will pick up and drop off guests. For more information, please ask your OSA representative at Registration on-site.

JTuB: Congress Joint Poster Session
Tuesday, 14 June 2011
13:30 - 15:30
Metro Ballroom West, Westin Harbour Castle

Poster sessions are an integral part of the technical program and offer a unique networking opportunity, where presenters can discuss their results one-to-one with interested parties. Each author is provided with a 4 ft. x 8 ft. (1.22 m x 2.44 m) board on which to display the summary and results of his or her paper.

Postdeadline Sessions
Postdeadline sessions are an opportunity to showcase the most late-breaking innovations in the field.

Sponsors

Exhibitors

Interested in being an Exhibitor at the Advanced Photonics Congress?

Exhibit space at this Congress is very limited, so be sure to sign up for your tabletop exhibit space today! This Congress provides you an audience of 400 scientists. Call Regan Pickett at 202-416-1474 or e-mail exhibitsales@osa.org for more information.

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Optical Sensors (Sensors)

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Conference Program

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If you would like to be considered as a presenter, please review the topic categories below and the author/presenter information for submission guidelines.

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  - Quantum Imaging
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  - Nanoscopy
  - Functional Imaging
  - Speckles
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A number of distinguished invited speakers have been invited to present at the meeting. In addition, the organizers have planned a number of special events to make your meeting experience more enjoyable!

Meeting-at-a-Glance

A tentative general schedule of the meeting (as well as all meetings in the Congress) is listed below. Please check back frequently for updates.

	12 June 2011	13 June 2011	14 June 2011	15 June 2011
Registration	10.00–18.30	7.00–18.30	7.00–18.00	7.30–17.00
Technical Sessions		8.30–18.00	8.30–18.00	8.30–18.00
Coffee Breaks		10.00–10.30 & 15.30–16.00	10.00–10.30 & 15.30–16.00	10.00–10.30 & 15.30–16.00
Exhibit Time		10.00–16.00	10.00–16.00	
Conference Reception *included in technical registration		18.30–20.00		
Joint Poster Session			13:30–15:30	
Optical Olympics	16:30–21:00			
APC Workshop: Biomedical Optical Sensors – Differentiators for Winning Technologies	14:00–18:00			

Conference Banquet *tickets must be purchased separately	19.30-21.30

Special Events

Optics Olympics
Sunday, 12 June 2011
16:30-21:00
Metro Ballroom West, Westin Harbour Castle

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Sponsors

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The Edward S. Rogers Sr. Department
of Electrical & Computer Engineering
UNIVERSITY OF TORONTO

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Canada

Optical Sensors (Sensors)

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Please note that transportation is to and from the event is on your own.

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Optical Sensors (Sensors)

Signal Processing in Photonics Communications (SPPCom)

Slow and Fast Light (SL)

Specialty Optical Fibers (SOF)

12-14 June, 2011,

The Westin Harbour Castle

Toronto, Canada

2011 Advanced Photonics: OSA Optics & Photonics Congress

Conference Program

The Organizers of the Advanced Photonics:
OSA Optics & Photonics Congress and Table Top Exhibit
thank the following sponsors for their generous support.

The Edward S. Rogers Sr. Department of Electrical & Computer Engineering
UNIVERSITY OF TORONTO

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CANADIAN PHOTONICS FABRICATION CENTRE
CENTRE CANADIEN DE FABRICATION DE DISPOSITIFS PHOTONIQUES

GOSPEL

Congress Highlights

IPR Workshop: Biomedical Optical Sensors-Differentiators for Winning Technologies

Harbour Salon C
Sunday, 12 June 2011
14:00-18:00

The market for biosensors is becoming progressively more diverse - and is expected to grow significantly in the coming years. Currently the bulk of revenue comes from the point-of-care medical diagnostics market, but this situation is likely to change with newer application research. Progress in biosensors has mainly been due to a combination of improvements in the biological components and the implementation of microsystem technologies. In the photonics community, there has been an explosion of research activity in recent years – and various different photonic biosensor concepts have been proposed and demonstrated. Sensitivity continues to improve and single molecular detection has been reported. But the transport of target molecules to the sensing surface still relies on diffusion or on fluid flow. Specimen preparation and pre-concentration remain serious challenges.

Are there already too many types of biosensor? Which applications are the best implementations of different sensors? What are the key issues that must be resolved? What is required to bring today's research to tomorrow's point-of-care diagnostic instruments? In this workshop, experts will highlight developments in pertinent fields - and a panel discussion will tackle the question: 'what are the key differentiators for winning biosensor technologies?' We expect that all attendees will have the opportunity to make a contribution to a successful workshop.

Confirmed Speakers (*as of 13 May*)**:**

Gilberto Brambilla, Univ. of Southampton, UK

Pierre Berini, *Univ. of Ottawa, Canada*

Richard De La Rue, *Univ. of Malaya, Malaysia*

Kishan Dholakia, *St. Andrews Univ., UK*

Martin Kristensen, *Univ. of Aarhus, Denmark*

Holger Schmidt, *Univ. of California at Santa Cruz, USA*

Ian White, *Univ. of Maryland, USA*

DanXia Xu, *NRC Ottawa, Canada*

Anatoly Zayats, *King's College London, UK*

Optics Olympics

Metro Ballroom West, Westin Harbour Castle
Sunday, 12 June 2011
18:00-22:00

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The five challenging yet fun games that comprise the competition are listed below:

1. Image competition
2. Laser Khet (Laser chess game)
3. Optics triathlon
4. Laser graffiti
5. Hitting targets

We are looking forward to your participation in the Optics Olympics!

Sponsored by*: **Institute of Optical Sciences, Univ. of Toronto**
OSA - The Optical Society
Simbol Test Systems

*as of 19 May 2011

Advanced Photonics Congress Welcome Reception

Metro Ballroom West, Westin Harbour Castle
Monday, 13 June 2011
18:30 - 20:00

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Advanced Photonics Congress Reception and Banquet Dinner

Hart House, Univ. of Toronto
Tuesday, 14 June 2011
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Tickets: Limited seating available. $35 USD per person.

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JTuB: Congress Joint Poster Session

Pier 4/ Harbour Ballroom Foyer, Westin Harbour Castle
Tuesday, 14 June 2011
13:30 - 15:30

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OIDA Workshop

Photonic Integration for High-Capacity Data Transport: Commercial Needs, Opportunities and Deployment

Monday, 13 June 2011

Queen's Quay, The Westin Harbour Castle, Toronto, Canada

We're bringing together the field's leading innovators in the areas of high data rate, high density, high capacity optical communications and the companies which are exploring photonic integration, monolithic and hybrid, as a data transport solution for a unique, one-day workshop - *join us!*

Luncheon Speaker

David F. Welch
Co-Founder, Executive Vice President and Chief Strategy Officer, Infinera Corporation

Schedule at-a-Glance

Sunday, 12 June

14:00 – 18:00	Registration

Monday, 13 June

07:30 – 08:30	Registration & Continental Breakfast
08:30 – 12:30	Session
12:00 – 13:30	Lunch* featuring a presentation from **David Welch**, *Co-Founder, Executive Vice President and Chief Strategy Officer, Infinera Corporation*
13:30 – 17:30	Session
18:00 – 19:30	Networking Reception

There is an ever-increasing world-wide commercial need for higher and higher rates of data transport. Despite the cyclical nature of the general economy, the volume of electronic communication has been on a steady growth path. The increasing need for moving large volumes of data has considerably impacted the area of long haul optical transmission. Aggregate long haul data rates, in the C band of the optical fiber spectrum, are expected to reach 25Tbit/s per fiber. This creates a compelling need for both line and client side systems capable of very high data rate transport and switching within a very small volume of space and reduced power consumption. Fulfilling this need requires creative innovations in the field of optical components, and photonic integration has been increasingly proposed and utilized as a solution in this application space.

http://www.oida.org/events/integration11

* Congress registrants are invited to attend the OIDA Workshop Luncheon. The fee is $25 USD and may be purchased at the registration desk. Limited seating available.

Keynote and Plenary Speakers

Slow Light Enhanced Nonlinear Effects in Periodic Structures

JMA1 • 8:45, *Harbour Salon B*

Benjamin Eggleton; *Univ. of Sydney, Australia*

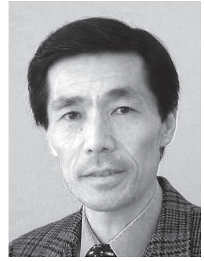
Benjamin J. Eggleton is an ARC Federation Fellow and Professor of Physics at the University of Sydney and is the founding Director of CUDOS, the ARC Centre of Excellence for Ultrahigh-bandwidth Devices for Optical Systems. He obtained Ph.D. degree in Physics from the University of Sydney. In 1996, he joined Bell Laboratories, Lucent Technologies as a Member of Staff and was subsequently promoted to Director within the Specialty Fibre Business Division of Bell Laboratories, where he was engaged in forward-looking research supporting Lucent Technologies business in optical fibre devices. Eggleton has published more than 300 journal publications (with over 7500 citations and an h-index of 44) and has filed over 35 patents. He is a Fellow of the OSA, IEEE and the Australian Academy of Technological Sciences and Engineering. Eggleton received numerous awards for his contributions, including the 2003 International Commission on Optics (ICO) Prize, the 1998 Adolph Lomb Medal from the OSA and the IEEE/LEOS Distinguished Lecturer Award. He was President of the Australian Optical Society from 2008-2010 and is Editor for Optics Communications.

Prospects and Challenges in High Power Fiber Laser Technology

SOMA1 • 8:45, *Pier 5*

Andreas Tunnermann[1,2], *[1]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany; [2]Inst. for Applied Physics, Friedrich-Schiller-Univ., Germany*

Andreas Tünnermann received a diploma and PhD degrees in physics from the University of Hannover in 1988 and 1992, respectively. His habilitation was related to topics on ultrastable light sources for interferometric gravitational wave detectors. In 1998 he joined the Friedrich-Schiller-University in Jena, Germany as a Professor and Director of the Institute of Applied Physics. In 2003 he became the Director of the Fraunhofer Institute of Applied Optics and Precision Engineering in Jena. He is known for his pioneering work in fiber laser technology and the application of high power femtosecond lasers for materials processing. Professor Tünnermann´s research activities on optics and applied quantum electronics have been awarded with the Roentgen-Award 1997, WLT-Award 1998, Otto-Schott-Award 2003, Leibinger Innovation Award 2004 and the Gottfried-Wilhelm-Leibniz-Award 2005.



Progress and Technical Challenges for Integrated Optics

JTuA1 • 10:30, *Harbour Salon B*

Katsunari Okamoto*; AiDi Corp., Japan.*

Dr. Katsunari Okamoto received the B.S., M.S., and Ph.D. degrees in electronics engineering from Tokyo University, Tokyo, Japan, in 1972, 1974, and 1977, respectively. He joined Ibaraki Electrical Communication Laboratory, Nippon Telegraph and Telephone Corporation (NTT), Ibaraki, Japan, in 1977, and was engaged in the research on transmission characteristics of multimode, dispersion-flattened single-mode, single-polarization (PANDA) fibers, and fiber-optic components. He proposed for the first time the dispersion-flattened fiber (DFF) and succeeded in fabrication of DFF that had chromatic dispersion less than +/-1 ps/km/nm over a wide spectral range. From September 1982 to September 1983, he worked as a guest researcher at Optical Fiber Group, Southampton University, Southampton, England, where he was engaged in the research on birefringent optical fibers. At NTT Photonics Laboratories, he has developed various kinds of AWGs ranging from 8ch-300nm spacing AWGs to 128ch-25GHz AWGs, flat spectral response AWGs and integrated-optic reconfigurable add/drop multiplexers (ROADM). 200 GHz to 50 GHz spacing AWGs are now widely used in the commercial WDM systems. From July 2006, he worked as Professor of Electrical and Computer Engineering at the University of California at Davis (UC Davis). His research at UC Davis includes passive and active photonics devices and silicon photonics. He is currently working as CTO at AiDi corporation aiming at the miniature lightwave spectroscopic sensors for environmental sensing and health diagnostics. He has published more than 285 papers in technical journals and international conferences. He authored and co-authored 8 books including "***Fundamentals of Optical Waveguides*** (Elsevier)". Dr. Okamoto is a member of the Institute of Electrical and Electronics Engineers (Fellow), Optical Society of America and the Institute of Electronics Information and Communication Engineers of Japan.

Shaping the Future of Nanobiophotonics

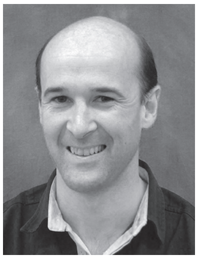
JTuA2 • 11:15, *Harbour Salon B*

Kishan Dholakia*, Univ. of St Andrews, UK*

Kishan Dholakia is Professor of Physics at the University of St Andrews Scotland and an honorary adjunct Professor at the Centre for Optical Sciences at the University of Arizona, USA.

He heads a large (~25) group working in various aspects of photonics including beam shaping, micromanipulation and biophotonics. He has published over 300 journal/conference papers and his group won the European Optics Prize in 2003. He was elected to the position of Fellow of the Royal Society of Edinburgh in 2007, Fellow of the Optical Society of America in 2008 and SPIE Fellow in 2009.

Tutorial Speakers



Photonic Crystal Fibers

SOMD3 • 17:00, *Pier 5*

William Wadsworth; *Univ. of Bath, UK*

William Wadsworth has been designing, fabricating and using photonic crystal fibres (PCFs) since 1999 when he joined the University of Bath as a post-doc. His previous work developing high power lasers and low-cost tunable lasers has informed a particular interest in the use of PCF for compact and versatile light sources.

Optical fiber sensors and their Specialty Fiber Needs

SOTuC5 • 17:15, *Pier 5Tutorial*

Alexis Mendez, *MCH Engineering, LLC, USA*

Alexis Mendez received a PhD. degree in Electrical Engineering from Brown University, in 1992. He is President of MCH Engineering LLC, a consulting firm specializing in optical fiber sensing technology, and has over 20 years of experience in optical fiber technology, sensors and instrumentation. Dr. Mendez was the former Group Leader of the Fiber Optic Sensors Lab within ABB Corporate Research (USA) where he led R&D activities for the development of fiber sensors for use in industrial plant, oil & gas, and high voltage electric power applications. He has written 60 technical publications, taught several short courses on fiber sensors, holds 5 US patents and is recipient of an R&D100 award. Dr. Mendez is a Fellow of SPIE and was past Chairman of the 2006 International Optical Fiber Sensors Conference (OFS-18), past Technical Chair of the 2nd Workshop on Specialty Optical Fibers and their Applications (WSOF21010), and is co-editor of the “Specialty Optical Fibers Handbook”.

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Explanation of Session Codes

ATuA4

Meeting Name

A = Access Networks and In-house Communications
S = Optical Sensors
SP = Signal Processing in Photonics Communications
SL = Slow and Fast Light
I = Integrated Photonics Research, Silicon and Nano Photonics
SO = Specialty Optical Fibers
J = Joint

Day of the Week

M = Monday
Tu = Tuesday
W = Wednesday

Session Designation
(alphabetically)

Number
(presentation order within the session)

The first letter of the code designates the conference (A=Access Networks and In-house Communications, S= Optical Sensors, SP=Signal Processing in Photonics Communications, SL=Slow and Fast Light, I=Integrated Photonics Research, Silicon and Nano Photonics, SO=Specialty Optical Fibers, J=Joint). The second element denotes the day of the week (Monday=M, Tuesday=Tu, Wednesday=W). The third element indicates the session within the particular day the talk is being given. Each day begins with the letter A and continues alphabetically. The number on the end of the code signals the position of the talk within the session (first, second, third, etc.). For example, a presentation coded ATuA4 indicates that this paper is part of Access Networks and In-house Communications (A) and is being presented on Tuesday (Tu) during the first session (A), and is the fourth paper (4) presented in that session.

Agenda of Sessions — Sunday, 12 June

10:00–18:30	**Registration Open,** *Harbour Ballroom Foyer*
14:00–18:00	**Workshop: Biomedical Optical Sensors-Differentiators for Winning Technologies,** *Harbour Salon C*
17:00–22:00	**Optics Olympics,** *Metro West*

Agenda of Sessions — Monday, 13 June

	Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C	Pier 2 & 3	Harbour Salon A	Pier 5
	ANIC	SPPCom	IPR	IPR	SL	Sensors	SOF
7:00–18:30	**Registration Open,** *Harbour Ballroom Foyer*						
7:30–19:30	**OIDA Workshop,** *Queen's Quay, The Westin Harbour Castle*						
8:30–8:45	**AMA • Network, Market and Operator View** (starts at 8:00)		**IPR/SL Opening Remarks,** *Harbour Salon B*			**Opening Remarks**	**Opening Remarks**
8:45–10:00			**JMA: IPR/SL Keynote Speaker Session,** *Harbour Salon B*			**SMA • Sensors Keynote Speaker Session**	**SOMA • SOF Keynote Speaker Session** (ends at 9:30)
10:00–16:00	**Exhibits Open,** *Pier 4/ Harbour Ballroom Foyer*						
10:00–10:30	**Coffee Break/Exhibits,** *Pier 4/ Harbour Ballroom Foyer*						
10:30–12:30	**AMB • Green Access and Operations**	**SPMA • High Spectral Efficiency**	**IMA • Modeling and Simulation I: Plasmonics**	**IMB • Nano-photonics: Waveguides, Optomech-anics, and SOI-Based Technologies**	**SLMA • Applications of Slow/Fast Light**	**SMB • Subwavelength and Plasmonic Sensors**	**SOMB • 2um Fiber Lasers**
12:30–13:30	**Lunch Break** *(on your own)*						
13:30–15:30	**AMC • OFDM-PON**	**SPMB • OFDM**	**IMC • Modeling and Simulation II: Periodic Structures and Waveguides**	**IMD • Nano-photonics: Waveguides, Lasers, and SOI-Based Technologies**	**SLMB • Applications of Slow/Fast Light II**	**SMC • Microfiber Sensors**	**SOMC • Novel Glass and Fluoride Fibers**
15:30–16:00	**Coffee Break/Exhibits,** *Pier 4/ Harbour Ballroom Foyer*						
16:00–18:00	**AMD • Hybrid and WDM-PON**	**SPMC • Optical Techniques I** (ends at 17:30)	**IME • Devices and Components I** (ends at 17:00)	**IMF • Nano-photonics: Photonic Crystals and nanowires**	**SLMC • Atomic and Rare-Earth Systems and Applications**	**SMD • Spectral and Biomedical Imaging**	**SOMD • Micro-structured Fibers**
18:30–20:00	**Advanced Photonics Congress and OIDA Welcome Reception,** *Metro Ballroom West*						

Key to Conference Abbreviations

ANIC	Access Networks and In-house Communications
Sensors	Optical Sensors
SPPcom	Signal Processing in Photonics Communications
SL	Slow and Fast Light
IPR	Integrated Photonics Research, Silicon and Nano Photonics
SOF	Specialty Optical Fibers

Agenda of Sessions — Tuesday, 14 June

	Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C	Pier 2 & 3	Harbour Salon A	Pier 5
	ANIC	SPPCom	IPR	IPR	SL	Sensors	SOF
7:30–18:00	**Registration Open,** *Harbour Ballroom Foyer*						
8:30–10:00	**ATuA • Basic Technologies for NG-PON** (starts at 8:00)	**SPTuA • Coding I** (ends at 9:30)	**ITuA • Devices and Components II**	**ITuB • Nano-photonics: Plasmonics and applications I**	**SLTuA • Slow/ Fast Light in SOAs and Photonic Crystals**	**STuA • High Intensity and Broadband THz Sources**	**SOTuA • Super-continuum Fiber Lasers**
10:00–16:00	**Exhibits Open,** *Pier 4/ Harbour Ballroom Foyer*						
10:00–10:30	**Coffee Break/Exhibits,** *Pier 4/ Harbour Ballroom Foyer*						
10:30–12:30	**ATuB • Radio over fiber and OCDMA**	**SPTuB • Advanced Modulation** (ends at 11:45)	**JTuA • Joint IPR/SL Plenary Session,** *Harbour Salon B*			**STuB • THz Spectroscopy and Imaging Applications**	**SOTuB • Chalcogenide and Tellurite Fibers** (ends at 12:15)
12:30–13:30	**Lunch Break** *(on your own)*						
1:30–15:30	**JTuB • Congress Joint Poster Session,** *Pier 4/ Harbour Ballroom Foyer*						
15:30–16:00	**Coffee Break/Exhibits,** *Pier 4/ Harbour Ballroom Foyer*						
16:00–18:00	**ATuC • Inhouse: Fiber and Wireless**	**SPTuC • DSP** (ends at 17:30)	**ITuC • Photonic Integration I**	**ITuD • Nano-photonics: Plasmonics and Applications II**	**SLTuB • Methods and Fundamentals**	**STuC • Terahertz Waveguides, Applications, and Device Technology**	**SOTuC • Fiber Sensors**
16:30–21:30	**Advanced Photonics Congress Reception and Banquet,** *Hart House, University of Toronto*						

Key to Conference Abbreviations

ANIC	Access Networks and In-house Communications
Sensors	Optical Sensors
SPPcom	Signal Processing in Photonics Communications
SL	Slow and Fast Light
IPR	Integrated Photonics Research, Silicon and Nano Photonics
SOF	Specialty Optical Fibers

Agenda of Sessions — Wednesday, 15 June

	Pier 7 & 8	Harbour Salon B	Harbour Salon C	Pier 2 & 3	Harbour Salon A	Pier 5
	SPPCom	IPR	IPR	SL	Sensors	SOF
7:30–17:00	**Registration Open,** *Main Foyer*					
8:30–10:00	**SPWA • Nonlienearities** (starts at 9:00)	**IWA • Modeling and Simulation III: Lasers and Emitters**	**IWB • Active nanophotonics, quantum dots, and nanocavities**	**SLWA • Nonlinear Optics and Waveguide Technologies**	**SWA • Biochemical Sensors I**	**SOWA • 1um Fiber Lasers** (ends at 9:45)
10:00–10:30	**Coffee Break,** *Harbour Ballroom Foyer*					
10:30–12:30	**SPWB • Coding II** (ends at 12:15)	**IWC • Photonic Integration II**	**IWD • Modeling and Simulation IV: Coupled Waveguides and Resonators** (ends at 12:15)	**SLWB: Slow/Fast Light Systems** (ends at 12:15)	**SWB • Biochemical Sensors II**	**SOWB • Hollow Core Fibers** (ends at 12:15)
12:30–13:30	**Lunch Break** *(on your own)*					
13:30–15:30	**SPWC • Transmission Systems**	**IWE • Photonic Integration III**	**IWF • Devices and Components III**		**SWC • Photonic Crystal Sensors**	**SOWC • Poled and Polarizing Fibers** (ends at 15:15)
15:30–16:00	**Coffee Break/Exhibits,** *Pier 4/ Harbour Ballroom Foyer*					
16:00–18:00	**SPWD • Optical Techniques II** (ends at 17:30)		**IWG • Devices and Components IV** **Concluding Remarks** (ends at 17:45)		**SWD • Speckle and Nonlinear Based Imaging**	**SOWD • Novel Applications and Effects** (ends at 17:30)

Key to Conference Abbreviations

ANIC	Access Networks and In-house Communications
Sensors	Optical Sensors
SPPcom	Signal Processing in Photonics Communications
SL	Slow and Fast Light
IPR	Integrated Photonics Research, Silicon and Nano Photonics
SOF	Specialty Optical Fibers

Pier 9 — Access Networks and In-house Communications

Harbour Salon B — Joint

Harbour Salon A — Optical Sensors

Pier 5 — Specialty Optical Fibers

7:00–18:30 Registration Open, *Harbour Ballroom Foyer*

8:00–10:00
AMA • Network, Market and Operator View
Thomas Pfeiffer, Alcatel-Lucent, Germany, Presider

AMA1 • 8:00 Invited
BT NGA Deployment & Evolution Strategy as Drivers for NG-PON2 Requirements, *Albert Rafel[1]; [1]Innovation & Design, Adastral Park, Martlesham Heath, UK.* This paper outlines the current regulatory situation in the UK and BT's open access operating model. It presents BT's current FTTP architecture and design giving details of the interconnection points for unbundling purposes at Ethernet level as well as the components making the design future proof.

AMA2 • 8:30 Invited
Next Generation Optical Access Networks, *Ronald Heron[1]; [1]Access CTO Team, Alcatel-Lucent, Canada.* Future optical access networks must support increased rate, reach, split, multi-operator access & wireline/wireless convergence. This paper outlines the role, challenges and breakthroughs of NG technologies including TDM-PON, WDM-PON & TWDM-PON.

AMA3 • 9:00 Invited
Practical Hybrid PON Technologies, *Naoto Yoshimoto[1]; [1]Access Network Service Systems Laboratories, NTT, Japan.* This paper describes possible access network architectures using hybrid PON technologies designed to meet operators' requirements in the next decade. From the technical continuity viewpoint, TDM based WDM-PON will be a promising candidate.

AMA4 • 9:30 Invited
Green Hybrid Optical/Wireless Access/In-House Networks, *Leonid Kazovsky[1], Kadir Albeyoglu[1], Tolga Ayhan[1]; [1]Stanford Univ., USA.* This paper focuses on energy efficient hybrid access networks. Solutions to underutilization of network are investigated. Power optimization of distributed antenna systems and cell-breathing technology for hybrid access networks are explored.

8:30–10:00
JMA • IPR/SL Keynote Speaker Session
Jacob B. Khurgin, Johns Hopkins Univ., USA, Presider
Luc Thévenaz, École Polytechnique Fédérale de Lausanne, Switzerland, Presider

Opening Comments • 8:30

JMA1 • 8:45 Plenary
Slow Light Enhanced Nonlinear Effects in Periodic Structures, *Benjamin Eggleton; Univ. of Sydney, Australia.* The generation of intense single-cycle THz pulses by tilted-pulse-front techniques for probing ultrafast nonlinear THz dynamics in semiconductors is described. Full-field imaging of THz Cherenkov waves and novel THz pulse detection methods are also discussed.

JMA2 • 9:30 Invited
Monitoring and Controlling Slow Light in Photonic Crystals, *Daryl M. Beggs[1], Isabella H. Rey[2], Tobias Kampfrath[1], Thomas Krauss[2], Kobus Kuipers[1]; [1]FOM Inst. AMOLF, Netherlands; [2]School of Physics & Astronomy, Univ. of St Andrews, UK.* By performing ultrafast pump-probe experiments, we show the 0.3THz adiabatic frequency conversion of pulses in a slow-light photonic crystal waveguide with 80% efficiency. We demonstrate the use of this conversion scheme in a delay line.

8:30-10:00
SMA • Sensors Keynote Speaker Session

The Sensors Keynote speaker(s) will be announced on the Update Sheet. Please check the Update sheet for speaker listings.

8:30–9:30
SOMA • SOF Keynote Session
John Ballato, Clemson Univ., USA, Presider

Opening Comments • 8:30

SOMA1 • 8:45 Keynote
Prospects and Challenges in High Power Fiber Laser Technology, *Andreas Tunnermann[1,2], Jens Limpert[2]; [1]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany; [2]Inst. for Applied Physics, Friedrich-Schiller-Univ., Germany.* Solid-state lasers are attractive sources of coherent radiation for various applications. At present fiber lasers and amplifiers are capturing the different markets. Novel developments and challenges in high-power fiber laser technology are reviewed.

10:00-10:30 Coffee Break, *Pier 4/ Harbour Ballroom Foyer*

10:00-16:00 Exhibits Open, *Pier 4/ Harbour Ballroom Foyer*

Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

10:30–12:30
AMB • Green Access and Operations
A. Koonen, Technische Univ. Eindhoven, Netherlands, Presider

AMB1 • 10:30 Invited
Research Directions for Low Energy Access Networks, *Peter Vetter[1], Dusan Suvakovic[1]; [1]Bell Labs - Alcatel-Lucent, USA.* The paper addresses different options for reduction of energy consumption in fixed access networks, studied by the GreenTouch consortium. A combination of different concepts will lead to an energy efficiency improvement of more than 100x.

AMB2 • 11:00 Invited
Implications of ODN on Energy Consumption in Access Networks, *Antonio Teixeira[1,2], Ali Shapari[1]; [1]Univ. de Aveiro, Portugal; [2]Nokia Siemens Networks, Portugal.* The problem of installed fiber plants and the issue of energy consumption are two challenging points in the current techno-economical environment. This paper addresses the investment and interface technology level in Optical Distribution Network (ODN).

AMB3 • 11:30
Long Reach PON Fault Management and Protection System, *Maged A. Esmail[1,2], Habib Fathallah[1,2]; [1]Electrical Engineering, King Saud Univ., Saudi Arabia; [2]Prince Sultan Advanced Technologies Res. Inst. (PSATRI), Saudi Arabia.* We propose a fault management and protection system for the ring-and-spur long reach PON. We use passive optical components in the field. We found that our system has recovery time 0.5ms as an upper bound.

10:30–12:30
SPMA • High Spectral Efficiency
Ezra Ip, NEC Labs, USA, Presider

SPMA1 • 10:30 Invited
High Spectral-Efficiency Transmission Techniques for Systems Beyond 100 Gb/s, *Xiang Liu[1], S. Chandrasekhar[1]; [1]Alcatel-Lucent, USA.* We review recent progress on high spectral-efficiency optical transmission with per-channel data rates beyond 100 Gb/s. Enabling technologies such as high-level QAM modulation and multiband superchannel transmission are discussed.

SPMA2 • 11:00 Invited
Chromatic Dispersion-Tolerant Higher-Order Multilevel Transmission with Optical Delay Detection, *Nobuhiko Kikuchi[1]; [1]Central Reseach Lab., Hitachi, Japan.* We present a practical receiver-side chromatic dispersion (CD) compensation scheme for higher-order multilevel signaling using optical delay-detection, and up to 40-Gbit/s 16QAM signaling experiments have been demonstrated with large tolerance to CD (±40-km SSMF) and laser phase noise (1-MHz linewidth).

SPMA3 • 11:30 Invited
Ultra High Capacity Transmission Based on High-Order QAM for Future Optical Transport Networks, *Takayuki Kobayashi[1], Akihide Sano[1], Akihiko Matsuura[1], Tadao Nakagawa[1], Eiji Yoshida[1], Miyamoto Yutaka[1]; [1]NTT Network Innovation Laboratories, NTT, Japan.* High-capacity transmission using high-order QAM enhanced by powerful DSP is being intensely investigated. In this paper, we review recent high capacity transmission approaches and propose a 400-Gb/s superchannel configuration for future OTNs.

10:30–12:30
IMA • Modeling and Simulation I: Plasmonics
Junji Yamauchi; Hosei Univ., Japan, Presider

IMA1 • 10:30 Invited
Optical Forces in Plasmonic Nanostructures: New Functionalities for Nanophotonic Circuits, *Olivier Martin[1]; [1] Swiss Federal Inst. Of Technology, Lausanne (EPFL), Switzerland.* We study in detail the modeling requirements for realistic plasmonic nanostructures and show that strong field gradients created at their vicinity can be used to trap nanostructures; this plasmonic trapping is also demonstrated experimentally.

IMA2 • 11:00 Invited
Theory and Modelling of Gain in Nano-Plasmonics and Metamaterials, *Ortwin Hess, Joachim Hamm; Imperial College, London.* We give an overview of the theory and modeling of amplification and gain in nano-plasmonic metamaterials and discuss novel results of full time-domain simulations shedding light on the coupled spatio-temporal plasmon-light dynamics in fishnet metamaterials.

IMA3 • 11:30
Transmission Line Modeling of Nano-Plasmonic Devices, *Osman S. Ahmed[1], Mohamed A. Swillam[2], Mohamed H. Bakr[1], Xun Li[1]; [1]Electrical and Computer Engineering, McMaster Univ., Canada; [2]Physics, Univ. of Toronto, Canada.* We demonstrate the application of the time domain transmission line method (TLM) to accurate modeling of surface plasmon polariton (SPP) structures. The constructed TLM allows for modeling of dispersive materials and perfect absorbing boundaries.

10:30–12:30
IMB • Nanophotonics: Waveguides, Optomechanics, and SOI-based Technologies
Susumu Noda; Kyoto Univ., Presider

IMB1 • 10:30 Invited
Exploiting Photosensitivity in Chalcogenide-assisted Integrated Optics, *Andrea Melloni[1], Antonio Canciamilla[1], Carlo Ferrari[1], Stefano Grillanda[1], Francesco Morichetti[1], Philippe Velha[2], Marc Sorel[2], Juejun Hu[3], J. David Musgraves[4], Bogdan Zdyrko[4], Igor Luzinov[4], Kathleen Richardson[4], Vivek Singh[5], Anu Agarwal[5], Lionel Kimerling[5]; [1]Dipart di Electtronica e Informazione, Politecnico di Milano, Italy; [2]EEE Dept., Univ. of Glasgow, UK; [3]Dept. of Materials Science & Engineering, Univ. of Delaware, USA; [4]Ctr. For Optical Materials Science and Engineering Technologies (COMSET), Clemson Univ., USA; [5]Microphotonics Center, Massachusetts Inst. Of Technology, USA.* We show the potential of post-fabrication trimming of integrated devices by exploiting photosensitivity in chalcogenide glass. Compensation of fabrication tolerances is demonstrated in As2S3 and As2S3-assisted silicon ring filters.

IMB2 • 11:00
Nonvolatile Optomechanical Memory Enabled by Dynamic Optical Backaction, *Mahmood Bagheri[1], Menno Poot[1], Wolfram Pernice[1], Hong Tang[1]; [1]Electrical Engineering, Yale Univ., USA.* We demonstrate coherent switching of nanomechanical resonators by optical cooling and amplification. The dynamic manipulation by optical backaction drives nanomechanical resonators at high amplitudes. A non-volatile memory is also demonstrated.

IMB3 • 11:15
Enhancing FWM Conversion Efficiency in a Silicon Waveguide by exploiting Phase-Matching via a Pump-induced Nonlinear Grating, *Jeffrey B. Driscoll[1], Xiaoping Liu[1], Richard Grote[1], Jerry I. Dadap[1], Nicolae C. Panoiu[2], Richard M. Osgood[1]; [1]Microelectronics Sciences Labs., Columbia Univ., USA; [2]Dept. of Electronic and Electrical Engineering, Univ. College London, UK.* We show that the anisotropy of Si may be used to induce a nonlinear grating on-chip, which could be exploited by FWM to phase-match signals well outside of the conversion bandwidth, allowing a >10dB conversion-efficiency-enhancement.

IMB4 • 11:30
Theoretical Investigation of CMOS-Compatible Metal-Oxide-Silicon-Oxide-Metal Waveguides, *Min-Suk Kwon[1]; [1]Optical Engineering, Sejong Univ., Republic of Korea.* We propose a metal-oxide-silicon-oxide-metal (MOSOM) waveguide that is a hybrid plasmonic waveguide, and we discuss its fabrication process based on standard CMOS fabrication tools. Its characteristics are theoretically investigated and explained.

Sessions continue on page XX.

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

Pier 2 & 3

Slow and Fast Light

10:30–12:30
SLMA • Applications of Slow/Fast Light
Luc Thévenaz; Ecole Polytechnique Federale de Lausanne, Switzerland, Presider

SLMA1 • 10:30 Invited
Progress in Slow/Fast/Stopped Light, *Jacob Khurgin; John's Hopkins Univ., USA.* The past 5 years have seen rapid developments of methods for manipulating the group velocity of light. In this talk we assess the current state of slow light versus fundamental limitations and attempt to identify promising application niches for slow and fast light.

SLMA2 • 11:00 Invited
Movable Dynamic Grating-Based Optical Delay Line in Polarization Maintaining Fibers, *Sanghoon Chin[1], Nikolay Primerov[1], Luc Thévenaz[1]; [1]Ecole Polytechnique Federale de Lausanne, Switzerland.* A new type of all optical delay line is realized in fibers. A local dynamic grating reflector can be generated everywhere in the fiber, demonstrating >1 us delay for 650 ps pulses.

SLMA3 • 11:30
All-optical Calculus Based on Dynamic Brillouin Grating Reflectors in Optical Fibers, *Nikolay Primerov[1], Sanghoon Chin[1], Luc Thévenaz[1], Leonora Ursini[2], Marco Santagiustina[2]; [1]EPFL, Switzerland; [2]Univ. of Padova, Italy.* We experimentally demonstrate that all-optical signal calculus can be realized based on dynamic Brillouin gratings in optical fibers. Temporal integration and first-order differentiation were performed for optical pulse with various waveforms.

Harbour Salon A

Optical Sensors

10:30–12:30
SMB • Subwavelength and Plasmonic Sensors
Gilberto Brambilla, University of Southampton, UK, Presider

SMB1 • 10:30 Invited
Subwavelength Hot Spot Generation for Sensor Applications, *Byoungho Lee[1], Sookyoung Roh[1], Dongho Oh[1], Jun-Bum Park[1], Eui-Young Song[1], Seong-Woo Cho[1], Il-Min Lee[1]; [1]Dept. of Electrical Engineering, Seoul Natl. Univ., Democratic People's Republic of Korea.* We present various methods for the generation of subwavelength plasmonic hot spots for sensor applications. It is shown that the structured nano-apertures on the metal film exhibit extremely small hot spots with enhanced field intensity.

SMB2 • 11:00
Nanoparticle Identification from a Liquid Matrix Using the Maximum Entropy Method for SPR Reflectance, *Jarkko J. Saarinen[1], Erik M. Vartiainen[2], Kai-Erik Peiponen[3]; [1]Center for Functional Materials, Abo Akademi University, Finland; [2]Department of Physics, Lappeenranta Univ. of Technology, Finland; [3]Department of Physics and Mathematics, Univ. of Eastern Finland, Finland.* We show that surface plasmon resonance (SPR) reflectance measurement can be used to identify nanoparticles from a liquid matrix using the maximum entropy method once the optical properties of the host liquid are known.

SMB3 • 11:15
Vertical Wall Affinity Sensor with Polarization Diversity, *Muhammad Alam[1], Stewart Aitchison[1], Mo Mojahedi[1]; [1]Univ. of Toronto, Canada.* We propose a highly sensitive biosensor consisting of a vertical metal plane separated from a vertical silicon layer by a narrow gap. The sensor provides high sensitivity and polarization diversity.

SMB4 • 11:30
Interrogation of Gold-Coated TFBG-SPR Refractometers Based on Differential Orthogonal Light States, *Valerie Voisin[1], Christophe Caucheteur[1], Patrice Mégret[1], Jacques Albert[2]; [1]SET, UMONS, Belgium; [2]Department of electronics, Carleton Univ., Canada.* A demodulation technique based on orthogonally polarized spectra of gold-coated tilted fiber Bragg gratings is proposed to measure the surrounding refractive index by comparing the differential amplitude of resonance peaks near a Plasmon resonance.

Pier 5

Specialty Optical Fibers

10:30–12:15
SOMB • 2um Fiber Lasers
Bryce Samson, Nufern, USA, Presider

SOMB1 • 10:30 Invited
Resonantly Pumped 2 µm Holmium Fibre Lasers, *Alexander Hemming[1], Shayne Bennetts[1], Nikita Simakov[1], Alan Davidson[1], John Haub[1], Adrian Carter[2]; [1]DSTO, Australia; [2]Nufern, USA.* We have demonstrated the first resonantly pumped double-clad holmium-doped fibre laser. An output power of 99W with 65% slope efficiency versus absorbed power was achieved at 2.12µm.

SOMB2 • 11:00 Invited
2um Fiber Lasers, *Martin Richardson, Lawrence Shah, R. Andrews Sims, Christina C.C. Willis, Pankaj Kadwani, Joshua Bradford; CREOL, Univ. of Central Florida, USA.* We review recent progress exploiting the unique characteristics of high power 2 um Tm fiber lasers in the spectral and the temporal domains. These developments offer new opportunities for applications in many areas.

SOMB3 • 11:30
Tunable Operation of Tm-Doped Fiber Ring Laser Controlled by Microbend-Induced Fiber Grating, *Hajime Sakata[1], Marie Ichikawa[1], Shungo Araki[1], Hiroyuki Nakagami[1]; [1]Electrical and Electronic Engineering, Shizuoka Univ., Japan.* We demonstrate a 1.9-µm band Tm-doped fiber ring laser by using bi-directional pumping with 1.6 µm laser diodes. The lasing wavelength is controlled by shifting the inter-resonance-mode passband due to a microbend-induced long-period fiber grating.

Sessions continue on page XX.

Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

AMB • Green Access and Operations—Continued

AMB4 • 11:45
In-service Measurement of Fiber Fault in WDM-PON, *Jingjing Liu[1], Nianyu Zou[1], Zhe Kang[1], Dong Wang[2], Ping Li[1]; [1]Research Institute of Photonics, China; [2]Beijing University of Posts and Telecommunications, Information & Electronics Technology Lab, China.* A scheme for in-service measurement of fiber fault in WDM-PON is proposed, which can monitor all the fiber branches simultaneously without disturbing the service, and locate the failure point accurately by a selective OTDR.

AMB5 • 12:00 Invited
High Speed Short Range Links, *S. Ralph; [1]Georgia Tech., USA. Abstract Not Available.*

SPMA • High Spectral Efficiency—Continued

SPMA4 • 12:00
Performance of Digital Nyquist-WDM, *Gabriella Bosco[1], Vittorio Curri[1], Andrea Carena[1], Pierluigi Poggiolini[1], Fabrizio Forghieri[2]; [1]Politecnico di Torino, Italy; [2]Cisco Photonics Italy, Italy.* We investigate by simulation the performance of Nyquist-WDM signals generated using high-speed digital-to-analog converters (DACs) with either PM-QPSK or PM-16QAM modulation, taking into account speed and bandwidth properties of state-of-the-art DACs.

SPMA5 • 12:15
Real-Time Nyquist Pulse Modulation Transmitter Generating Rectangular Shaped Spectra of 112 Gbit/s 16QAM Signals, *Rene Schmogrow[1], Marcus Winter[1], Matthias Meyer[1], David Hillerkuss[1], Bernd Nebendahl[3], Joachim Meyer[2], Michael Dreschmann[2], Michael Huebner[2], Juergen Becker[2], Christian Koos[1], Wolfgang Freude[1], Juerg Leuthhold[1]; [1]Institute of Photonics and Quantumelectronics, Karlsruhe Institute of Technology, Germany; [2]Institute for Information Processing, Karlsruhe Institute of Technology, Germany; [3]Agilent Technologies, Germany.* A real-time software-defined transmitter generating Nyquist pulses with nearly rectangular spectra is demonstrated at 56 Gbit/s for PDM-QPSK and 112 Gbit/s for PDM-16QAM.

IMA • Modeling and Simulation I: Plasmonics—Continued

IMA4 • 11:45
High-Accuracy Calculations of Light Scattering by Plasmonic Cylinders Using the Legendre Pseudospectral Frequency-Domain (PSFD) Method, *Chih-Yu Wang[1], Shih-Yung Chung[1], Chun-Hao Teng[2], Chung-Ping Chen[1], Hung-chun Chang[1]; [1]Electrical Engineering, Natl. Taiwan Univ., Taiwan; [2]Applied Mathematics, National Chiao Tung Univ., Taiwan.* A high-order accurate pseudospectral frequency-domain (PSFD) method is used to analyze light scattering by plasmonic cylinders. Field coupling and enhancement within the gap of close spaced cylinders are examined.

IMA5 • 12:00
Polarizability of Single Split-Ring Nanoresonators at Optical Frequencies, *Yury Terekhov[1], Anton V. Zhuravlev[1], Gennady V. Belokopytov[1]; [1]Oscillations Department, M.V. Lomonosov Moscow State Univ., Russian Federation.* Full polarizability matrix including magnetoelectric cross-components of single SRR was calculated by finite elements method. Three plasmon modes which defines resonance behavior of polarizability were identified.

IMA6 • 12:15
Low-loss Dielectric-coated Hollow Rectangular Plasmonic Waveguide supporting THz Guidance, *B. M. Azizur Rahman[1], Anita Quadir[1], Huda Tanvir[1], Ken T. V. Grattan[1]; [1]Electrical Electronic and Information Engineering, City Univ. London, UK.* Modal characteristics of a THz waveguide using an H-field based finite element method is presented. It is shown that by introducing Teflon coating, propagation loss of a hollow-core rectangular plasmonic waveguide can be significantly reduced.

IMB • Nanophotonics: Waveguides, Optomechanics, and SOI-based Technologies—Continued

IMB5 • 11:45
Design and Fabrication of Thermo-Optic Tunable Guided-Mode Resonance Filters, *Mohammad J. Uddin[1], Robert Magnusson[1]; [1]Electrical Engineering, Univ. of Texas at Arlington, USA.* A novel thermo-optic tunable guided-mode resonance filter is designed and fabricated. The fabricated filter has a spectral width of 12 nm, tuning range of 15 nm, and tuning efficiency of 0.15 nm per degree Celsius.

IMB6 • 12:00
Highly Efficient Broadband Silicon-on-Insulator Grating Couplers for the Short Wave Infrared Wavelength Range, *Bart Kuyken[1], Nannicha Hattasan[1], Diedrik Vermeulen[1], Shankar K. Selvaraja[1], Wim Bogaerts[1], William Green[2], Roel Baets[1], Gunther Roelkens[1]; [1]PRG Ghent, PRG Ghent Univ./Imec, Belgium; [2]IBM TJ Watson Res. Ctr., USA.* We demonstrate broadband silicon-on-insulator fiber-to-chip grating couplers for the short wave infrared region. The devices show a peak coupling loss of -5.2 dB at 2150 nm and a 3 dB bandwidth of 160 nm.

IMB7 • 12:15
Polymer-Clad Silicon on Insulator Slot Modulator, *Xi Chen[1], David Espinoza[1], Eric Dudley[1], Zheng Li[1], Moustafa Mohamed[1], Yonghao Cui[1], Won Park[1], Li Shang[1], Alan Mickelson[1]; [1]Electrical Computer and Energy Engineering, Univ. of Colorado at Boulder, USA.* A commercially fabricated slot waveguide is postprocessed with FIB deposited electrodes and polymer coating to function as a modulator. A model for modulation based on transmission measurements is used to optimize it within commercial rules.

12:30–13:30 Lunch Break *(on your own)*

Pier 2 & 3	Harbour Salon A	Pier 5
Slow and Fast Light	Optical Sensors	Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SLMA • Applications of Slow/Fast Light—Continued

SLMA4 • 11:45
Phase Locking of SBS Slow Light in a 2.2-km Single-Mode Fiber, *Joseph E. Vornehm[1], Aaron Schweinsberg[1], Zhimin Shi[1], Robert Boyd[1,2]; [1]Inst. Of Optics, Univ. of Rochester, USA; [2]Dept. of Physics, Univ. of Ottawa, Canada.* A stimulated Brillouin scattering (SBS) slow light system in a 2.2-km single-mode fiber was phase locked to a reference signal. Optical pulses of 6.5 ns duration were delayed 0.9 pulse width while maintaining lock.

SLMA5 • 12:00 Invited
Microwave Photonics Applications Using Slow and Fast Light Effects, *Juan Sancho[1], Juan Lloret[1], Ivana Gasulla[1], Salvador Sales[1], José Capmany[1]; [1]ITEAM Res. Inst., Univ. Politecnica Valencia, Spain.* We review the potential applicability of SFL techniques to the field of Microwave photonics. The main results obtained for several applications such as filtering, phased array antennas, arbitrary waveform generation and OEO will be analyzed.

SMB • Subwavelength and Plasmonic Sensors—Continued

SMB5 • 11:45
Ultra-Sensitive (Acoustic) Pressure Sensor with High Temporal Resolution, *Balthasar Fischer[1], Ernst Wintner[1]; [1]Photonics Institute, Univ. of Technology Vienna, Austria.* A novel all-optical pressure sensor is presented. Based on a rigid Fabry-Pérot, the transducer detects refractive index changes induced by pressure fluctuations. This design is so sensitive that the miniaturized device is applicable as microphone.

SMB6 • 12:00
Infrared radiation detector interrogated by Optical Frequency Domain Reflectometer (OFDR), *Kivilcim Yüksel[1], Christophe Caucheteur[1], Jean-Michel Renoirt[2], Patrice Mégret[1], Marc Debliquy[2], Marc Wuilpart[1]; [1]Electromagnetism and Telecommunications, U-MONS, Belgium; [2]Material Science Unit, Univ. of Mons, Belgium.* We experimentally demonstrated a fast infrared radiation sensor. The system is applicable in a quasi-distributed configuration to cover a large area using a single interrogation unit (OFDR) for early fire detection.

SMB7 • 12:15
Truly Continuous-Wave Spatial-Domain Cavity Ring-Down Technique Based on Frequency-Shifted Interferometry, *Fei Ye[1], Bing Qi[1], Li Qian[1]; [1]Department of Electrical and Computer Engineering, University of Toronto, Canada.* We present a novel spatial-domain cavity ring-down technique using frequency-shifted interferometry, by monitoring the intensity decay of a continuous-wave beam circulating in a fiber-loop cavity. It was applied to fiber bend loss measurements.

SOMB • 2um Fiber Lasers—Continued

SOMB4 • 11:45 Invited
Tm-doped Multi-component Glass Fibers for 2um Fiber Lasers, *Shibin Jiang[1]; [1]Advalue Photonics, USA.* Highly Tm-doped silicate glasses and fibers exhibit a high slope efficiency of 68.3% and a gain per unit length of greater than 2dB/cm. Single frequency fiber lasers with laser linewidth less than 3kHz, Q-switched single frequency fiber lasers, and mode-locked fiber lasers near 2 micron wavelength were demonstrated using this newly developed fiber.

12:30–13:30 Lunch Break *(on your own)*

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

Pier 9

Access Networks and In-house Communications

13:30–15:15
AMC • OFDM-PON
Pandelis Kourtessis, UK, Presider

AMC1 • 13:30 Invited
The "Five W's" of OFDM for Optical Access: What, Why, Where, When and How? *Neda Cvijetic[1]; [1]NEC US, USA.* The "Five W's" of OFDM-based optical access are addressed, covering technology principles and recent progress, application scenarios for future PON systems, the near-term development timeline, and the practical outlook for key DSP-based enabling technologies.

AMC2 • 14:00
A Novel Upstream Link Scheme for OOFDM-PON, *Qingyi Guo[1], Kan He[1], Xun Li[1], Weiping Huang[1]; [1]Dept. of Electrical and Computer Engineering, McMaster Univ., Canada.* We propose an efficient OOFDM-PON scheme: orthogonal subcarrier multiplexing at the ONU with colorless laser diode, and all-optical FFT at the OLT for high speed demultiplexing. The deterioration caused by laser perturbation is also investigated.

AMC3 • 14:15
Dynamic Subcarrier Allocation for OFDMA-PONs with Monitoring Mechanism, *Wansu Lim[1], Pandelis Kourtessis[1], Milos Milosavljevic[1], John Senior[1]; [1]Optical Networks Group, Science and Technology Research Inst. (STRI), Univ. of Hertfordshire, UK.* A new protocol design for 10G OFDMA-PONs is reported, demonstrating dynamic subcarrier allocation based on monitoring of each ONU's queuing status. 0.7 ms packet delay and 540 Mbps throughput were achieved for SLA0 ONUs.

AMC4 • 14:30 Invited
Benchmarking Comparison of Physical Layer Performance for Various Implementations of OFDM Access Networks, *Ioannis Tomkos[1], Elias Giacoumidis[1], Athanasios Kavatzikidis[1], Ivan Cano[2], Josep Prat[2]; [1]AIT, Greece; [2]UPC, Spain.* A survey of optical transmission techniques based on Orthogonal Frequency Division Multiplexing (OFDM) is presented. The characteristics and power budget/transmission performance of these methods are evaluated on optical access networks.

Pier 7 & 8

Signal Processing in Photonics Communications

13:30–15:30
SPMB • OFDM
Nobuhiko Kikuchi, Hitachi Ltd, Japan

SPMB1 • 13:30 Invited
Terabit/s Super-Channels Based on OFDM, *Juerg Leuthold[1], W. Freude[1], C. Koos[1], D. Hillerkuss[1], R. Schmogrow[1], S. Ben Ezra[2]; [1]Institute of Photonics and Quantum Electronics (IPQ) & Institute of Microstructure Technology (IMT) at Karlsruhe Institute of Technology, Karlsruhe, Germany; [2]Finisar Corporation, Nes Ziona, Israel.* OFDM emerges as a viable technology for the generation of Terabit/s super-channels. We review the concepts behind electrical and all-optical OFDM and report on recent electrical 100 Gbit/s and 26 Tbit/s all-optical super-channel generation experiments.

SPMB2 • 14:00 Invited
Digital Signal Processing for Multi-gigabit Real-time OFDM, *Qi Yang[1]; [1]State Key Laboratory of Optical Communication Technologies and Networks, China.* We summarize the digital signal processing for multigigabit real-time optical OFDM. Various OFDM procedures and algorithms are discussed with a focus on OFDM receiver implementation.

SPMB3 • 14:30
Low-Complexity Multi-Band Polyphase Filter Bank for Reduced-Guard-Interval Coherent Optical OFDM, *Alex Tolmachev[1], Moshe Nazarathy[1]; [1]EE, Technion, Israel.* Smart multi-band signal processing yields substantial reduction of FDE FFT complexity for recent Reduced Guard Interval (RGI) techniques emerging in ultra-broadband long-haul OFDM, providing the simplest high-performance QPSK-OFDM system.

SPMB4 • 14:45
Compensation for Dispersion-Enhanced Phase Noise in Reduced-Guard-Interval CO-OFDM Transmissions, *Qunbi Zhuge[1], David V. Plant[1]; [1]Electrical & Computer Engineering, McGill University, Canada.* We propose a dual-polarization grouped maximum-likelihood algorithm to compensate for the dispersion-enhanced phase noise of reduced-guard-interval (RGI) CO-OFDM. The laser linewidth tolerance is increased to 2 MHz after a 4800 km transmission.

Harbour Salon B

Integrated Photonics Research, Silicon and Nano Photonics

13:30–15:30
IMC • Modeling and Simulation II: Periodic Structures and Waveguides
Hung-chun Chang, Natl. Taiwan Univ., Taiwan, Presider

IMC1 • 13:30 Invited
Homogenization of Dielectric Rod-type Metamaterials, *Didier Felbacq[1], Guy Bouchitte[2]; [1]Lab. Charles Coulomb, Univ. de Montpellier II, France; [2]Lab. IMATH, Univ. du Sud-Toulon-Var, France.* The scattering by a medium with dielectric is considered, when the wavelength is larger than the period. Various regimes are demonstrated: quasi-static homogenization, artificial magnetism near resonances, spatial dispersion.

IMC2 • 14:00
Analyzing Photonic Crystals with Arbitrary Unit Cells Using Boundary Integral Equations, *Wangtao Lu[1,2], Ya Yan Lu[3]; [1]Joint Advanced Res. Ctr. of USTC and City Univ., China; [2]Univ. of Science and Technology of China, China; [3]City Univ. of Hong Kong, Hong Kong.* An accurate boundary integral equation method is developed for analyzing 2D photonic crystals where the cylinders in the unit cells have arbitrary shapes and corners. It first calculates the so-called Neumann-to-Dirichlet map for unit cells.

IMC3 • 14:15
Analysis of Periodic Structures at Oblique Incidence Using an LOD-FDTD Method, *Yuu Wakabayashi[1], Jun Shibayama[1], Junji Yamauchi[1], Hisamatsu Nakano[1]; [1]Hosei Univ., Japan.* A broadband mirror consisting of a subwavelength grating is analyzed using a locally one-dimensional FDTD method with the periodic boundary condition. A high reflectivity is obtained around wavelengths of 1.4μm and 1.9μm.

IMC4 • 14:30
Tailoring the Far Field of Bragg Reflection Waveguides, *Nima Zareian[1], Amr S. Helmy[1], Payam Abolghasem[1]; [1]Dept. of Electrical and Computer Engineering, Univ. of Toronto, Canada.* A comprehensive study of the far field of Bragg reflection waveguides is presented. Insight obtained by a newly developed Gaussian approximation of the near field provides a valuable tool for optimizing the far-field pattern.

IMC5 • 14:45
Full-Vectorial Finite-Difference Scheme for the Analysis of Thin-Layered Structures, *Cheng-Han Du[1], Yih-Peng Chiou[1,2]; [1]Graduate Inst. of Photonics and Optoelectronics, Natl. Taiwan Univ., Taiwan; [2]Dept. of Electrical Engineering, Natl. Taiwan Univ., Taiwan.* We develop a full-vectorial finite-difference formulation for layered structures. Fields and their derivatives across the layers are related by matrices. Sampled points can step over multiple layers. The computation is greatly saved.

Harbour Salon C

Integrated Photonics Research, Silicon and Nano Photonics

13:30–15:30
IMD • Nanophotonics: Waveguides, Lasers, and SOI-Based Technologies
Dragomir Neshev; Australian Natl. Univ., Australia, Presider

IMD1 • 13:30 Invited
Generalized Bragg Reflection Waveguides for Monolithic Frequency Converters Using Second Order Nonlinearity, *Amr S. Helmy[1]; [1]ECE, Univ. of Toronto, Canada.* Recent advances in phase-matching using Bragg reflection waveguides are discussed. Limitations on the choice of materials are highlighted. Multilayer cores demonstrated as novel design which allows for relaxed constraints over the material choice.

IMD2 • 14:00
Engineering Circular Multiple Light Scattering For Polarization-Insensitive Planar Diffraction, *Jacob Trevino[1], Luca Dal Negro[2,1]; [1]Division of Material Science and Engineering, Boston Univ., USA; [2]Electrical and Computer Engineering, Boston Univ., USA.* Plasmonic aperiodic spirals, which are shown to support structural resonances carrying orbital angular momentum, are investigated by dark-field imaging with analytical multi-particle calculations in the framework of the Generalized Mie Theory.

IMD3 • 14:15
Comparison of Cascade, Baseline, and Lattice Architectures for Ultra-Compact RF Photonic Filters on SOI, *Payam Alipour[1], Ali Asghar Eftekhar[1], Amir Hossein Atabaki[1], Qing Li[1], Siva Yegnanarayanan[1], Christi K. Madsen[2], Ali Adibi[1]; [1]Georgia Inst. of Technology, USA; [2]Texas A&M Univ., USA.* We compare the cascade, baseline, and lattice architectures for a four-pole, four-zero photonic filter implemented using high-Q resonator-based components on SOI. These filters are fully reconfigurable and very compact (total area 0.15 mm2).

IMD4 • 14:30
Luneburg lens in Silicon-on-Insulator platform, *Andrea Di Falco[1], Susanne C. Kehr[1], Ulf Leonhardt[1]; [1]School of Physics and Astronomy, Univ. of St Andrews, UK.* We discuss the design and experimental demonstration of an integrated Luneburg lens realized in Silicon-on-Insulator platform, via grey-scale lithography. The lens implements on-chip Fourier transform, independently on the angle of incidence.

IMD5 • 14:45
Effects of Scatterer Size and Concentration on the Spectral Features of Dye-Based Random Lasers, *Natanael Cuando-Espitia[1], Juan Hernández-Cordero[1], Crescencio García-Segundo[2], Rosa Quispe-Sicha[2]; [1]Inst. de Investigaciones en Materiales, Mexico; [2]Centro de Ciencias Aplicadas y Desarrollo Tecnológico, UNAM, Mexico.* Random lasers varying concentration and size of SiO2 scatterers were analyzed. We report on the dependence of the spectral features (wavelength and full width at half maximum) on the size and concentration of the scatterers.

Sessions continue on page XX.

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

Pier 2 & 3

Slow and Fast Light

13:30–15:30
SLMB • Applications of Slow/Fast Light II
Marco Santagiustina, Univ. degli Studi di Padova, Italy, Presider

SLMB1 • 13:30 Invited
Slow Light for Cancer Detection: Ultrasound-Modulated Optical Tomography Using Slow Light in Spectral Hole Burning Materials, *Philip Hemmer[1], Stefan Kroll[2], Lihong Wang[3], Huiliang Zhang[1], Mahmood Sabooni[2], Lars Rippe[2], Chulhong Kim[3]; [1]Texas A&M Univ., USA; [2]Lund Univ., Sweden; [3]Washington Univ. in St Louis, USA.* Ultrasound modulated optical tomography allows optical imaging with ultrasound resolution in highly scattering tissue, with application to early tumor detection. Slow light provides additional time domain filtering to enhance detection sensitivity.

SLMB2 • 14:00
Demonstration of a Slow-Light Laser Radar with Two-Dimensional Scanning, *Aaron Schweinsberg[1], Zhimin Shi[1], Joseph E. Vornehm[1], Robert Boyd[1,2]; [1]Optics, Univ. of Rochester, USA; [2]Physics, Univ. of Ottawa, Canada.* We demonstrate a proof-of-concept system for steering a coherently-combined multi-aperture slow-light laser radar. Each aperture incorporates slow-light elements, using dispersive delay and SBS, to ensure power overlap at the target.

SLMB3 • 14:15
Optical Control of the Faraday Effect in a Slow-light Medium, *Ifan Hughes[1], Paul Siddons[1], Lee Weller[1], Charles S. Adams[1]; [1]Physics Dept., Durham Uni., UK.* We demonstrate modified Faraday polarization rotation of an optical field controlled by a pump beam in hot rubidium vapour. Induced rotations of greater than π/2 rad are seen with a transmission of 95%.

SLMB4 • 14:30 Invited
Optomechanically Induced Transparency, *Albert Schliesser[1], Samuel Deleglise[1], Stefan Weis[1], Rémi Rivière[1], Emanuel Gavartin[1], Olivier Arcizet[2], Tobias Kippenberg[1]; [1]EPFL, Switzerland; [2]Inst. Néel, France.* In analogy to electromagnetically induced transparency observed in atomic systems, we demonstrate that the transmission of a probe laser beam through an optomechanical device can be modulated using a second, "control" laser beam.

Harbour Salon A

Optical Sensors

13:30–15:30
SMC • Spectral and Biomedical Imaging
Alex Vitkin, UHN Res., Canada, Presider

SMC1 • 13:30 Invited
Sensors Based on Optical Fibre Microwires Coils and Related Resonators, *Gilberto Brambilla[1]; [1]Optoelectronics Research Centre, UK.* This talk will review part of the work carried out recently at the University of Southampton on the use of microfiber coils for sensing.

SMC2 • 14:00
Embedded Microfiber in Microchip for High Sensitivity Evanescent Field Absorbance Detection, *Lei Zhang[1], Limin Tong[1]; [1]Zhejiang Univ., China.* A 1.5-µm-diameter microfiber was embedded in a microchip for high sensitivity evanescent field absorbance detection. The sensitivity of the device was investigated by measuring the absorbance of Methylene Blue, achieving a detection limit of 2.8 µM.

SMC3 • 14:15
Tactical-grade Interferometric Fiber Optic Gyroscope Driven with a Narrow-Linewidth Laser, *Seth W. Lloyd[1], Michel Digonnet[1], Shanhui Fan[1]; [1]Electrical Engineering, Stanford Univ., USA.* We report on the use of narrowband lasers in fiber optic gyroscopes using solid-core and microstructured air-core fiber coils. We present theoretical and experimental results and discuss the benefits over traditional fiber gyroscopes.

SMC4 • 14:30
In-line Evanescent-Wave Microfluidic Absorption Sensor Based on an Embedded Optical Microfiber Coil, *Roberto Lorenzi[1,2], Yongmin Jung[2], Gilberto Brambilla[2]; [1]Department of Materials Science, Università degli Studi di Milano-Bicocca, Italy; [2]Optoelectronic Research Centre, Univ. of Southampton, UK.* We present the absorption spectra collected with an evanescent-field absorption sensor. The device comprises a fluidic channel with an embedded fiber coil resonator. Deviations from Beer-Lambert law will be discussed in terms of adsorption mechanism.

SMC5 • 14:45
High Finesse Fiber Bragg Grating Cavity and Its Applications in Temperature-invariable Strain Sensing, *Xijia Gu[1]; [1]Electrical and Computer Engineering, Ryerson Univ., Canada.* A novel fiber strain sensor based on a high finesse fiber Bragg grating cavity was demonstrated. The sensor responded linearly to applied strain, however is immune to temperature variation and thus solved strain-temperature duality problem.

Pier 5

Specialty Optical Fibers

13:30–15:30
SOMC • Novel Glass and Fluoride Fibers
Ishwar Aggarwal; US NRL, USA, Presider

SOMC1 • 13:30 Invited
Glass for Optical Fibers, *Ji Wang; Corning, USA.* The talk will review the requirement of key glass attributes for optical fiber fabrication for both soft (multi-component) glasses, and high-silica based glasses. Examples will be given in each case on how the glass properties are tailored via composition and/or processing for successful fiber optic applications.

SOMC2 • 14:00 Invited
US Manufacture of IR Fibers, *Francoise Chenard[1]; [1]IRflex Corporation, USA.* IRflex is the only US company specializing in the production of fiber-optic devices for mid-infrared applications from 2-12 micron. Our innovative mid-infrared fiber enables the development and production of leading-edge critical devices.

SOMC3 • 14:30
Laser Sintering of c-YAG Fiber, *Jonathan Goldstein[1], Geoff Fair[1], David Zelmon[1], Heedong Lee[2]; [1]Air Force Research Lab, USA; [2]UES, USA.* A small section of extruded green fiber of ceramic YAG has been densified by means of laser beam sintering with a 1.6W beam from a CO2 laser, sintered for approximately 1 minute.

SOMC4 • 14:45
Characterization of High-Purity Tellurite Glasses for Fiber Optics, *Vitaly Dorofeev[1], Alexander Moiseev[1], Mikhail Churbanov[1], Victor Plotnichenko[2], Alexey Kosolapov[2], Evgeny Dianov[2]; [1]Inst. of Chemistry of High-Purity Substances of RAS, Russian Federation; [2]Fiber Optics Research Center RAS, Russian Federation.* High-purity TeO2-(WO3, La2O3, ZnO, Na2O, Bi2O3) optically homogeneous glasses with OH-groups absorption of 0.001 - 0.012 cm-1 (~3 µm) and optical losses of 50-100 dB/km (1.56 µm) were prepared. High quality optical fibers were made from them.

Sessions continue on page XX.

Pier 9

Access Networks and In-house Communications

Pier 7 & 8

Signal Processing in Photonics Communications

Harbour Salon B

Integrated Photonics Research, Silicon and Nano Photonics

Harbour Salon C

Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

AMC • OFDM-PON—Continued

AMC5 • 15:00
Novel 16QAM Detection Scheme for Optical Access Networks, *Nikolaos Sotiropoulos[1], Huug de Waardt[1], A. Koonen[1]; [1]Electrical Engineering, Eindhoven Univ. of Technology, Netherlands.* In this paper, incoherent detection of a square 16QAM signal is demonstrated for the first time using simulations and the scheme's suitability for future optical access networks, along with conventional coherent detection, is explored.

SPMB • OFDM—Continued

SPMB5 • 15:00
Optimum Clipping for Optical OFDM with Limited Resolution DAC/ADC, *Christian R. Berger[1], Yannis Benlachtar[2], Robert Killey[2]; [1]Electrical and Computer Engineering, Carnegie Mellon University, USA; [2]Electronic and Electrical Engineering, University College London, UK.* We study the effects of clipping and quantization noise on the performance of an optical OFDM system. To this end we derive a closed-form formula that links optimum clipping with the bit resolution of signal converters.

SPMB6 • 15:15
Non-Iterative Interpolation-Based Phase Noise ICI Mitigation for CO-OFDM Transport Systems, *Mohammad Ebrahim Mousa Pasandi[1], David V. Plant[1]; [1]McGill University, Canada.* We study the performance of a phase noise induced ICI compensation scheme based on linear interpolation for CO-OFDM transport systems. This practical approach does not suffer from error propagation while enjoying low computational complexity.

IMC • Modeling and Simulation II: Periodic Structures and Waveguides—Continued

IMC6 • 15:00
Simulation of Waveguide Corner and Cross by Complex Mode Matching Method, *Rui Wang[1], Lin Han[1], Jianwei Mu[1], Weiping Huang[1]; [1]Electrical and Computer Engineering, McMaster Univ., Canada.* Radiation field emitting perpendicular to waveguide axis in waveguide corner and cross is simulated by complex mode matching method and validated by FDTD. Power conservation is demonstrated to establish self-consistency of the method.

IMC7 • 15:15
Ultra Broadband Mid-IR Detectors Using Multilayer Anti-reflection Coupling, *Pao T. Lin[1,2]; [1]Materials Science and Engineering, Massachusetts Inst. of Technology, USA; [2]Microphotonics Center, Massachusetts Inst. of Technology, USA.* Ultra broadband mid-IR detector is demonstrated in the spectral region at 2-4 um. The light coupler is composed of multilayer dielectric layers. A 60 enhancement of transmittance is achieved at light incident angles θ=0o-75o.

IMD • Nanophotonics: Waveguides, Lasers, and SOI-Based Technologies—Continued

IMD6 • 15:00
Adiabatic Couplers for Linear Power Division, *Moustafa Mohamed[1], Zheng Li[1], Eric Dudley[1], Xi Chen[1], Li Shang[1], Won Park[1], Alan Mickelson[1]; [1]Electrical, Computer, and Energy Engineering, Univ. of Colorado at Boulder, USA.* Adiabatic 3 dB couplers exhibit wide bandwidth and resistance to process and thermal variations. In this work, we investigate tradeoffs between sensitivity and overall length. The discussion includes plans for commercial fabrication.

IMD7 • 15:15
Optical Bio-Chemical Sensors on SNOW Ring Resonators, *Mohammadreza Khorasaninejad[1], Anant M. P. Anantram[2], Simarjeet Saini[1]; [1]Univ. of Waterloo, Canada; [2]Univ. of Washington, USA.* In this paper we propose novel ring resonator based bio-chemical sensors on silicon-nanowire-optical-waveguide and show that the sensitivity can be increased by an order of magnitude as compared to Silicon-on-insulator based ring resonators.

15:30–16:00 Coffee Break, *Pier 4/ Harbour Ballroom Foyer*

16:00–18:00
AMD • Hybrid and WDM-PON
Ioannis Tomkos, AIT, Greece, Presider

AMD1 • 16:00 Invited
Test-bed Functionality of the SARDANA Hybrid NG-PON, *Josep Prat[1], Victor Polo[1], J. A. Lazaro[1], F. Bonada[1], E. Lopez[1], B. Schrenk[1], M. Omella[1], F. Saliou[2], Q. T. Le[2], P. Chanclou[2], D. Leino[3], Risto Soila[3], S. Spirou[4], L. Costa[5], Antonio Teixeira[5], Giorgio M. Tossi Beleffi[6], D. Klonidis[7], Ioannis Tomkos[7]; [1]Univ. Politecnica de Catalunya, Spain; [2]Orange Labs, France; [3]Tellabs, Finland; [4]Intracom, Greece; [5]IT, Portugal; [6]ISCOM, Italy; [7]AIT, Greece.* The tests with broadband multimedia services of the SARDANA multi-layer prototype prove the feasibility of scalable hybrid DWDM/TDM-PON FTTH networks with resilient optically-integrated ring-trees architecture.

AMD2 • 16:30 Invited
Extended-Reach Passive Optical Networks, *A. Tran[1], Alan Lee[2], Thomas Chae[1], Kerry Hinton[2]; [1]Victoria Res. Lab., NICTA, Australia; [2]Electrical and Electronic Engineering, Univ. of Melbourne, Australia.* We review several techniques to extend the reach of PON beyond 60 km utilizing a repeater at the remote node and distributed Raman amplification. We also discuss practical deployment issues and economics of extended-reach PON.

16:00–17:30
SPMC • Optical Techniques I
Xiang Liu, Bell Labs, USA, Presider

SPMC1 • 16:00 Invited
All-Optical Signal Processing using Optical Nonlinearities, *Alan Willner; Univ. of Southern California, USA.* Optical nonlinearities can be used to transparently manipulate a high-speed optical data signal in amplitude, phase and wavelength. This paper will discuss various signal processing applications such as: constellation manipulation, traffic grooming and channel equalization.

SPMC2 • 16:30
Real-Time Group Delay Monitoring of Ultra-wide-Band Dispersive Devices by Low-Noise Incoherent Interferometry, *Antonio Malacarne[1], Yongwoo Park[1], José Azaña[1]; [1]INRS-EMT, Canada.* Simple incoherent interferometry technique is demonstrated and applied for accurate real-time group-delay monitoring of a dispersion-compensating fiber and of a 10m-long chirped fiber grating over up to 70nm-bandwidth at 15frames/s update rate

16:00–17:00
IME • Devices and Components I
Michael Watts; MIT, USA, Presider

IME1 • 16:00 Invited
CMOS Integrated Silicon Nanophotonics: An Enabling Technology for Exascale Computing, *William Green[1], Solomon Assefa[1], Alexander Rylyakov[1], Clint Schow[1], Folkert Horst[2], Yurii Vlasov[1]; [1]IBM Res., USA; [2]IBM Zurich GMBH, Switzerland.* We will present a CMOS integrated silicon nanophotonic technology, which can enable future Exa-scale supercomputers by connecting racks, modules, and chips together with ultra-low power massively parallel optical interconnects.

IME2 • 16:30
Post-Fabrication Tuning of Silicon Microring Resonators by Femtosecond Laser Modification, *Daniel Bachman[1], Zhijiang Chen[1], Ashok M. Prabhu[1], Robert Fedosejevs[1], Ying Tsui[1], Vien Van[1]; [1]Electrical and Computer Engineering, Univ. of Alberta, Canada.* We investigated the feasibility of post-fabrication tuning of Silicon microring resonators by fs laser modification at 400nm wavelength. Red and blue shifts were obtained for different laser fluences, with a maximum resonance shift of 10nm/shot.

16:00–18:00
IMF • Nanophotonics: Photonic Crystals and Nanowires
Andrea Melloni; Univ. of California at San Diego, Presider

IMF1 • 16:00 Invited
Light Propagation in 3-D Photonic Crystals, *Susumu Noda, Kenji Ishizaki; Kyoto Univ., Japan.* We introduce recent progress on the control of light propagation in three-dimensional (3-D) photonic crystals. We demonstrate 3-D guiding within photonic crystal-embedded waveguides. A novel controlling approach using the surface of crystals is also discussed.

IMF2 • 16:30
Experimental Demonstration of Ultra-Low Loss Coupling into Slow Light Slotted Photonic Crystal Waveguide on Silicon Nanomembrane, *Che-Yun Lin[1], Xiaolong Wang[2], Swapnajit Chakravarty[2], Wei-Cheng Lai[1], Yi Zou[1], RayT. Chen[1]; [1]Electrical and Computer Engineering, Univ. of Texas at Austin, USA; [2]Omega Optics, USA.* We experimentally demonstrate highly efficient coupling to a slotted photonic crystal waveguide using a mode converter and a photonic crystal impedance taper. Measurements show a -2.6dB insertion loss for coupling in/out of the slow light waveguide.

Sessions continue on page XX.

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SLMB • Applications of Slow/Fast Light II—Continued

SLMB5 • 15:00
Tunable Light-Storage for almost 1 Microsecond, *Thomas Schneider[1], Stefan Preussler[1], Kambiz Jamshidi[1]; [1]HFT, HfTL-Leipzig, Germany.* We describe the latest results of the investigation of a new method to store optical packets called Quasi-Light-Storage (QLS). We discuss the method and show experimental results with a delay-bandwidth product of around 700 Bit.

SLMB6 • 15:15
All-Optical Control of the Group Velocity, Central Frequency and Spectral Bandwidth of a Laser Pulse, *Stefano Cavalieri[1,3], Emiliano Sali[1], Emilio Ignesti[1], Roberto Buffa[2], Lorenzo Fini[1,3], Marco Tognetti[1]; [1]Physics, Univ. di Firenze, Italy; [2]Physics, Univ. di Siena, Italy; [3]LENS, Univ. di Firenze, Italy.* We present recent results on different schemes (involving both coherent and incoherent interactions) that allow all-optical control of several properties of a large-spectral-bandwidth (up to 3.3 GHz) laser pulse propagating in an atomic medium.

SMC • Spectral and Biomedical Imaging—Continued

SMC6 • 15:00
Characterization of a Low-Cost Long-Period Fiber Grating Induced by a Polymeric Microstructure, *Jorge A. Soto-Olmos[1], Juan Hernández-Cordero[2], Laura Oropeza-Ramos[1]; [1]Departamento de Electrónica, Facultad de Ingeniería, Univ. Nacional Autónoma de México, Mexico; [2]Inst. de Investigaciones en Materiales, Univ. Nacional Autónoma de México, Mexico.* In this paper a low-cost long-period fiber grating induced by a polymeric microstructure is reported. Fabrication and characterization of the device and experimental results of the spectrum variations due to external pressures are presented.

SMC7 • 15:15
A Simple Bend Sensor Based on Multimode Interference and a Twin Core Fiber Mach-Zehnder Interferometer, *Aissa Harhira[1], Jerome Lapointe[1], Raman Kashyap[1]; [1]Ecole Polytechnique de Montreal, Canada.* An optimized Bend Sensor based on a multimode interference combined with a twin-core fiber is proposed. The bend induced wavelength shifts on the interference fringes is experimentally monitored. Losses in multimode fiber are studied.

SOMC • Novel Glass and Fluoride Fibers—Continued

SOMC5 • 15:00 Invited
Fluoride Glass Fibers, *Mohammad Saad[1]; [1]IR-Photonics Canada, Canada.* There is an increasing demand on high quality optical fibers that transmit over 2 microns, where silica fibers are opaque, for applications as divers as spectroscopy and sensing, laser power delivery, fiber lasers, fiber amplifiers, defense (IRCM). The talk will focus on latest development of fluoride fibers.

15:30–16:00 Coffee Break, *Pier 4/ Harbour Ballroom Foyer*

16:00–18:00
SLMC • Atomic and Rare-Earth Systems and Applications
John Howell, Univ. of Rochester, USA, Presider

SLMC1 • 16:00 Invited
Chip-Scale Platform for Quantum Interference-Based Slow Light in Atoms, *Bin Wu[1], John Hulbert[2], Katie Hurd[2], Aaron Hawkins[2], Holger Schmidt[1]; [1]UCSC, USA; [2]Brigham Young Univ., USA.* Hollow-core waveguides form the foundation of a new class of atomic spectroscopy chips that allows for large light-matter interactions at ultralow power levels. We will review the development of a chip-scale platform for large quantum interference effects in hot rubidium vapor.

SLMC2 • 16:30
Extended Frequency Operation of Slow Light in Semiconductor Optical Amplifiers, *Sean O'Duill[1], Gadi Eisenstein[1]; [1]Electrical Engineering, Technion, Israel.* We present a scheme to extend the frequency operation of phase shifters based on slow light in semiconductor optical amplifiers. We show that phase-shifting can be performed on microwave signals at frequencies approaching 100 GHz.

16:00–18:00
SMD • SMD
Presider to Be Announced

SMD1 • 16:00 Invited
Multispectral Imaging in Combustion Analysis, *Marshall B. Long[1]; [1]Mechanical Engineering and Materials Science, Yale Univ., USA.* Optical techniques employing a variety of light scattering mechanisms and detection strategies are important tools for studying combustion. Developments in lasers and detectors have enabled increasingly detailed measurements in these complex systems.

SMD2 • 16:30 Invited
Infrared and Raman Spectroscopic Imaging for Histopathology, *Rohit Bhargave; Univ. of Illinois, USA.* We present a new approach to recognizing cell types and disease states in tissue using vibrational spectroscopic imaging. Theory, instrumentation, pattern recognition algorithms and applications in specific areas will be discussed.

16:00–18:00
SOMD • Microstructured Fibers
Andreas Tunnermann, Friedrich Schiller Univ., Jena, Germany

SOMD1 • 16:00 Invited
New Prospect of Tellurite Microstructured Fibers, *Yasutake Ohishi[1]; [1]Research Center for Advanced Photon Center, Toyota Technological Inst., Japan.* Dispersion tailored microstructured fibers and nanowires are developed using tellurite glasses. We demonstrate low threshold single-mode supercontinuum generation by using a tellurite nanowire under the pump of a picosecond fiber laser.

SOMD2 • 16:30 Invited
Multi-Material Optical Fiber Fabrication and Applications, *Ayman Abouraddy[1]; [1]Univ. of Central Florida, USA.* Multi-material optical fiber fabrication and applications

Sessions continue on page XX.

Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

AMD • Hybrid and WDM-PON—Continued

AMD3 • 17:00 Invited
A Practical Coherent WDM PON, *Yun C. Chung[1]; [1]Dept. EE, KAIST, Republic of Korea.* We review the recent progresses in the coherent WDM PON technologies achieved at KAIST. Using these technologies, we demonstrate the feasibility of implementing practical long-reach and high-split WDM PONs.

SPMC • Optical Techniques I—Continued

SPMC3 • 16:45
Scalable Photonic-Assisted Wideband Frequency Converter, *Charles Middleton[1], Richard DeSalvo[1]; [1]Harris Corporation, USA.* We present a photonic-assisted wideband tunable RF frequency converter with low phase noise to provide RF to IF frequency translation, and demonstrate 121 dB*Hz^2/3 spur-free dynamic range at 20 GHz RF and 2 GHz IF.

SPMC4 • 17:00
Performance of a DSP Phase Control Method for Phase Regenerators Based on Phase Sensitive Amplification, *Shu Zhang[1], John Cartledge[1]; [1]Electrical and computer engineering, Queen's University, Canada.* A digital signal processor based phase control method is investigated for all-optical phase regeneration using phase sensitive amplification. The phase Q factor is improved by 5.3-7.3 dB for a sampling rate of 312.5 MSa/s.

SPMC5 • 17:15
Modeling Polarization in a Bidirectional Fiber System, *William La[1], Li Qian[1]; [1]ECE, University of Toronto, Canada.* We present, for the first time, methods to model the polarization of the output lightwave of a bidirectional fiber-optic system, in which the lightwave propagates through polarization control elements in both directions.

IME • Devices and Components I—Continued

IME3 • 16:45
Athermal Silicon Waveguides Using the Subwavelength Grating Effect, *Jens H. Schmid[1], Marc Ibrahim[2], Pavel Cheben[1], Jean Lapointe[1], Siegfried Janz[1], Przemek J. Bock[1], Adam Densmore[1], Rubin Ma[1], Winnie N. Ye[2], Dan-Xia Xu[1]; [1]Inst. for Microstructural Sciences, Natl. Res. Council Canada, Canada; [2]Dept. of Electronics, Carleton Univ., Canada.* We present a method for designing athermal silicon waveguide devices using the subwavelength grating effect. Photonic wire waveguides are patterned with periodic gaps and filled with SU-8 polymer to cancel the silicon thermo-optic effect.

IMF • Nanophotonics: Photonic Crystals and Nanowires—Continued

IMF3 • 16:45
Enhanced Light Emission from Silicon Using Photonic Crystal Nanocavities, *Liam O'Faolain[1], Matteo Galli[2], Abdul Shakoor[1], Roberto Lo Savio[2], Simone Portalupi[2], Karl Welna[1], Dario Gerace[2], Giorgia Guizzetti[2], Lucio Claudio Andreani[2], Thomas Krauss[1], Alessia Irrera[3], Giorgia Franzo[3], Francesco Priolo[3]; [1]SUPA, School of Physics and Astronomy, Univ. of St Andrews, UK; [2]Dipartimento di Fisica "A. Volta", Univ. Degli Studi di Pavia, Italy; [3]MATIS-IMM-CNR, Italy.* Using Photonic crystal nanocavities, we first dramatically enhance third harmonic generation from silicon. Then, by virtue of a strong Purcell factor, we significantly increase defect state photoluminescence and greatly suppress thermal quenching.

IMF4 • 17:00
Silicon Photonic Wire Bragg Grating for On-chip Wavelength (De)Multiplexing Employing Ring Resonators, *Paul Muellner[1], Roman Bruck[2], Matthias Karl[2], Matthias Baus[2], Thorsten Wahlbrink[2], Rainer Hainberger[1]; [1]Health & Environment, AIT Austrian Inst. of Technology GmbH, Austria; [2]AMO GmbH, Germany.* We present the design and experimental demonstration of a highly reflective silicon photonic wire Bragg grating operated for TM-polarized light at a wavelength of 1550 nm.

IMF5 • 17:15
Photonic Band Structure of Circular Photonic Crystals in Silicon-on-Insulator Slab by Surface Coupling Reflectivity Technique, *Jian H. Lin[1], Danh Bich Do[1], Georg W. Rieger,[2], Jeff F. Young[2], Hung-Chih Kan[1], Chia Chen Hsu[1,3]; [1]Department of Physics, National Chung Cheng Univ., Taiwan; [2]Dept. of Physics and Astronomy, Univ. of British Columbia, Canada; [3]Graduate Inst. of Opto-Mechatronics, Natl. Chung Cheng Univ., Taiwan.* We characterized the photonic band structure of a two dimensional (2D) circular photonic crystal (CPC) silicon membrane slab waveguide with surface coupling reflectivity (SCR) technique.

NOTES

Pier 2 & 3	Harbour Salon A	Pier 5
Slow and Fast Light	Optical Sensors	Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SLMC • Atomic and Rare-Earth Systems and Applications—Continued

SLMC3 • 16:45
Control of Slow and Fast Light by Incoherent Interactions in Atomic Schemes, *Stefano Cavalieri[1,3], Emilio Ignesti[1], Marco Tognetti[1], Roberto Buffa[2], Lorenzo Fini[1,3], Emiliano Sali[1], Federico Tommasi[1]; [1]Physics, Univ. di Firenze, Italy; [2]Physics, Univ. di Siena, Italy; [3]LENS, Univ. di Firenze, Italy.* We present recent theoretical and experimental results concerning both retardation and acceleration of light pulses in schemes involving a second 'control' laser field but that do not involve any coherent preparation of the atomic medium.

SLMC4 • 17:00
Simultaneous Two-Channel Slow Light, *Anil K. Patnaik[1,2], Paul S. Hsu[3], Sukesh Roy[3], James R. Gord[1]; [1]AFRL, USA; [2]Physics, Wright State Univ., USA; [3]Spectral Energies, LLC, USA.* Simultaneous control of light speed in two channels in a single delay element of a rubidium vapor cell is demonstrated.

SLMC5 • 17:15
Optical Precursors in Slow and Fast Light Media, *Shengwang Du[1], Jiefei Chen[1], Michael M. Loy[1], George K. Wong[1]; [1]Physics, Hong Kong Univ. of Science and Technology, Hong Kong.* We observe optical precursors generated from slow and fast light cold atomic media. Using constructive interference between sequenced precursors, we produce optical transient pulses with peak powers of about 9 times the input power.

SMD • SMD—Continued

SMD3 • 17:00 Invited
Multi-Megahertz OCT: Technology, Recent Developments and Advantages, *Thomas Klein[1], Wolfgang Wieser[1], Benjamin R. Biedermann[1], Christopher Eigenwillig[1], Robert Huber[1]; [1]Ludwig-Maximilians-Univ. München, Germany.* Fourier domain mode locked lasers enable unprecedented line rates in optical coherence tomography for completely new imaging protocols and data analysis approaches. The optical design and potential benefits for clinical diagnosis will be discussed.

SOMD • Microstructured Fibers—Continued

SOMD3 • 17:00 Tutorial
Photonic Crystal Fibers, *William Wadsworth[1]; [1]University of Bath, UK.* This tutorial covers the concepts and properties of photonic crystal fibers, also known as microstructured or holey fibers. The similarities and differences between PCFs and specialty step¬index fibers are discussed, together with fabrication and applications.

NOTES

Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

AMD • Hybrid and WDM-PON—Continued

AMD4 • 17:30 Invited

Optical Subsystems for Next Generation Access Networks, *Jose A. Lazaro[1], V. Polo[1], B. Schrenk[1], F. Bonada[1], I. Cano[1], E. T. Lopez[1], C. Kazmierski[2], G. de Valicourt[2], R. Brenot[2], J. Bauwelinck[3], X.-Z. Qiu[3], P. Ossieur[4], M. Forzati[5], P.-J. Rigole[6], I. T. Monroy[7], E. Tangdiongga[8], M. Morant[9], L. Nicolau[10], A. L. Teixeira[10], D. Erasme[11], D. Klonidis[12], I. Tomkos[12], J. Prat[1], C. Kouloumentas[13], H. Avramopoulos[13]; [1]Univ. Politècnica de Catalunya, Dept. TSC, Spain [2]Alcatel-Thales III-V labs, a joint Laboratory of "Alcatel Lucent Bell Labs" and "Thales Research & Technology" Campus Polytechnique, France; [3]INTEC/IMEC-Ghent University, Gent, Belgium; [4]Tyndall National Institute & Univ. College Cork, Ireland; [5]Networking and Transmission Laboratory, Acreo AB, Sweden; [6]IGNIS, Torshamnsgatan, Sweden; [7]Danmarks Tekniske Universitet (DTU), Denmark; [8]Technische Universiteit Eindhoven(TU/e), The Netherlands; [9]Nanophotonics Technology Centre, Univ. Politécnica de Valencia, Spain; [10]Institute of Telecommunications (IT), Portugal; [11] Institut Télécom, France; [12]Athens Information Technology (AIT), Peania, Greece; [13]School of Electrical & Computer Engineering, National Technical University of Athens, Greece.* Recent optical technologies are providing higher flexibility to next generation access networks: on the one hand, providing progressive FTTx and specifically FTTH deployment, progressively shortening the copper access network; on the other hand, also opening fixed-mobile convergence solutions in next generation PON architectures. It is provided an overview of the optical subsystems developed for the implementation of the proposed NG-Access Networks.

IMF • Nanophotonics: Photonic Crystals and Nanowires—Continued

IMF6 • 17:30

Temperature-enhanced Light Emission from Er-TeO2 Photonic Crystals, *Pao T. Lin[1], Michiel Vanhoutte[1], Juejun Hu[2]; [1]Materials Science and Engineering, Massachusetts Inst. of Technology, USA; [2]Materials Science and Engineering, Univ. of Delaware, USA.* Photonic crystals are fabricated in Er-doped TeO_2 films. Strong photoluminescence around 1530 nm is observed by 488-532 nm laser pumping. 98x enhanced emission is demonstrated after annealing the thin films at 600C.

IMF7 • 17:45

Thermal Radiation from Patterned Platinum Microstructures, *Gabriel Vasile[1,2], Mustafa Arikan[1], Snorri Ingvarsson[1]; [1]Science Inst., Univ. of Iceland, Iceland; [2]Natl. Inst. of Res.-Development for Cryogenics and Isotopic Technologies, Romania.* We investigate thermal radiation from Pt microheaters with Au nanoparticles deposited. Polarization resolved thermal radiation was measured. Measurements show intensity of radiation is multiplied by factor of 2-3 for NP's deposited microheaters.

18:30–20:00 Advanced Photonics Congress and OIDA Welcome Reception, *Metro Ballroom West*

NOTES

Pier 2 & 3	Harbour Salon A	Pier 5
Slow and Fast Light	Optical Sensors	Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SLMC • Atomic and Rare-Earth Systems and Applications—Continued

SLMC6 • 17:30
Optical Pulse Differentiation Based on a Resonant Slow & Fast Light System, *Sanghoon Chin[1], Tae-Jung Ahn[2], Luc Thévenaz[1]; [1]Ecole Polytechnique Federale de Lausanne, Switzerland; [2]Photonics Engineering, Chosun Univ., Republic of Korea.* We experimentally demonstrate that temporal differentiation of optical pulses can be realized in a slow & fast light system based on a resonance. The waveform of a 13 ns Gaussian pulse was experimentally first-order differentiated.

SLMC7 • 17:45
Enhanced Echo Retrieval Efficiency Using Ultraslow Light, *J. Hahn[1], Byoung S. Ham[1]; [1]School of EE, Inha Univ., Republic of Korea.* Using ultraslow light phenomenon, we report two-orders of magnitude enhanced photon echo efficiency in a rare-earth doped solid medium, where the enhancement is due to lengthened photon-atom interaction time in a dilute optical medium.

SMD • SMD—Continued

SMD4 • 17:30
A Near-Infrared LED-based Material Classification Sensor System, *Oliver Schwaneberg[1,2], Uwe Köckemann[1], Holger Steiner[1], Norbert Jung[1]; [1]Computer Science, Bonn-Rhine-Sieg Univ. of Applied Sciences, Germany; [2]DFG Research Training Group 1564, Univ. of Siegen, Germany.* In safety applications it is often desired that certain materials do not enter a dangerous area. This paper presents a near-infrared LED-based sensor system for robust material classification and ranging up to a distance of 1,000mm.

SMD5 • 17:45
Resonant Cavity Enhanced LWIR Sensing in Polycrystalline Pb1-xSnxTe, *Timothy W. Zens[1], Piotr Becla[1], Lionel Kimerling[1], Anu Agarwal[1]; [1]Microphotonics Center, Massachusetts Inst. of Technology, USA.* Polycrystalline Pb1-xSnxTe LWIR photodetectors have been fabricated in resonant cavity structures on Si platforms. We describe the fabrication process and report detector performance demonstrating the feasibility of monolithic LWIR detectors-on-ROIC.

SOMD • Microstructured Fibers—Continued

18:30–20:00 Advanced Photonics Congress and OIDA Welcome Reception, *Metro Ballroom West*

NOTES

Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

7:30–18:00 Registration Open, *Harbour Ballroom Foyer*

Tuesday 14 June

8:00–10:00
ATuA • Basic Technologies for NG-PON
Josep Prat; Univ. Politecnica de Catalunya, Spain, Presider

ATuA1 • 8:00 Invited
Semiconductor Optical Amplifiers in Extended Reach PONs, *Juerg Leuthold, W. Freude, C. Koos, R. Bonk, S. Koenig, D. Hillerkuss, R. Schmogrow; Institute of Photonics and Quantum Electronics (IPQ) & Institute of Microstructure Technology (IMT) at Karlsruhe Institute of Technology, Germany.* Design guidelines for semiconductor optical amplifiers (SOAs) in extended reach PON networks are discussed. Important parameters such as the input saturation power or the alpha fac-tor and their impact in PON networks are discussed.

ATuA2 • 8:30 Invited
WDM PON Based on Silicon Photonic Micro-ring Modulators, *Keren Bergman; [1]Columbia Univ., NY, USA.* We demonstrate an optical access networks architecture uniquely enabled by CMOS compatible silicon micro-rings. The wavelength selective behavior of micro-ring modulators enables single-sideband modulation, which simultaneously generates downstream signals and centrally distributed carriers for upstream re-modulation.

ATuA3 • 9:00 Invited
Burst Mode, Overlapping Sub-Carrier Multiplexed (SCM) WDM PONs, *David V. Plant[1], A. El-Sahn[1], Jonathan M. Buset[1], Bhavin J. Shastri[1]; [1]McGill Univ., Canada.* A symmetric WDM PON architecture using an innovative overlapped-SCM scheme that maximizes the spectrum usage of a bandwidth-limited RSOA is demonstrated. In addition, burst mode receivers for this application are discussed.

8:30–9:30
SPTuA • Coding I
Moshe Nazarathy, Technion - Israel Inst. of Technology, Israel, Presider

SPTuA1 • 8:30 Invited
Implementation and Evaluation by Hardware Emulator of Soft-Decision Forward Error Correction for 100G Systems, *Kiyoshi Onohara[1], Yoshikuni Miyata[1], Kenya Sugihara[1], Takashi Sugihara[1], Kazuo Kubo[1], Hideo Yoshida[1], Kazuumi Koguchi[1], Takashi Mizuochi[1]; [1]Mitsubishi Electric Corp., Japan.* We discuss implementation and performance evaluation of LDPC(4608,4080) for 100Gb/s throughput by hardware emulator. We expect that an NCG of the LDPC code concatenated with enhanced FEC is 10.8 dB at a BER of 10-15.

SPTuA2 • 9:00
Alamouti Code against PDL in Polarization Multiplexed Systems, *Sami Mumtaz[1], Ghaya Rekaya-Ben Othman[1], Yves Jaouen[1], Jingshi Li[2], Swen Koenig[2], Rene Schmogrow[2], Juerg Leuthhold[2]; [1]Comelec, Telecom Paristech, France; [2]Institute of Photonics and Quantumelectronics, Karlsruhe Institute of Technology (KIT), Germany.* We theoretically and experimentally investigate the performance of the Alamouti polarization- time code to mitigate PDL. We show that due to the orthogonal structure of its codewords, it can entirely compensate PDL.

SPTuA3 • 9:15
On the Joint Optimization of Modulation and Channel Coding for High Data-Rate Optical Communication Systems, *Paolo Leoni[1], Stefano Calabrò[2], Berthold Lankl[1], Bernhard Spinnler[2]; [1]Universität der Bundeswehr München, Germany; [2]Nokia Siemens Networks GmbH & Co. KG, Germany.* We present a method to jointly optimize modulation and channel coding for high data-rate, non-differentially encoded optical systems, taking phase noise into account. Applied to 100G systems, it shows that constellation expansion might be beneficial.

8:30–10:00
ITuA • Devices and Components II
Peter Rakich; Sandia Natl. Labs, USA, Presider

ITuA1 • 8:30 Invited
Nano-Optomechanical Systems, *Hong Tang[1]; [1]Yale Univ., USA.* We describe the convergence of NEMS and nanophotonics in novel optomechanical circuits. Through active coupling of NEMS with high Q cavities, we demonstrate further scaling of NEMS in size, mass, sensitivity, frequency, and damping rate.

ITuA2 • 9:00
Compact and Widely Wavelength Tunable Lasers Based on Flexible Polymer Bragg Reflection Waveguide, *Kyung-Jo Kim[1], Jun-Whee Kim[1], Min-Cheol Oh[1]; [1]Electrical Engineering, Pusan National University, Republic of Korea.* Widely tuning and reproducible operation of tunable laser is demonstrated based on the extraordinary elastic property of flexible polymeric Bragg reflector. Compact tunable laser package is also demonstrated by incorporating a small PZT actuator.

ITuA3 • 9:15
High-Finesse Cavities Fabricated by Buckling Self-Assembly of a-Si/SiO2 Multilayers, *Trevor Allen[1], Josh Silverstone[1], Ray DeCorby[1], Nakeeran Ponnampalam[1]; [1]Univ. of Alberta, Canada.* Microcavities were fabricated by controlled formation of delamination buckles within a-Si/SiO2 multilayers. Linewidth (~0.1 nm in the 1550 nm-range) and finesse (>600) are close to reflectance-limited predictions, indicating low-defect cavities.

8:30–10:00
ITuB • Nanophotonics: Plasmonics and Applications I
Pierre Berini; Univ. of Ottawa, Canada, Presider

ITuB1 • 8:30 Invited
Molding Light in Plasmonic and Metamaterial Structures, *Dragomir N. Neshev[1]; [1]Nonlinear Physics Centre, RSPE, Australian Natl. Univ., Australia.* We present our advances on manipulation of light in metallic nanostructures, including arrays of nanoslits and left-handed fishnet metamaterials. In particular we show experimentally the nonlinear tuning of liquid crystal infiltrated metamaterials.

ITuB2 • 9:00
All Optical and Electro Optical Active Plasmonic Telecom Components, *Sukanya Randhawa[1], Alexey V. Krasavin[2], Jan Renger[1], Anatoly Zayats[2], S. Lazache[3], Alex Bouhelier[3], Romain Quidant[1]; [1]Plasmon nano-optics, Inst. of Photonic Sciences, Spain; [2]King's College, UK; [3]Inst. Carnot de Bourgogne, France.* We demonstrate numerically and experimentally all optical and electro optic switching of the SPP transmission at telecom wavelengths, utilizing a compact and highly sensitive ring resonator.

ITuB3 • 9:15
Metaflex - Metamaterials in Flexible Substrates at Visible Wavelengths, *Andrea Di Falco[1], Thomas Krauss[1]; [1]School of Physics and Astronomy, Univ. of St Andrews, UK.* We discuss our recent results in the realization and characterization of Metaflex, for different plasmonic structures, including a novel mechanism yielding to ultra-narrow spectral features in flexible plasmonics.

Sessions continue on page XX.

Pier 2 & 3 — Slow and Fast Light

Harbour Salon A — Optical Sensors

Pier 5 — Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

7:30–18:00 Registration Open, *Harbour Ballroom Foyer*

8:30–10:00
SLTuA • Slow/Fast Light in SOAs and Photonic Crystals
Thomas Krauss; Univ. of St. Andrews, UK, Presider

SLTuA1 • 8:30 Invited
All-Optical Processing in III-V Photonic Crystals, *Alfredo de Rossi[1], Sylvain Combrié[1], Pierre Colman[1,3], Chad Husko[2], Chee W. Wong[2], Isabelle Sagnes[3], Isabelle Cestier[4], Vardit Eckhouse[4], Gadi Eisenstein[4]; [1]THALES Res. and Technology, France; [2]Optical Nanostructure Lab., Columbia Univ., USA; [3]Lab. de Photonique et de Nanostructure (CNRS UPR 20), France; [4]Electrical Engineering Department, Technion, Israel.* Efforts made to improve the Photonic Crystal Waveguides against linear and nonlinear losses have made the promises of this technology possible. We discuss some of the major achievements, particularly the demonstration of optical solitons on-chip.

SLTuA2 • 9:00
Frequency Unlimited Optical Delay Lines Based on Slow and Fast Light in SOAs, *Perrine Berger[1,2], Jérôme Bourderionnet[1], Minhao Pu[3], Kresten Yvind[3], Fabien Bretenaker[2], Daniel Dolfi[1], Mehdi Alouini[4]; [1]Thales Res. and Technology, France; [2]Lab. Aimé Cotton, CNRS-Univ. Paris Sud 11, France; [3]DTU Fotonik, Dept. of Photonics Engineering, Technical Univ. of Denmark, Denmark; [4]Inst. de Physique de Rennes, UMR CNRS 6251, France.* We experimentally demonstrate that up-converted coherent population oscillations (CPO) in SOA open the possibility to conceive integrated optical tunable delay lines beyond the carrier lifetime limit, up to THz frequencies.

SLTuA3 • 9:15
Nonlinear Coefficients in Slow Light Engineered Photonic Crystal Waveguides, *Sourabh Roy[1], Marco Santagiustina[1], Pierre Colman[2], Sylvain Combrié[2], Alfredo de Rossi[2]; [1]Dept. of Information Engineering, CNIT, Univ. of Padova, Italy; [2]Thales Res. and Technology, France.* The self-, cross- and four-wave mixing coefficients are determined in photonic crystal waveguides specially designed for slow light. A general dependence with wavelength is found.

8:30–10:00
STuA • High Intensity and Broadband THz Sources
Peter Jepsen; Technical Univ. of Denmark, Denmark, Presider

STuA1 • 8:30 Invited
Filamentation THz generation in air, *Leang Chin; Universite Laval, Canada.* Experiments on THz pulse generation from single and multiple filaments in air using single or two-color technique will be discussed. Its application to sensing molecular rotational wave packet revival will be given. Stand-off detection of THz from a distance through monitoring nitrogen fluorescence in a filament was observed. The physics seems to be due to population trapping in the wake of strong field interaction with nitrogen molecules inside the filament.

STuA2 • 9:00
Transient Reflective Ultra-broadband THz Spectroscopy, *David Cooke[1], Lyubov Titova[2], Tyler L. Cocker[2], Frederik C. Krebs[3], Al Meldrum[2], Frank Hegmann[2], Peter U. Jepsen[4]; [1]Physics, McGill University, Canada; [2]Physics, University of Alberta, Canada; [3]Risø National Laboratory, Technical University of Denmark, Denmark; [4]Photonics Engineering, Technical University of Denmark, Denmark.* We discuss recent experiments using a novel time-domain THz spectrometer using air plasmas to generate and detect ultra-broadband THz pulses. Using this novel setup, we map the ultrafast carrier response of organic and nanocrystalline semiconductors.

STuA3 • 9:15
Broadband Enhanced 26 MV/cm THz Radiation in Uniform Nano-slit Arrays, *Mostafa Shalaby[1], Marco Peccianti[1,3], Luca Razzari[1], Gargi Sharma[1], Tsuneyuki Ozaki[1], Roberto Morandotti[1], Hannes Merbold[2], Thomas Feurer[2], Anja Webeer[4], Laura Heyderman[4], Hans Sigg[4], Bruce Patterson[5]; [1]INRS-EMT, Canada; [2]Institute of Applied Physics University of Bern, Switzerland; [3]Institute for Chemical and Physical Processes, Italy; [4]Laboratory for Micro- and Nanotechnology, Paul Scherrer Institut, Switzerland; [5]5SwissFEL, Paul Scherrer Institut, Switzerland.* We investigate a 1D uniform array of nano-slits capable to induce broadband plasmon-mediated field enhancement exceeding 100 in the range 0.2 to 2 THz, with a peak value of 760 at 0.2 THz.

8:30–10:00
SOTuA • Supercontinuum Fiber Lasers
Alain Villeneuve, Genia Photonics Inc., Canada, Presider

SOTuA1 • 8:30 Invited
UV/Vis Supercontinuum and Apps, *John Clowes; [1].* Abstract not available.

SOTuA2 • 9:00
Characterization of Fiber Supercontinuum by Chromatic Scattering, *Evgueni F. Martynovich[1], V. P. Dresvianski[1], A. A. Starchenko[1], S. M. Kobtsev[2], S. V. Kukarin[2], S. N. Bagayev[3]; [1]Irkutsk Branch of Institute of Laser Physics SB RAS, Russian Federation; [2]Novosibirsk State University, Russian Federation; [3]Institute of Laser Physics SB RAS, Russian Federation.* Chromatic scattering has been proved to characterize the polarization state of the fiber supercontinuum spectral components during propagation in media. Applications are considered for novel technology of multi-layer data recording.

SOTuA3 • 9:15
Taper Topography Control of Instabilities and Rogue Waves in Supercontinuum Fibers, *Benoit Barviau[1], Arnaud Mussot[1], Alexandre Kudlinski[1], John Dudley[2]; [1]University of Lille, France; [2]FEMTO-ST, France.* Longitudinal variation of dispersion and nonlinearity in tapered photonic crystal fiber dramatically improves the noise characteristics of supercontinuum generation. Experimental results are interpreted in terms of modified rogue wave dynamics.

Sessions continue on page XX.

Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

ATuA • Basic Technologies for NG-PON—Continued

ATuA4 • 9:30
Bandwidth Distribution with Adaptive Threshold-based Optical Burst Assembly in Long-Reach EPON, *Burak Kantarci[1], Hussein T. Mouftah[1]; [1]School of Information Technology and Engineering, Univ. of Ottawa, Canada.* Long-reach PONs (LR-PONs) suffer from high delay due to long feeder distance. Here, we present a new bandwidth distribution approach which adopts multi-server polling in LR-EPON and adaptive threshold-based burst assembly in OBS networks.

ATuA5 • 9:45
Contention Resolution Using Control Packet Buffering in Optical Burst Switched Networks, *Ahmed I. Abdelrahman[1], Hossam Shalaby[2], Sherif Rabia[3]; [1]Faculty of Engineering, Alexandria Univ., Egypt; [2]Egypt Japan Univ. of Science and Technology, Egypt; [3]Faculty of engineering, Alexandria Univ., Egypt.* In this paper a novel contention resolution technique based on control packet buffering in OBS networks is proposed. This buffering is implemented in the electronic domain, thus avoiding complex optical domain solutions.

ITuA • Devices and Components II—Continued

ITuA4 • 9:30
First Demonstration of Cavity-Resonator-Integrated Guided-Mode Resonance Filter, *Kenji Kintaka[1], Tatsuya Majima[2], Junichi Inoue[2], Koji Hatanaka[2], Shogo Ura[2], Junji Nishii[3]; [1]Natl. Inst. of Advanced Industrial Science and Technology, Japan; [2]Dept. of Electronics, Kyoto Inst. of Technology, Japan; [3]Research Inst. for Electronic Science, Hokkaido Univ., Japan.* A guided-mode resonance filter integrated in a waveguide cavity resonator was designed and fabricated for miniaturization of aperture size. A high-reflection filter at around 850-nm wavelength was experimentally demonstrated for the first time.

ITuA5 • 9:45
Resonant Cavity Enhancement of Polycrystalline PbTe Films for Two-Color IR detectors on Si-ROICs, *Timothy W. Zens[1], Jianfei Wang[2], Juejun Hu[2], Lionel Kimerling[1], Anu Agarwal[1]; [1]Microphotonics Center, Massachusetts Inst. of Technology, USA; [2]Microphotonics Center Alumni, Massachusetts Inst. of Technology, USA.* Dual color (1.5 and 3.5 μm) resonant-cavity-enhanced IR photodetectors on a silicon platform have been demonstrated. We describe the fabrication process and report detector performance demonstrating the feasibility of monolithic IR detectors-on-ROIC.

ITuB • Nanophotonics: Plasmonics and Applications I—Continued

ITuB4 • 9:30
Hybrid Plasmonic Waveguide Devices for Silicon on Insulator Platform, *Muhammad Alam[1], Stewart Aitchison[1], Mo Mojahedi[1]; [1]Univ. of Toronto, Canada.* Properties of the modes supported by the hybrid metal-low-high index waveguides are strongly polarization dependent. We present designs of a number of hybrid waveguide devices for silicon on insulator platform that utilizes this property.

ITuB5 • 9:45
Dielectric Strip Grating Embedded Trapezoidal Plasmonic Waveguide, *Michelle Y. Xu[1], Stewart Aitchison[1]; [1]Univ. of Toronto, Canada.* Novel dielectric strip grating embedded trapezoidal SPP waveguides are designed, fabricated, and characterized in air and under index matching oil. The resonance has a 1100 nm/RIU sensitivity and is validated by calculation.

10:00–10:30 Coffee Break, *Pier 4/ Harbour Ballroom Foyer*

10:00–16:00 Exhibits Open, *Pier 4/ Harbour Ballroom Foyer*

NOTES

Pier 2 & 3	Harbour Salon A	Pier 5
Slow and Fast Light	Optical Sensors	Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SLTuA • Slow/Fast Light in SOAs and Photonic Crystals—Continued

SLTuA4 • 9:30 Invited

Direct Observation of Temporal Solitons and Pulse Acceleration in III-V Semiconductor Photonic Crystal Waveguides, *Timothy Karle[1], Paul Monnier[1], Sylvain Combrié[2], Alfredo de Rossi[2], Fabrice Raineri[1], Rama Raj[1]; [1]LPN-CNRS, France; [2]Thales Res. and Technology, France.* Temporal mapping of 20pJ pulse propagation in a 2DPhC waveguide show of soliton formation. For high signal powers the photonic band is modified influencing the group velocity leading to an acceleration of the pulse propagation.

STuA • High Intensity and Broadband THz Sources—Continued

STuA4 • 9:30 Invited

High Power Terahertz Pulse Generation, Imaging, and Detection, *Frank Hegmann; [1].* The generation of intense single-cycle THz pulses by tilted-pulse-front techniques for probing ultrafast nonlinear THz dynamics in semiconductors is described. Full-field imaging of THz Cherenkov waves and novel THz pulse detection methods are also discussed.

SOTuA • Supercontinuum Fiber Lasers—Continued

SOTuA4 • 9:30 Invited

Infrared Supercontinuum Fiber Sources, *L. Brandon Shaw[1], Rafael Gattass[1], Jas Sanghera[1], Ishwar Aggarwal[2]; [1]NRL, USA; [2]Sotera Defense Solutions, USA.* IR supercontinuum generation in chalcogenide glass fiber is reviewed. Modeling for optimizing supercontinuum generation, fiber design and fabrication, and experimental results are presented.

10:00–10:30 Coffee Break, *Pier 4/ Harbour Ballroom Foyer*

10:00–16:00 Exhibits Open, *Pier 4/ Harbour Ballroom Foyer*

NOTES

Pier 9	Pier 7 & 8	Harbour Salon B
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Joint

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

Tuesday 14 June

Pier 9

10:30 –12:30
ATuB • Radio Over Fiber and OCDMA
Thomas Pfeiffer; Alcatel-Lucent, Germany, Presider

ATuB1 • 10:30 Invited
Techniques, Applications, and the Outlook of Radio-over-Fiber Networks, *Anthony Ng'oma[1]; [1]Corning Inc, USA.* We discuss key RoF system challenges, including MIMO and mm-wave signal transmission at 60 GHz. We propose practical solutions and successfully demonstrate practical RoF system implementations capable of delivering > 30 Gb/s wireless data signals.

ATuB2 • 11:00
Research on OFDM-ROF system at Millimeter-wave Band Employing Optical External Modulator Generation, *Zhe Kang[1], Nianyu Zou[1], Dong Wang[2], Jingjing Liu[1], Yingming Gao[1]; [1]Dalian Polytechnic Univ., Res. Inst. of Photonics, China; [2]Beijing Univ. of Posts and Telecommunications, Information and Electronics Technology Lab, China.* A 40GHz Radio-over-Fiber system is proposed to transmit 2.5Gb/s 16QAM-OFDM wireless signals with only 20GHz RF source. Simulation results show that a reliable EVM value is obtained after 40km SMF transmission.

ATuB3 • 11:15
Wireless Convergence over Next Generation OFDMA-PONs, *Milos Milosavljevic[1], Pandelis Kourtessis[1], John Senior[1]; [1]Univ. of Hertfordshire, UK.* This paper demonstrates the feasibility of optical/wireless convergence based on DoF propagation. Network modelling results confirm the transmission of 16 CPRI signals up to 100km OFDMA-PON infrastructures achieving 40 Gbit/s total aggregate rates.

ATuB4 • 11:30 Invited
OCDMA and OFDMA Technologies for NG-PON, *Ken-ichi Kitayama[1]; [1]Osaka Univ., Japan.* OCDMA and OFDMA are promising for NG-PON2, aiming at a revolution change after 2015. OCDMA and OFDMA can implement new demands for soft-capacity on-demand, high data confidentiality, high bandwidth efficiency as well as low-power consumption.

ATuB5 • 12:00
Influence of the MAI Distribution over the BER Evaluation in a Multirate, Multiclass OOC-OCDMA System, *Thiago R. Raddo[1], Anderson Sanches[1], José Valdemir dos Reis Jr[1], Ben-Hur V. Borges[1]; [1]Electrical, Sao Paulo Univ., Brazil.* We propose a BER expression based on binomial distribution for a multirate OCDMA system. We compare it with Poisson assumption for MAI and show the later underestimates the number of users for a given BER.

ATuB6 • 12:15
Point-to-point and Point-to-multipoint CDMA Access Network with Enhanced Security, *Alfredo A. Ortega[1], Victor A. Bettachini[1], Jose Ignacio Alvarez-Hamelin[1,2], Diego F. Grosz[1,2]; [1]Optoelectrónica, ITBA (Inst. Tech. de Buenos Aires), Argentina; [2]CONICET (Argentinian Council of Scientific and Technological Res.), Argentina.* We propose a network implementation with enhanced security at the physical layer by means of time-hopping CDMA, supporting cryptographically secure point-to-point and point-to-multipoint communication.

Pier 7 & 8

10:30–11:45
SPTuB • Advanced Modulation
Rene Schmogrow, Karlsruhe Institute of Technology, Germany, Presider

SPTuB1 • 10:30 Invited
Ideal POL-QAM Modulation for Coherent Detection Schemes, *Henning Buelow[1,2]; [1]ZFZ/ON, Alcatel-Lucent, Germany; [2]LIT, University Erlangen, Germany.* The gain of POL-QAM at high OSNR can only be kept at low OSNR by increasing the complexity of the FEC decoder indicating that DSP effort has to be considered for a comparison versus PDM-QAM.

SPTuB2 • 11:00 Invited
Performance Evaluation of Coherent PS-QPSK (HEXA) Modulation, *Gabriella Bosco[1], Andrea Carena[1]; [1]Politecnico di Torino, Italy.* We investigate the performance of the 8-point four-dimensional PS-QPSK (HEXA) modulation format in uncompensated WDM long-haul optical transmission systems, comparing it to standard 16-point PM-QPSK and 4-point PM-BPSK constellations.

SPTuB3 • 11:30
A Modified CMA for PS-QPSK, *Pontus Johannisson[1], Martin Sjödin[1], Magnus Karlsson[1]; [1]Photonics Laboratory, Department of Microtechnology and Nanoscience, Chalmers University of Technology, Sweden.* A modified constant modulus algorithm (CMA) is presented that allows polarization demultiplexing of polarization-switched QPSK. The suggested algorithm has been found to work well on both numerical and experimental data.

Harbour Salon B

10:30–12:30
JTuA • IPR/SL Joint Session
John Howell, Univ. of Rochester, USA, Presider
Thomas Krauss, Univ. of St. Andrews, UK, Presider

JTuA1 • 10:30 Plenary
Progress and Technical Challenges for Integrated Optics, *Katsunari Okamoto[1]; [1]AiDi Corp., Japan.* The paper reviews progress of integrated optics and discuss technical challenges of silicon photonics devices. It also describes a novel planar waveguide spectrometer based on Fourier transform spectroscopy.

JTuA2 • 11:15 Plenary
Shaping the Future of Nanobiophotonics, *Kishan Dholakia[1], Tomas Cizmar[1], Michael Mazilu[1], Joerg Baumgartl[1], Praveen Ashok[1], Xanthi Tsampoula[1], Frank Gunn-Moore[1]; [1]Univ. of St Andrews, UK.* We describe the emerging field of Nanobiophotonics with an emphasis on shaping light and integration. Examples of advances in super resolved imaging, optical manipulation, Raman analysis and cell transfection will be presented.

JTuA3 • 12:00 Invited
Slotted Photonic Crystal Slow Light Modulators, *Juerg Leuthold, W. Freude, C. Koos, L. Alloatti, D. Korn, R. Palmer, J.M.-Brosi; Institute of Photonics and Quantum Electronics (IPQ) & Institute of Microstructure Technology (IMT) at Karlsruhe Institute of Technology, Germany.* CMOS-compatible electro-optic modulators offering highest-speed signal processing with little power consumption are reviewed. Emphasis is given to slotted photonic crystal modulators fabricated by taking advantage of the silicon-organic hybrid platform.

12:30-13:30 Lunch Break *(on your own)*

Optical Sensors

Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

10:30–12:30
STuB • THz Spectroscopy and Imaging Applications
David Cooke; McGill Univ., Canada, Presider

STuB1 • 10:30 Invited
Science and Technology in the Submillimeter with High Resolution Techniques, *Frank C. De Lucia[1]; [1]Physics, Ohio State University, USA.* With emphasis on high-resolution systems, the interaction of the physics of the spectral region with the physics of applications will be discussed. It will be shown how this leads to optimal choices of system strategies.

STuB2 • 11:00
Ultrafast Imaging of Terahertz Pulse Generation by Cherenkov Radiation in LiNbO3, *Zhenyou Wang[1]; [1]Phsics department, University of Alberta, Canada.* We demonstrate full-field imaging of terahertz waves induced by a point focused optical pulse in lithium niobate. The group velocities of the optical and THz pulses as well as the Cherenkov radiation angle are directly measured.

STuB3 • 11:15
Spatio-temporal Characteristics of THz Emission at the Subwavelength Scale via Optical Rectification, *Sze Phing Ho[1,4], Matteo Clerici[1], Marco Peccianti[1,2], Fabrizio Buccheri[1,3], A. Busacca[3], Tsuneyuki Ozaki[1], Jalil Ali[4], Roberto Morandotti[1]; [1]INRS Énergie, Matériaux et Télécommunications, Canada; [2]IPCF-CNR, UOS Roma., Italy; [3]DIEET, University of Palermo., Italy; [4]Nanophotonics Research Alliance, Universiti Teknologi Malaysia., Malaysia.* Highly localized THz emission via optical rectification in thin nonlinear crystals is a promising method for subwavelength microscopy. We present here the peculiar THz spatio-temporal characteristics induced by the non-paraxial generation regime.

STuB4 • 11:30
Time and Frequency-resolved Terahertz Microscopy with a Photoconductive Near-field Probe, *Jan Wallauer[1], Alex Ortner[1], Andreas Bitzer[1], Stefan Waselikowski[1], Markus Walther[1]; [1]Physics, University Freiburg, Germany.* Using a photoconductive antenna as scanning THz near-field probe we demonstrate mapping of electric and magnetic fields close to microstructures. Our approach visualizes the near-fields with sub-ps temporal and sub-wavelength spatial resolution.

STuB5 • 11:45
Dielectric Properties of Heavy Oils Using Terahertz Time-Domain Spectroscopy, *Amin Kabir[1], Ayesheshim Ayesheshim[1], Lyubov Titova[1], Zhenyou Wang[1], Patrice Abivin[2], Yuesheng Cheng[2], Kentaro Indo[2], Frank Hegmann[1]; [1]Department of Physics, University of Alberta, Canada; [2]Schlumberger DBR Technology Center, Canada.* We investigate the terahertz dielectric properties of heavy oils as a function of temperature using terahertz time-domain spectroscopy. These results facilitate the study of temperature-dependent intermolecular interactions within heavy oils.

STuB6 • 12:00 Invited
Towards 1-mW THz Photoconductive Sources with Low-Cost Laser Drivers, *Elliott Brown[1]; [1]Wright State University, USA.* A growing number of applications in the THz field require more power, efficiency, affordability, and reliability from time- and frequency-domains sources alike. We have developed efficient phoconductive switches and photomixers that can be driven by fiber mode-locked and cw-diode lasers, respectively. The average power of the PC switches is approaching 1 mW.

10:30–12:15
SOTuB • Chalcogenide and Tellurite Fibers
John Ballato, Clemson Univ., USA, Presider

SOTuB1 • 10:30 Invited
Applications of Chalc Fibers, *Dan Hewak[1], K. Kahn[1], C. C. Huang[1]; [1]University of Southampton, UK.* Chalcogenide glass optical fibers have been extensively studied since 1967, when sulphide based fibers and their potential applications were first proposed. In this paper we describe our current work on the fabrication and application of chalcogenide fiber and our vision for their practical implementation in the future.

SOTuB2 • 11:00 Invited
Chalcogenide Microstructured Optical Fibers for IR Photonics, *Jean-Luc Adam[1], Johann Trolès[1], Laurent Brilland[2]; [1]U. of Rennes-CNRS, France; [2]Perfos, France.* Chalcogenide glasses show broad IR transparency and high NL refractive index. Singlemode chalcogenide microstructured fibers were obtained with losses around 0.3dB/m in the mid-IR. Fibers with small or large effective mode areas were demonstrated.

SOTuB3 • 11:30
Chromatic Dispersion Engineering in Chalcogenide Microporous Fibers for the Middle-infrared, *Bora Ung[1], Maksim Skorobogatiy[1]; [1]Engineering physics, Ecole Polytechnique de Montreal, Canada.* Tuning of the microporosity in the core of chalcogenide fibers provides extensive dispersion engineering that allows red-shifting of zero-dispersion points and flattened dispersion profiles. The porosity also significantly lowers propagation losses.

SOTuB4 • 11:45
Bragg Grating in Sub-wavelength Chalcogenide Wires, *Raja Ahmad[1], Martin Rochette[1]; [1]Electrical and Computer Engineering, McGill University, Canada.* We report the photo-inscription of Bragg gratings in chalcogenide (As2Se3) fibers tapered down to 1 µm. A transmission dip of <-30 dB at a wavelength of 1573 nm is achieved after 9 minutes of exposure time with 633 nm light.

SOTuB5 • 12:00
Tungstate-Tellurite Optical Fibers for Special Applications, *Alexey Kosolapov[1], Yuriy Yatsenko[1], Vitaly Nazaryants[1], Maxim Astapovich[1], Victor Plotnichenko[1], Alexander Moiseev[2], Vitaly Dorofeev[2], Gennady Snopatin[2], Mikhail Churbanov[2], Evgeny Dianov[2]; [1]Fiber Optics Research Center of RAS, Russian Federation; [2]Institute of Chemistry of High-Purity Substances, Russian Federation.* Different types of optical fibers with losses less than 100 dB/km were produced from high-purity tungstate-tellurite glasses. The microstructured fiber for supercontinuum generation in the range 1-5 µm with optical loss of 4 dB/m has been fabricated.

12:30-13:30 Lunch Break *(on your own)*

Joint

13:30–15:30
JTuB • Joint Poster Session

JTuB1
Fast Light in Erbium Doped Fibers Based on Coherent Population Oscillations with Nonlinear Negative Absorption, *Francisco Arrieta-Yáñez[1], Sonia Melle[1], Óscar G. Calderón[1]; [1]Optics, Universidad Complutense de Madrid, Spain.* Superluminal propagation of signals (wavelengths 1536,787 nm) in erbium-doped fibers without additional pump is demonstrated. We explain this phenomenon within the coherent population oscillations model in a medium with nonlinear negative absorption.

JTuB2
Amplitude-Preserving Tunable Pulse Delay in AlGaInAs-InP Active Ring-Resonators, *Andrea Melloni[1], Antonio Canciamilla[1], Carlo Ferrari[1], Francesco Morichetti[1], Gabor Mezosi[2], Marc Sorel[2]; [1]Policom - Dipartimento di Elettronica e Informazione, Politecnico di Milano, Italy; [2]School of Engineering, Univ. of Glasgow, UK.* We report on the use of active waveguides to compensate for losses in reconfigurable delay lines based on ring resonators. Pulse delay in both transparency and amplification regimes is demonstrated.

JTuB3
Simultaneous Slow and Fast Light, *Bin Luo[1], Hong Guo[1]; [1]School of Electronics Engineering and Computer Science, Peking Univ., China.* Simultaneous slow and fast light requires rf field [Opt. Lett. 35, 64 (2010)], which is inconvenient. We suggest that the rf field can be replaced by lights and thus, the phenomena can be realized optically.

JTuB4
Destructive Interference of Dark Resonances in a Room Temperature Tripod System, *Santosh Kumar[1], Thomas Laupretre[2], Fabien Bretenaker[2], Rupamanjari Ghosh[1], Fabienne Goldfarb[2]; [1]Jawaharlal Nehru Univ., India; [2]Lab. Aime Cotton, France.* We explore the response of a tripod system in 4He* under excitation by perpendicularly polarized pump and probe beams in the presence of a transverse magnetic field. Destructively interfering dark resonances are observed and interpreted.

JTuB5
Few-cycle Self-Induced-Transparency Solitons, *YuanYao Lin[1], I-Hong Chan[1], Ray-Kuang Lee[1]; [1]Inst. of Photonics Technologies, National Tsing Hua Univ., Taiwan.* We reveal the existence of few-cycle optical self-induced-transparency soliton family in a two-level absorbing system in slow- and fast-light regime. The effects of number of cycles on area theory and pulse group velocity are elucidated.

JTuB6
Localized Dynamic Brillouin Gratings Permanently Induced by Chaotic Signals, *Marco Santagiustina[1], Leonora Ursini[1]; [1]Dept. of Information Engineering, CNIT, Univ. of Padova, Italy.* A method to permanently induce localized, dynamic Brillouin gratings is proposed and numerically demonstrated. It exploits the thumb-tack correlation of chaotic lasers signals.

JTuB7
Novel Highly Nonlinear Composite Tellurite Microstructured Optical Fibers for SC Generation, *Zhongchao Duan[1], Meisong Liao[1], Xin Yan[1], Weiqing Gao[1], Takenobu Suzuki[1], Yasutake Ohishi[1]; [1]Toyota Technological Inst., Japan.* We prepared a novel composite tellurite MOFs consisting of two different glasses as core and clad to freely control chromatic dispersion. Broad and flattened SC spectra were demonstrated in the fiber under femtosecond laser pumping.

JTuB8
Enhanced Low-Index Field Confinement by Radially Stratified Micro Optical Fibers, *Wenfu Zhang[1,2], Jianwei Mu[3], Weiping Huang[3], Wei Zhao[1]; [1]State Key Lab. of Transient Optics and Photonics, Xi'an Inst. of Optics and Precision Mechanics, Chinese Academy of Sciences, China; [2]Graduate School of the Chinese Academy of Sciences, China; [3]Electrical and Computer Engineering, McMaster Univ., Canada.* The ring micro-fiber is studied. The calculating results show that light can be concentrated in nanometer-thin low-index ring regions with very high confinement efficiency.

JTuB9
High-Purity Tungstate-Tellurite Glasses and Single-Mode Fibers: Fabrication and Studies, *Vitaly Dorofeev[1], Alexander Moiseev[1], Mikhail Churbanov[1], Billy Richards[2], Animesh Jha[2], Alexey Kosolapov[3], Evgeny Dianov[3]; [1]Inst. of Chemistry of High-Purity Substances of RAS, Russian Federation; [2]Inst. for Materials Res., Univ. of Leeds, UK; [3]Fiber Optics Research Center RAS, Russian Federation.* The single-mode optical fibers were fabricated from TeO2-WO3-La2O3-(Bi2O3) glasses with low content of impurities and absorption losses less then 100 dB/km (1.56 µm). Rode-in-tube as well as monolith preform stretching techniques were used.

JTuB10
A Mode Coupled Erbium Doped Fiber Structure for All-Optical Regeneration of DPSK and OOK Signals, *Scott Shepard[1], Richard Long[2]; [1]Louisiana Tech Univ., USA; [2]CenturyLink, USA.* We numerically demonstrate all-optical regenerators based on mode coupled EDFAs. These are phase transparent for DPSK signals and improve the SNR of OOK signals by over 3 dB.

JTuB11
Ring-Based WDM-PON with Suppression of Rayleigh Backscattering Interferometric Noise, *Chi Wai Chow[2], Chien-Hung Yeh[1], Yu-Fu Wu[2], Fu-Yuan Shih[2], Sien Chi[2]; [1]Industrial Technology Res. Inst., Taiwan; [2]Natl. Chiao Tung Univ., Taiwan.* We demonstrate a ring-based WDM-PON. Rayleigh-backscattering (RB) can be suppressed since the upstream signal and the RB are traveling in different directions. We also analyze the network performance when upgrading to 40-Gb/s.

JTuB12
40 Gbps Long-Reach Access Network with Multi-Video Services Broadcasting, *Chien-Hung Yeh[1], Chi Wai Chow[2], Lin-Gung Yang[2], Yen-Liang Liu[1], Ci-Ling Pan[3]; [1]Industrial Technology Res. Inst., Taiwan; [2]Natl. Chiao Tung Univ., Taiwan; [3]National Tsing Hus Univ., Taiwan.* We propose and demonstrate the 40 and 10 Gb/s downlink and uplink traffic in long-reach PON architecture with multi-services broadcasting, such as CATV, DVB-T, IP-TV and HD-TV etc., in 100 km fiber access transmission.

JTuB13
Adjustment of Uplink Data Rate in RSOA-Based ONU in PON Access, *Chien-Hung Yeh[1], Chi Wai Chow[2], Lin-Gung Yang[2], Ci-Ling Pan[3]; [1]Industrial Technology Res. Inst., Taiwan; [2]Natl. Chiao Tung Univ., Taiwan; [3]Natl. Tsing Hua Univ., Taiwan.* We first propose and investigate the dynamic uplink traffic rate adjustment employing RSOA-based optical network unit (ONU) in current PON and long reach PON systems, according to the injected power level of downlink signal.

JTuB14
Modeling and Design Optimization of Discrete Mode Lasers for High Speed Single-Mode Operation in Optical Communication Networks, *Yu Li[1], Yanping Xi[1], Weiping Huang[1]; [1]Electrical & Computer Engineering, McMaster Univ., Canada.* Static and dynamic characteristics of discrete mode laser are investigated theoretically by a rigorous time-domain traveling-wave model. Design optimization is carried out on key parameters of the laser for single-mode operation in optical networks.

JTuB15
Optimization of CMOS-Compatible Hybrid Plasmonic Waveguides for Nonlinear Applications, *Ke-Yao Wang[1], Amy C. Foster[1]; [1]Electrical and Computer Engineering, Johns Hopkins Univ., USA.* We demonstrate the design and optimization of three CMOS-compatible hybrid plasmonic waveguide structures for nonlinear interactions. Our proposed hybrid waveguide structure provides the largest nonlinear phase shift compared to other designs.

JTuB16
Enhanced Absorption of Ultrathin Film a-Si Solar Cell Based on Ultrathin Metal Grating, *Sangjun Lee[1], Sangin Kim[1], Jaejin Lee[1], Hanjo Lim[1]; [1]Ajou Univ., Republic of Korea.* We present enhanced absorption of solar cell composed of an ultrathin absorbing layer embedded between a metal reflector and an ultrathin metal grating. Absorption improvement for both TE and TM polarizations is achieved.

JTuB17
Surface Roughness Effect on Q-Factor of Ge Whispering Gallery Mode Microdisk Resonator, *Seongjae Cho[1], Sukmo Koo[1], Kyungwan Yoo[1], Evan R. Pickett[1], Namkyoo Park[1], Theodore I. Kamins[1], Byung-Gook Park[1], James S. Harris[1]; [1]Electrical Engineering, Stanford Univ., USA.* In this paper, surface roughness effect on Q-factor on Ge whispering gallery mode microdisk resonator is thoroughly investigated by 2-D and 3-D FDTD simulations with variations on roughness indices.

JTuB18
Refractive Index Profiling of an Optical Waveguide with Optical Path Perturbation, *KaiHsun Tsai[1], San-Yu Ding[1], Wan-Shao Tsai[1]; [1]Dept. of Applied Materials and Optoelectronics Engineering, Natl. Chi-Nan Univ., Taiwan.* Two-dimensional index profile of an optical fiber was reconstructed with the measured differential optical fields by perturbing the optical path in the end-fire coupling measurement. Good results were obtained compared with the known index profile.

JTuB19
Design Optimization of High Performance Single-mode Fabry-Perot Lasers Based on Quantum Dot Materials, *Lanxin Deng[1], Lin Han[1], Yanping Xi[1], Xun Li[1], Weiping Huang[1]; [1]Electrical and Computer Engineering, McMaster Univ., Canada.* The inhomogeneous and homogeneous broadening of quantum-dot Fabry-Perot laser is discussed by a rate-equation model. With optimum values, the single longitudinal-mode laser is designed and the requirement of the inhomogeneous broadening is discussed.

JTuB20
Benzocyclobutene Multimode Interference Power Splitters Fabricated by Ultraviolet Laser Illumination, *Yu-Shuan Chang[1], Wan-Shao Tsai[2], Way-Seen Wang[3,1]; [1]Graduate Inst. of Photonics and Optoelectronics, National Taiwan Univ.,Taiwan; [2]Dept. of Applied Materials and Optoelectronics Engineering, Natl. Chi-Nan Univ., Taiwan; [3]Dept. of Electrical Engineering, Natl. Taiwan Univ., Taiwan.* Various MMI power splitters fabricated by laser illumination on benzocyclobutene are compared. With suitable beam expansion ratios, experimental results show the devices can be fabricated with high accuracy, short time, and good controllability.

Joint

JTuB • Joint Poster Session—Continued

JTuB21
Numerical Simulations of Temperature Dependence of High-Efficiency Multi-Junction Solar Cells Under Concentrated Sunlight, *Jeffrey Wheeldon[1], Alex W. Walker[1], Olivier Theriault[1], Mark Yandt[1], Karin Hinzer[1]; [1]Univ. of Ottawa, Canada.* The temperature dependence of GaInP/GaAs/Ge multi-junction solar cells are numerically modeled. The temperature dependence of the solar cell dark current and the spectral sensitivity of the solar cell are demonstrated.

JTuB22
Automatic Extraction of Chirp Parameter of DFB Laser, *Lin Han[1], Yefeng Wen[1], Weiping Huang[1]; [1]Electrical and Computer Engineering, McMaster Univ., Canada.* A new method is proposed for extracting DFB laser chirp parameter by fitting the side-band strengths ratio curve obtained from spectrum measurement. It is validated by comparing with the result obtained from fiber dispersion measurement.

JTuB23
High Power Pulse Trains Envelop Severance in Quasi-Phase-Matched Waveguide, *Shih-Chiang Lin[1]; [1]I-SHOU Univ., Taiwan.* A method of 2-ps pulse trains generation in QPM waveguide is proposed. The mechanism of pulse train envelop severance, due to group velocity mismatched, is studied.

JTuB24
Step Index POF Link Power Budget Calculation Today and Tomorrow, *Olaf Ziemann, S. Loquai, Roman Kruglov; Univ. of Nueremberg, Germany.* The correct calculation of the optical power budget is very important for the present standardization. This paper will present a present example and will show options for future improvements with optimized components.

15:30-16:00 Coffee Break, *Pier 4/ Harbour Ballroom Foyer*

NOTES

Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

Tuesday 14 June

16:00–18:00
ATuC • Inhouse: Fiber and Wireless
Juerg Leuthold; KIT,Germany, Presider

ATuC1 • 16:00 Invited
Options for a 1 Gbit/s Standard POF Interface Report on the German Standardization Activities, *Olaf Ziemann[1], Christian-Alexander Bunge[1], Juri Vinogradov[1], S. Loquai[1], Roman Kruglov[1]; [1]Univ. Nueremberg, Germany.* A German standardization group works since Sep. 2009 on a guideline for a future 1 Gbit/s POF interface. This paper will summarize the recent activities and will present the current status.

ATuC2 • 16:30 Invited
Converged In-home Networks Using 1-mm Core Size Plastic Optical Fiber, *Eduward Tangdiongga[1], Davide Visani[1,2], Hejie Yang[1], Yan Shi[1], Chigo M. Okonkwo[1], Henrie van den Boom[1], Giovanni Tartarini[2], A. Koonen[1]; [1]Electrical Engineering, COBRA Res. Inst., TU Eindhoven, Netherlands; [2]DEIS, Univ. of Bologna, Italy.* Broadband wireline and wireless transmission system over 1-mm core size 50-m long POF is discussed. Transmission capacity of 2.2 Gbit/s DMT and 528-MHz UWB wireless signals is achieved, having performance complying with requirements.

ATuC3 • 17:00 Invited
Ultra-broadband Optical Wireless for Indoor Applications, *Thas A. Nirmalathas[1,2], Ke Wang[1,2], Christina Lim[1], Efstratios Skafidas[1,2]; [1]Dept of Electrical and Electronic Engineering, Univ. of Melbourne, Australia; [2]Victoria Res. Lab., NICTA, Australia.* In this paper, we demonstrate an experimental 4x12.5 Gb/s ultra-broadband optical wireless system incorporating wavelength division multiplexing.

16:00–17:30
SPTuC • DSP
Gabriella Bosco, Politecnico di Torino, Italy, Presider

SPTuC1 • 16:00 Invited
Integrated Carrier Phase and Frequency Estimation for Coherent Detection based on Multi-Symbol Differential Detection (MSDD), *Moshe Nazarathy[1], Netta Sigron[1], Igor Tselniker[1]; [1]EE, Technion, Israel.* We present new results on MSDD carrier recovery for optical coherent detection. The frequency and phase estimation functions are jointly accomplished with lowest complexity, high performance and automatic adaptation to the channel statistics.

SPTuC2 • 16:30
Structure of a Digital Feedback Clock Recovery for Parallelized Receivers, *Daniel Schmidt[1], Berthold Lankl[1]; [1]University of the Federal Armed Forces, Germany.* High speed receivers must process several samples in parallel. For such a parallelized receiver architecture an implementation of a digital feedback timing recovery scheme is proposed.

SPTuC3 • 16:45
Combined CD and DGD Monitoring Based on Data-Aided Channel Estimation, *Fabian N. Hauske[1], Yabin Ye[1], Idelfonso Tafur Monroy[2], Fabio Pittala[1,2], Neil Guerrero Gonzalez[2]; [1]European Research Center, Huawei Technologies Duesseldorf GmbH, Germany; [2]DTU Fotonik, Technical University of Denmark, Denmark.* By use of a training sequence, fast and robust CD and DGD estimation is demonstrated for a 112 Gbit/s PDM-QPSK system over a wide range of combined channel impairments.

SPTuC4 • 17:00
Adaptive Single-Carrier Frequency-Domain Equalization for 100G Coherent Optical Communications, *Omid Zia-Chahabi[1], Raphaël Le Bidan[1], Michel Morvan[1], Christophe Laot[1]; [1]Institut Telecom/Telecom Bretagne, France.* We investigate the principle and performance of fractionally-spaced adaptive single-carrier frequency-domain equalization for 16-QAM 100G coherent optical communications. The proposed solution is shown to be robust against linear impairments.

16:00–18:00
ITuC • Photonic Integration I
Valery Tolstikhin; OneChip Photonics Inc., Canada, Presider

ITuC1 • 16:00 Invited
Large-Scale Monolithic Integration of PM-QPSK Modulation Architecture in 500 Gb/s Transmitters, *Scott Corzine[1], Peter Evans[1], Matthew Fisher[1], Andrew Dentai[1], Ranjani Muthiah[1], Randal Salvatore[1], Adam James[1], Pavel Studenkov[1], Eva Strzelecka[1], Thomas Vallaitis[1], Forrest Sedgwick[1], Matthias Kuntz[1], Vikrant Lal[1], Masaki Kato[1], Maura Raburn[1], Augi Spannagel[1], Wayne Williams[1], Shashank Agashe[1], Arnold Chen[1], Damien Lambert[1], John Thomson[1], Doug Christini[1], Don Pavinski[1], Parmijit Samra[1], Jianping Zhang[1], Tiangong Liu[1], Babak Behnia[1], Jeffrey Bostak[1], Vince Dominic[1], Alan Nilsson[1], Brian Taylor[1], Jeff Rahn[1], Gilad Goldfarb[1], Vinayak Dangui[1], Mike Van Leeuwen[1], Han Sun[1], Kuang-Tsan Wu[1], Matthew Mitchell[1], Jacco Pleumeekers[1], Mark Missey[1], Radha Nagarajan[1], Rick Schneider[1], James Stewart[1], Mike Reffle[1], Tim Butrie[1], Charles Joyner[1], Charles Joyner[1], Mehrdad Ziari[1], Fred Kish[1], Dave Welch[1]; [1]Infinera, USA.* We describe the monolithic integration of 10 InP-based phase-modulated transmitter channels employing polarization multiplexing and quadrature phase-shift keying coherent modulation format to provide an aggregate 500Gb/s bandwidth on a single chip.

ITuC2 • 16:30 Invited
InP-Based Transmitter PICs, *Hiroyuki Ishii[1], Hiromi Oohashi[1]; [1]NTT Photonics Laboratories, Japan.* InP-based photonic integrated circuits (PICs) that contain semiconductor lasers are promising as compact high-performance transmitters for future photonic networks. Recent activity on InP-based transmitter PICs is described.

ITuC3 • 17:00
Spot-Size Converter: A Generic Building Block for Regrowth-Free Multi-Guide Vertical Integration in InP, *Fang Wu[1], Valery Tolstikhin[1], Yury Logvin[1], Chris Brooks[1]; [1]OneChip Photonics Inc, Canada.* A wide-band spot-size converter for low-loss and alignment tolerant coupling to a single-mode fiber that also allows for on-chip wavelength splitting and routing is reported. The design, fabrication and characterization of the device are presented.

16:00–18:00
ITuD • Nanophotonics: Plasmonics and Applications II
Jeremy Baumberg; Univ. of Cambridge, UK, Presider

ITuD1 • 16:00 Invited
Active and Passive Surface Plasmon Photonics, *Pierre Berini[1]; [1]SITE, Univ. of Ottawa, Canada.* Recent progress on integrated surface plasmon components is reviewed. Passive and active plasmonic functions, such as modulation, amplification and lasing, detection, and sensing are dicussed.

ITuD2 • 16:30
A Silicon Lens for Integrated Free-Space Optics, *David Fattal[1], Jingjing Li[1], Zhen Peng[1], Marco Fiorentino[1], Raymond G. Beausoleil[1]; [1]HP Labs, USA.* We introduce a CMOS-compatible planar lens made of a hexagonal array of silicon posts, with a diameter distribution tailored to produce an arbitrary transmitted wavefront, opening the way to the integration of 3-D optical systems.

ITuD3 • 16:45
Guided-Mode-Resonance Enabled Absorption in Amorphous Silicon for Thin-Film Solar Cell Applications, *Tanzina Khaleque[1], Jaewoong Yoon[1], Wenhua Wu[1], Mehrdad Shokooh-Saremi[1], Robert Magnusson[1]; [1]Electrical Engineering, Univ. of Texas at Arlington, USA.* Nanoscale patterns with 300-nm periods fabricated on thin films of amorphous silicon on glass substrates. Around 50% integrated absorption enhancement compared to unpatterned silicon reference samples is observed for the 400–950-nm wavelength range.

ITuD4 • 17:00
Filter Response of Feedback Plasmonic Junctions, *Mohamed A. Swillam[1], Amr S. Helmy[1]; [1]ECE/Physics, Univ. of Toronto, Canada.* We propose a novel filter structure for plasmonic circuits. The proposed structure is based on creating a feedback junction. The unique characteristics of the structure are analyzed using a simple and accurate analytical model.

Sessions continue on page XX.

Pier 2 & 3	Harbour Salon A	Pier 5
Slow and Fast Light	Optical Sensors	Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

16:00–18:00
SLTuB • Methods and Fundamentals
Byoung Ham, Inha Univ., South Korea, Presider

SLTuB1 • 16:00 Invited
Understanding Propagation Loss in Slow Light Waveguides, *Sebastian A. Schulz[1], William Whelan-Curtin[1], Isabella H. Rey[1], Thomas Krauss[1]; [1]School of Physics and Astronomy, Univ. of St Andrews, UK.* Engineering dispersion and loss in photonic crystal waveguides allows us to control propagation up to moderate group indices. Novel results on 'over-engineered' waveguides give insights into loss vs. both propagation constant and group index.

SLTuB2 • 16:30
Coupled-Resonator Optical Waveguides (CROWs) Based on Grating Resonators with Modulated Bandgap, *Hsi-Chun Liu[1], Christos Santis[1], Amnon Yariv[1,2]; [1]Electrical Engineering, California Inst. of Technology, USA; [2]Applied Physics, California Inst. of Technology, USA.* We theoretically study CROWs based on modulated grating resonators. The defect sections between resonators control the coupling coefficients and frequency detuning. The transmission spectra of CROWs rely on a proper choice of the defect length.

SLTuB3 • 16:45
Slow Light Using Cross Gain Modulation in a Quantum Dash Semiconductor Optical Amplifier, *Sean O'Duill[1], Vissorian Mikhelashvili[1], Johann P. Reithmaier[2], Gadi Eisenstein[1]; [1]Electrical Engineering, Technion, Israel; [2]Technische Physik, Univ. of Kassel, Germany.* We report on measurements of phase shifting using cross gain modulation in a quantum dash semiconductor optical amplifier.

SLTuB4 • 17:00
Extraction of CROW Parameters Using Scattering Tree, *Roman Novitski[1], Jacob Scheuer[1], Ben Z. Steinberg[1]; [1]Tel-Aviv Univ., Israel.* We present a method for extracting the coupling coefficients and the resonant frequency detunings of a coupled resonator optical waveguide (CROW) from its discrete impulse response calculated from the frequency response of the through port.

16:00–18:15
STuC • Terahertz Waveguides, Applications, and Device Technology
Markus Walther; Univ. Freiburg, Germany, Presider

STuC1 • 16:00 Invited
The Transition from a TEM-like Mode to a Plasmon-like Mode in a Parallel Plate Waveguide, *Jingbo Liu[1], Rajind Mendis[1], Daniel Mittleman[1]; [1]Rice University, USA.* We experimentally characterize the spatial mode inside a finite-width parallel-plate waveguide using a subwavelength probe. We observe a transition from a TEM-like spatial mode at low frequencies to a plasmon-like mode at high frequencies.

STuC2 • 16:30
Suspended Core Subwavelength Fibers for Practical Low-loss Terahertz Guidance, *Bora Ung[1], Mathieu Rozé[1], Anna Mazhorova[1], Markus Walther[2], Maksim Skorobogatiy[1]; [1]Engineering physics, Ecole Polytechnique de Montreal, Canada; [2]Materials Research Center, University of Freiburg, Germany.* We describe fabrication of polymer suspended core fibers (porous & non-porous cores) for terahertz guiding, and their characterization via near-field THz microscopy. These novel fibers enable convenient handling and mode isolation from perturbations.

STuC3 • 16:45
Suspended Core Polyethylene Fiber for Bio-sensing Applications in the Terahertz Region, *Anna Mazhorova[1], Mohammed Zourob[2], Maksim Skorobogatiy[1]; [1]Genie Physique, Ecole Polytechnique de Montreal, Canada; [2]Institut National de la Recherche Scientifique, Canada.* For the first time we demonstrate the possibility of using suspended core polyethylene fibers for the sensing of E.coli. Diameter of fiber is 5.1 mm, it has 150 µm suspended core which is strongly isolated from the environment

STuC4 • 17:00 Invited
Industrial Applications of Pulsed Terahertz Radiation, *Philip Taday[1]; [1]TeraView Limited, UK.* Terahertz pulsed applications have long been thought to be a physics laboratory tool. In this paper I discuss recent advancements in bring terahertz sensors in real world practical applications in industry.

16:00–18:00
SOTuC • Fiber Sensors
Alexis Mendez; MCH Engineering, USA, Presider

SOTuC1 • 16:00 Invited
Challenges in deploying fiber based systems for oil and gas sensing, *Domino Taverner; [1].*

SOTuC2 • 16:30
Optical fibers with hermetic coating for high temperature applications, *Valery Kozlov[1], Joo Koh[1], Kevin Bennett[1], Paul Sanders[2], Trevor MacDougall[2]; [1]Science and Technology, Corning Inc., USA; [2]Qorex LLC, USA.* Optical fibers with carbon coating and high temperature protective coating were tested at temperatures up to 200C and hydrogen pressures up to 400psi to study carbon coating hermetic properties at elevated temperatures.

SOTuC3 • 16:45
Development of a Novel Cladding-doped Optical Fiber with Au Metal Nano-particles for Surface Plasmon Resonance Sensor Applications, *Seongmin Ju[1], Pramod R. Watekar[2], Seongmook Jeong[1], Youngwoong Kim[1], Hyong Sun Kim[1], Poram Jeon[1], Cheol Jin Kim[3], Won-Taek Han[1]; [1]Graduate Program of Photonics and Applied Physics/Department of Information and Communications, Gwangju Institute of Science and Technology, Republic of Korea; [2]School of Electronics Engineering, VIT University, India; [3]Department of Ceramic Engineering, Gyeongsang National University, Republic of Korea.* A novel optical fiber having its cladding doped with Au metal nanoparticles was developed. The enhanced surface plasmon resonance without using metal thin film on the fiber surface was obtained.

SOTuC4 • 17:00
Visible Light Emitting Optical Fibers using Up-Conversion, *Michael Bass[3,2], John Ballato[1]; [1]Clemson University, USA; [2]University of Central Florida, USA; [3]bdDisplays, LLC, USA.* Optical fibers are described that emit visible light along their length when particulate up-converters in the cladding are excited by light from semiconductor light sources propagating in the core and leaking into the cladding.

Sessions continue on page XX.

Pier 9	Pier 7 & 8	Harbour Salon B	Harbour Salon C
Access Networks and In-house Communications	Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

ATuC • Inhouse: Fiber and Wireless—Continued

ATuC4 • 17:30

Background Light Induced Noise and Its Effects on Indoor Gigabit Optical Wireless Communication Systems, *Ke Wang[1,2], Ampalavanapillai Nirmalathas[1,2], Christina Lim[2], Efstratios Skafidas[1,2]; [1]National ICT Australia-Victoria Research Laboratory (NICTA-VRL), Univ. of Melbourne, Australia; [2]Dept. of Electrical and Electronic Engineering, Univ. of Melbourne, Australia.* We experimentally study the receiver sensitivity and power-penalty due to shot noise induced by the background light in indoor gigabit optical wireless communication systems. This noise typically causes several dB power-penalties in the system.

ATuC5 • 17:45

Securing Free Space Optics Communications through Optical Chaos, *Fabrizio Chiarello[1], Marco Santagiustina[1], Leonora Ursini[1]; [1]Dept. of Information Engineering, CNIT, Univ. of Padova, Italy.* A free space optical chaotic communication system for the secure transmission of a digital message at hundreds Mb/s is presented. The performance of the system is investigated including the indoor infrared channel impairments.

SPTuC • DSP—Continued

SPTuC5 • 17:15

Complexity Analysis of Block Equalization Approach for PolMux QAM Coherent Systems, *Mehrez Selmi[1], Philippe Ciblat[1], Yves Jaouën[1], Christophe Gosset[1]; [1]Telecom ParisTech, France.* The computational load of block CMA equalizers is addressed. Compared to the adaptive CMA, we show block approaches increase the convergence speed by ~10 but only the complexity by ~4 in 112Gbit/s PolMux 16QAM systems.

ITuC • Photonic Integration I—Continued

ITuC4 • 17:15

Single Step Epitaxial Growth of Ge-on-Si for Active Photonic Devices, *Rodolfo E. Camacho-Aguilera[1], Jonathan Bessette[1], Yan Cai[1], Xiaoman Duan[1], Jifeng Liu[2], Lionel Kimerling[1], Jurgen Michel[1]; [1]DMSE, MIT, USA; [2]Dartmouth College, USA.* Germanium for integrated photonic devices has been grown selectively on Si, using a single step epitaxial process, eliminating the standard highly dislocated Ge or SiGe buffer layer to accommodate the Ge-Si lattice mismatch.

ITuC5 • 17:30

High n-type Doping for Ge Lasers, *Jonathan Bessette[1], Rodolfo E. Camacho-Aguilera[1], Yan Cai[1], Lionel Kimerling[1], Jurgen Michel[1]; [1]MIT, USA.* We present evidence of enhanced n -type doping of epitaxial Ge-on-Si for integrated light emitting devices. SIMS, Hall Effect, and photoluminescence measurements confirm dopant concentrations as high as 4 × 1019 cm-3 with efficient PL emission.

ITuC6 • 17:45

Novel Designs for On-chip Mid-Infrared Detectors Integrated with Chalcogenide Waveguides, *Vivek Singh[1], Juejun Hu[2], Timothy W. Zens[1], Jianfei Wang[1], Pao T. Lin[1], Jacklyn Wilkinson[3], Spencer Novak[3], J. David Musgraves[3], Lionel Kimerling[1], Kathleen Richardson[3], Anu Agarwal[1]; [1]Dept. of Materials Science and Engineering, Massachusetts Inst. of Technology, USA; [2]Dept. of Materials Science and Engineering, Univ. of Delaware, USA; [3]School of Materials Science and Engineering, COMSET, Clemson Univ., USA.* We present novel designs and corresponding simulation results showing a reduction in reflection for a waveguide-integrated, on-chip detector for the mid-infrared regime, using chalcogenide glass waveguides integrated with a PbTe detector.

ITuD • Nanophotonics: Plasmonics and Applications II—Continued

ITuD5 • 17:15

Ultra-small Highly Birefringent Slot-Microfiber, *Fei Xu[1]; [1]Nanjing Univ., China.* We present the wave guiding properties of the proposed ultra-small highly birefringent slot-microfiber. Birefringence as large as 4×10-2 at 1550 nm can be obtained with microfibers 1 μm in diameter.

ITuD6 • 17:30

Organic and Hybrid Plasmonic Nanostructures for Energy Conversion, *Gary P. Wiederrecht[1]; [1]Center for Nanoscale Materials, Argonne Natl. Lab., USA.* Recent advances for photoinduced charge separation in nanostructures are discussed. Both organic and organic plasmonic hybrid nanostructures are described. Ultrafast electronic coupling in the hybrid nanostructures is also observed.

ITuD7 • 17:45

On-chip Nanofocusing Using a Hybrid Plasmonic-Dieletric Tapered Waveguide, *Ye Luo[1], Ali Adibi[1], Maysamreza Chamanzar[1], Ali Asghar Eftekhar[1]; [1]School of ECE, Georgia Inst. of Technology, USA.* We present a novel on-chip plasmonic nanofocusing technique based on tapering the metal layer of a hybrid Si-Au waveguide. Input optical energy becomes strongly concentrated and highly localized at the metallic tip.

18:30–21:30 Advance Photonics Congress Reception and Banquet, *Hart House, Univ. of Toronto*

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SLTuB • Methods and Fundamentals—Continued

SLTuB5 • 17:15
Electromagnetic Energy Velocity in Slow Light, *Marco Santagiustina[1]; [1]Dept. of Information Engineering, CNIT – Univ. of Padova, Italy.* Group and electromagnetic energy velocities in structural and material slow light are compared. They are equal for structural slow light; the enhancement of linear and nonlinear effects depends on energy velocity.

SLTuB6 • 17:30
On Fast Light and Signal Detection Latency, *Levent Kayili[1], Mo Mojahedi[1]; [1]Edward S. Rogers Sr., Dept. of Electrical and Computer Engineering, Univ. of Toronto, Canada.* Through the calculation of time-varying error probability, we show that a reduction in signal latency can be obtained in a practical active medium with negative group velocity (negative group delay) in the presence of noise.

SLTuB7 • 17:45
Myths and Reality of the "Slow" and "Fast" Light, *Valeri Kovalev[1,2], Nadezhda E. Kotova[1,2]; [1]Physics, Heriot-Watt Univ., UK; [2]P.N. Lebedev Physical Inst., Russian Federation.* Experimentally observed pulse delays usually attributed to the group velocity phenomenon cannot be such since not all necessary conditions for this phenomenon are met. Observations are accountable for by nonlinearity of resonant absorption or gain.

STuC • Terahertz Waveguides, Applications, and Device Technology—Continued

STuC5 • 17:30
Ultrafast THz Pulse Shaping: Generation of Half-cycle Pulse from Multi-cycle THz Pulse, *Mostafa Shalaby[1], Marco Peccianti[1,2], Luca Razzari[3], Gargi Sharma[1], Tsuneyuki Ozaki[1], Roberto Morandotti[1]; [1]INRS-EMT, Canada; [2]Institute for Chemical and Physical Processes, Italy; [3]Italian Institute of Technology, Italy.* Using optical pump / THz probe technique in InP, we demonstrate ultrafast slicing of a multi-cycle THz pulse into single- and half-cycle THz pulses.

STuC6 • 17:45
Characteristics of Terahertz Antenna Pulsed Sources Made on Fe-Implanted InGaAsP/InP Photoconductive Materials, *Andre Fekecs[1,3], Maxime Bernier[1,3], Martin Chicoine[2,3], François Schiettekatte[2,3], Paul Charette[1], Richard Arès[1,3], Denis Morris[1,3]; [1]Institut interdisciplinaire d'innovation technologique - 3IT, Université de Sherbrooke, Canada; [2]Département de physique, Université de Montréal, Canada; [3]Regroupement québécois sur les matériaux de pointe - RQMP, Canada.* Pulsed terahertz emitters were fabricated on Fe-implanted InGaAsP/InP photoconductive materials. The THz signals are detected by electro-optic sampling using fs-pulses at 790 nm or at 1.55 µm. Characteristics of this new THz source are discussed.

STuC7 • 18:00
Dynamics of Noise in THz Photomixers as a Receiver Sensor, *Barmak Heshmat[1], Hamid Pahlevaninezhad[1], Jinye Zhang[1], Thomas Edward Darcie[1]; [1]University of Victoria, Canada.* We present an analytical estimation and experimental measurement of noise spectral density and noise average power in THz photomixers as receivers in heterodyne THz sensing. This includes generation-recombination, thermal, and flicker noise.

SOTuC • Fiber Sensors—Continued

SOTuC5 • 17:15 Tutorial
Optical fiber sensors and their Specialty Fiber Needs, *Alexis Mendez[1]; [1]MCH Engineering, LLC, USA.* This tutorial will review the basic principles, applications, and specialty fiber needs for optical fiber sensors. key technical trends will be identified along with relevant commercial opportunities and challenges.

18:30–21:30 Advance Photonics Congress Reception and Banquet, *Hart House, Univ. of Toronto*

Pier 7 & 8	Harbour Salon B	Harbour Salon C
Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

7:30–17.00 Registration Open, *Harbour Ballroom Foyer*

9:00–10:00
SPWA • Nonlienearities
Robert Killey, Univ. College London, UK, Presider

SPWA1 • 9:00 Invited

Nonlinearity Compensation using Digital Backward Propagation, *Eduardo Mateo[1], Fatih Yaman[1], Ting Wang[1], Guifang Li[2]; [1]NEC Laboratories America, USA; [2]CREOL, The college of Optics and Photonics. University of Central Florida, USA.* Compensation of fiber impairments using advanced DPS techniques will play a fundamental role in future communications systems. In particular, technologies for nonlinearity compensation using digital backward propagation are discussed in this paper.

SPWA2 • 9:30

Reducing the Complexity of Electronic Pre-compensation for the Nonlinear Distortions in a Directly Modulated Laser, *Abdullah S. Karar[1], John Cartledge[1], James Harley[2], Kim Roberts[2]; [1]Electrical and Computer Engineering, Queen's University, Canada; [2]Ciena Corporation, Canada.* A simplified expression relating the required input current for a directly modulated laser to a target output optical power is obtained and used experimentally in mitigating the laser nonlinear distortion by digital signal processing.

SPWA3 • 9:45

Reduction of Nonlinear Impairments in Fiber Transmission System Using Fiber Diversity, *Sina Naderi Shahi[1], Shiva Kumar[1]; [1]ECE, McMaster University, Canada.* A multi-fiber architecture combined with optical/electrical equalizers is proposed to mitigate nonlinearity in fiber-optic systems. Transmission reach at BER of 2.1×10^-3 is quadrupled in 8-fiber configuration as compared to single-fiber system.

8:30–10:00
IWA • Modeling and Simulation III: Lasers and Emitters
Aziz Rahman, City University of London, Presider

IWA1 • 8:30 Invited

Active Device Modeling and Simulation: Multi-Stable Micro-Lasers for an All Optical Switching, *Dmitry N. Chigrin[1], Sergei V. Zhukovsky[1,2]; [1]Faculty of Electrical, Information, and Media Engineering, Bergische Univ. Wuppertal, Germany; [2]Dept. of Physics, Univ. of Toronto, Canada.* Multistability in microstructures can pave the way towards designing an all-optical memory cells suitable for applications in integrated optics. We review general theoretical principles behind the multistable microlaser operation and applications.

IWA2 • 9:00 Invited

Fully-Vectorial Methods for Emitting Devices, *Paul Urbach[1], O. Janssen[1]; [1]Delft Univ. of Technology, the Netherlands, Netherlands.* It will be shown that the incoherent emission can be computed very efficiency by applying the reciprocity principle. We shall furthermore consider the optimization of the structures.

IWA3 • 9:30

Numerical Simulation of Dicke Superradiance in a Semiconductor Laser Device, *Xuhan Guo[1], Kevin A. Williams[1], Vojtech F. Olle[1], Adrian Wonfor[1], Richard V. Penty[1], Ian H. White[1]; [1]Dept. of Engineering, Univ. of Cambridge, UK.* This paper reports a theoretical model for Dicke Superradiance in semiconductor laser devices. Simulations agree well with previously-observed superradiance properties and are used to optimize driving conditions and device geometry.

IWA4 • 9:45

Erbium-Doped Chalcogenide Glass Micro-Disks as Monolithic Mid-IR Laser Sources, *Faleh M. Altal[1], Clara Dimas[1], Juejun Hu[2,3], Anu Agarwal[2], Lionel Kimerling[2]; [1]Materials Science and Engineering, Masdar Inst. of Science and Technology, United Arab Emirates; [2]Microphotonics Center, Massachusetts Inst. of Technology, USA; [3]Department of Materials Science & Engineering, Univ. of Delaware, USA.* The feasibility of Mid-Infrared (MIR) lasing in Erbium-doped Gallium Lanthanum Sulfide (GLS) micro-disks was investigated. Based on state-of-the-art Chalcogenides micro-disk resonators parameters, lasing was simulated and shown to be possible.

8:30–10:00
IWB • Active Nanophotonics, Quantum Dots, and Nanocavities
Gary Wiederrecht, Argonne National Laboratory, USA, Presider

IWB1 • 8:30 Invited

Extruding Opals: Self-Assembling Active Soft NanoPhotonics on the Kilometre Scale, *Jeremy Baumberg[1]; [1]University of Cambridge, UK.* A new technique produces kilometre-scale single-domain opaline photonic crystals from standard polymers by novel solvent-less nano-assembly. Stretching these unusual elastomeric opals induces new scattering color and enables many applications.

IWB2 • 9:00

Nanoscale Photonic Transistor, *Alexey V. Krasavin[1], Anatoly Zayats[1]; [1]Department of Physics, King's College London, UK.* We combine a highly-efficient nanoscale photonic guiding approach with a robust modulation principle, utilising novel electro-optical material and numerically demonstrate a nanoscale photonic modulator having an unprecedented length of ~100 nm.

IWB3 • 9:15

Optical Field Molding within Near-Field Coupled Twinned Nanobeam Cavities, *Benoit Cluzel[2,1], Kevin Foubert[1,2], Loic Lalouat[2], Emmanuel Picard[1], Jean Dellinger[2], David Peyrade[3], Frederique de Fornel[2], Emmanuel Hadji[1]; [1]INAC/SP2M, CEA, France; [2]LICB, CNRS, France; [3]LTM, CNRS, France.* Twinned high Q nanobeam cavities can be optically coupled while being placed in the optical near-field of each other. They form then a new optical system which supports discrete field maps addressable by wavelength selection.

IWB4 • 9:30

Photoluminescence of Strain-Engineered CdSe/Cd(0.5)Zn(0.5)S Core/Shell Colloidal Quantum Dots, *Jaime Brar[1], Vincent Veilleux[2], Peter Krug[3], Karin Hinzer[1], Claudine Allen[2], Henry P. Schriemer[1]; [1]SITE, Univ. of Ottawa, Canada; [2]COPL, Univ. Laval, Canada; [3]Univ. of New South Wales, Australia.* Photoluminescence (PL) measurements were performed to gain insight into bleaching processes, to determine relative quantum efficiency, temperature dependence of the PL and the contribution of carrier-phonon scattering processes to thermal broadening.

IWB5 • 9:45

Quantum-Tuned Two-Junction Solar Cells, *Xihua Wang[1], Ghada Koleilat[1], Edward Sargent[1]; [1]Electrical and Computer Engineering, Univ. of Toronto, Canada.* We report quantum-size-effect tuned tandem solar cells. Our two-junction photovoltaic devices employ light-absorbing material of a single composition and use two rationally-selected nanoparticle sizes to harvest the sun's broad spectrum.

10.00–10.30 Coffee Break, *Harbour Ballroom Foyer*

Pier 2 & 3	Harbour Salon A	Pier 5
Slow and Fast Light	Optical Sensors	Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

7:30–17.00 Registration Open, *Harbour Ballroom Foyer*

8:30–10:00
SLWA • Nonlinear Optics and Waveguide Technologies
Toshihiko Baba, Yokohama National Univ., Japan, Presider

SLWA1 • 8:30 Invited
Nonlinear Optics at the Single-Photon Level Inside a Hollow Core Fiber, *Sebastian Hofferberth[1]; [1]Dept. of Physics, Harvard Univ., USA.* Cold atoms inside a hollow core fiber provide an unique system for studying optical nonlinearities at the few-photon level. We present our experimental apparatus and discuss results regarding all-optical switching at ultra-low light levels.

SLWA2 • 9:00
Slow and Fast Light in High-Birefringence Fiber Parametric Amplifiers, *Marco Santagiustina[1]; [1]Dept. of Information Engineering, CNIT, Univ. of Padova, Italy.* Slow and fast light effects in high-birefringence fibers are theoretically predicted. Delay can be controlled through the pump polarization.

SLWA3 • 9:15
Decay Time in a Cavity in Slow or Fast Light Regime, *Thomas Laupretre[1], Rupamanjari Ghosh[2], Sylvain Schwartz[3], Fabienne Goldfarb[1], Fabien Bretenaker[1]; [1]Laboratoire Aime Cotton, France; [2]Jawaharlal Nehru Univ., India; [3]Thales Res. and Technology France, France.* We measure the photon lifetime in a cavity containing 4He* creating slow or fast light. This lifetime is shown to depend on the group velocity of light. Ultimate performances of fast light gyros are discussed.

SLWA4 • 9:30
Light Storage Enhancement by Reducing the Brillouin Bandwidth, *Stefan Preussler[1], Kambiz Jamshidi[1], Andrzej Wiatrek[1], Thomas Schneider[1]; [1]Inst. fuer Hochfrequenztechnik, Hochschule fuer Telekommunikation Leipzig, Germany.* To achieve higher storage times for a new method for the storage of optical pulses called Quasi-Light-Storage we reduced the SBS gain bandwidth. In our experiments we achieved an enhancement of 40%.

SLWA5 • 9:45
Saturation and Delay in Broadband Brillouin Slow-Light, *Andrzej Wiatrek[1], Kambiz Jamshidi[1], Stefan Preussler[1], Thomas Schneider[1]; [1]Inst. für Hochfrequenztechnik, DTAG HfT Leipzig, Germany.* In this contribution we investigate the influence of gain saturation on the pulse width and the pulse delay. It is shown that saturation can lead to a pulse width compression while increasing the delay time.

8:30–10:00
SWA • Biochemical Sensors I
Mário Ferreira; Univ. of Aveiro Portugal, USA, Presider

SWA1 • 8:30 Invited
Ink-Jet-Printed Optofluidic SERS for Molecular Analysis, *Ian M. White[1]; [1]Fischell Department of Bioengineering, University of Maryland, USA.* We present ink-jet fabrication of optofluidic surface enhanced Raman spectroscopy (SERS) devices with no micro/nano-fabrication required. This novel, ultra-low-cost technique enables on-demand fabrication of SERS devices for lab and field use.

SWA2 • 9:00
Efficient Raman Sensor for Nanoparticles using Hollow Core Photonic Crystal Fiber, *Jacky S. W. Mak[1], Abdiaziz A. Farah[1], Feifan Chen[1], Amr S. Helmy[1]; [1]The Edward S. Rogers Sr. Department of Electrical and Computer Engineering, University of Toronto, Canada.* Strong Raman modes of the semiconductor core, thiol agents, and their interfacial compound in colloidal CdTe quantum dots were observed and compared for the first time in aqueous solution through efficient Raman scattering in HC-PCF.

SWA3 • 9:15
Low-Loss Tunable All-in-Fiber Filter for Raman Spectroscopy, *Anna Chiara Brunetti[1], Lara Scolari[2], Toke Lund-Hansen[1], Karsten Rottwitt[1]; [1]DTU Fotonik, DTU, Technical University of Denmark, Denmark; [2]NKT Photonics A/S, Denmark.* We show a novel in-line low-loss thermally tunable Rayleigh-rejection filter for Raman spectroscopy, based on a solid-core Photonic Crystal Fiber (PCF) filled with a high-index material.

SWA4 • 9:30
High Density Ink Jet Printing of Bio-molecules for Photonic Crystal-based Microarray Applications, *Wei-Cheng Lai[1], Kathryn Moncivais[2], Swapnajit Chakravarty[3], Xiaolong Wang[3], Che-Yun Lin[1], Zhiwen J. Zhang[2], RayT. Chen[1]; [1]Electrical and Computer Engineering, The University of Texas at Austin, USA; [2]Division of Medicinal Chemistry, College of Pharmacy, The University of Texas at Austin, USA; [3]Omega Optics Inc, USA.* High density inkjet printing of protein solutions was investigated for photonic crystal based microarray applications. Spacing of 60m has been demonstrated between unique inkjet-printed spots on a silicon substrate.

SWA5 • 9:45
Ultra Broadband Mid-IR Detectors Using Multilayer Anti-reflection Coupling, *Pao T. Lin[1]; [1]Materials Science and Engineering, MIT--EAPS, USA.* Ultra broadband mid-IR detector is demonstrated in the spectral region at 2-4 um. The light coupler is composed of multilayer dielectric layers. A 60 % enhancement of transmittance is achieved at light incident angles θ=0o-75o.

8:30–9:45
SOWA • 1um Fiber Lasers
John Clowes, Fianium, USA, Presider

SOWA1 • 8:30 Invited
Commercial fiber lasers, *Mike O'Conner; [1]. [1]IPG Photonics Corp. USA.* Fiber laser development for defense applications fall into two primary areas: spectrally broad, and spectrally narrow fiber lasers. The former are useful for tactical, close-range applications, and are used as single lasers, or as multiple lasers which are incoherently combined. The latter are being developed for long-range applications, and narrow linewidth is required for either coherent or spectral combining of multiple beams. In this paper, we discuss the recent advances in both types of fiber lasers.

SOWA2 • 9:00
Generation of Sub-200-fs Microjoule Pulses From an All-fiber CPA System, *Dirk Mortag[1], Thomas Theeg[1], Katharina Hausmann[1,2], Lars Grüner-Nielsen[4], Kim G. Jespersen[4], Dieter Wandt[1,2], Uwe Morgner[2,3], Dietmar Kracht[1,2], Jörg Neumann[1,2]; [1]Laser Zentrum Hannover e.V., Germany; [2]Centre for Quantum Engineering and Space-Time Research - QUEST, Germany; [3]Institut für Quantenoptik, Leibniz Universität Hannover, Germany; [4]OFS Denmark, Incubation Center, Denmark.* We report on an all-fi[|#12#|]ber-integrated CPA system generating microjoule pulses. It incorporates a [|#12#|] fiber stretcher with negative third-order dispersion to achieve minimum pulse durations of 189 fs after compression with a grating arrangement.

SOWA3 • 9:15 Invited
All-solid Photonic Bandgap Fiber Lasers, *Christina B. Olausson[1], Akira Shirakawa[2], Jens K. Lyngsø[1], Kim P. Hansen[1], Jes Broeng[1], Ken-ichi Ueda[2]; [1]NKT Photonics A/S, Denmark; [2]Institute for Laser Science, University of Electro-Communications, Japan.* Solid core photonic bandgap fibers exhibit a unique spectral filtering effect with efficient out-of-band suppression. This is used for artificial gain shaping and ASE filtering in high power fiber lasers for operation at unconventional wavelengths.

10.00–10.30 Coffee Break, *Harbour Ballroom Foyer*

Pier 7 & 8	Harbour Salon B	Harbour Salon C
Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

10:30–12:15
SPWB • Coding II
Alexei Pilipetski, Tyco Tellecommunications, USA, Presider

SPWB1 • 10:30 Invited

On the Implementation of Soft-Decision Decoders for High-Speed Optical Transmission, *Ivan Djordjevic[1]; [1]Electrical and Computer Engineering, University of Arizona, USA.* We describe large-girth LDPC codes suitable for high-speed optical transmission and several reduced-complexity (RC) LDPC-decoding algorithms. We evaluate quantization effect BER performance degradation and discuss corresponding FPGA implementation.

SPWB2 • 11:00

Quasi-Cyclic LDPC based on PEG Construction for Optical Communications, *Sami Mumtaz[1], Ghaya Rekaya-Ben Othman[1], Yves Jaouen[1]; [1]Comelec, Telecom Paristech, France.* A new construction of quasi-cyclic LDPC codes based on the progressive edge-growth algorithm is presented. These codes perform better than most LDPC codes proposed for optical transmissions and design parameters can be chosen without constraint.

SPWB3 • 11:15

BICM and TCM Comparison in 100 Gbps Optical Coherent Links in Nonlinear Regime, *Tommaso Foggi[1], Roberto Magri[2]; [1]CNIT, Italy; [2]Ericsson S.p.A., Italy.* The popular single-carrier QPSK modulation format is compared with 8PSK BICM and TCM schemes in 100 Gbps optical links in linear and nonlinear regime, with or without inline dispersion compensation.

SPWB4 • 11:30

Soft Differential Decoding with Non-redundant Error Correction for Dispersion Managed Optical Transmission System, *Zhuhong Zhang[1], Fabin N. Hauske[2], Chuandong Li[1], Yanjun Zhu[3], Yanming Li[3], Fei Zhu[3], Yusheng Bai[3]; [1]Ottawa R&D Center, Huawei Technologies, Canada; [2]Europe Research Center, Huawei Technologies, Germany; [3]US R&D Center, Huawei Technologies, USA.* Considering DSP implementation constraints, we demonstrate that soft differential decoding with NEC provides the best performance when co-propagating 100G PDM-QPSK with 10G OOK channels over dispersion managed links at 50GHz channel.

SPWB5 • 11:45

Physical Layer Constraints in Dynamic Optical Mesh Networks at Higher Bit-rates, *Danish Rafique[1], Andrew D. Ellis[1]; [1]Tyndall National Institute, Ireland, Ireland.* We demonstrate that addition of higher-order modulation formats and increased network flexibility significantly degrades the through traffic due to severe X effects, in a WDM optical transport network employing dynamic 28Gbaud -mQ transponders.

SPWB6 • 12:00

Experimental Demonstration of PDL Mitigation using Polarization-Time Coding in PDM-OFDM Systems, *Sami Mumtaz[1], Jingshi Li[2], Swen Koenig[2], Yves Jaouen[1], Rene Schmogrow[2], Ghaya Rekaya-Ben Othman[1], Juerg Leuthhold[2]; [1]Comelec, Telecom Paristech, Paris, France; [2]Institute of Photonics and Quantumelectronics, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.* For the first time, we demonstrate experimentally that PDL can be highly mitigated by the use of Polarization-Time coding in OFDM transmissions. We show that Silver code performs better than Golden and Alamouti codes.

10:30–12:30
IWC • Photonic Integration II
Richard Soref; AFOSR, USA, Presider

IWC1 • 10:30 Invited

CMOS Photonics Platform for 25 Gbit/s Optical Transceivers, *Peter De Dobbelaere; [1]Luxtera, USA.* We present a mature CMOS photonics technology platform for design, simulation and manufacturing of optical transceivers. The capability is illustrated with some examples and a roadmap towards higher speed, denser data transmission and closer integration.

IWC2 • 11:00 Invited

A Silicon Photonics Platform with Heterogeneous III-V Integration, *Wim Bogaerts[1], Shankar K. Selvaraja[1], Hui Yu[1], Thijs Spuessens[1], Pauline Mechet[1], Stevan Stankovic[1], Shahram Keyvaninia1, Joris Van Campenhout[2], Philippe Absil[2], Gunther Roelkens[1], Dries Van Thourhout[1], Roel Baets[1]; [1]Information Technology - Photonics Research Group, Ghent Univ. - Imec, Belgium; [2]Imec v.z.w., Belgium.* We present a silicon photonics platform combining silicon processing and heterogeneously integrated III-V materials. This enables passive and active photonic functions on silicon, such as waveguides, filters, modulators, photodetectors and lasers.

IWC3 • 11:30

1310 nm Evanescent Hybrid III-V/Si Laser Based on DVS-BCB Bonding, *Stevan Stankovic[1], Gunther Roelkens[1], Dries Van Thourhout[1], Richard Jones[2], Matthew Sysak[2], John Heck[2]; [1]INTEC, Ghent Univ. - Imec, Belgium; [2]Photonics Technology Lab, Intel Corp., USA.* We present an evanescently-coupled, hybrid III-V/Silicon Fabry-Perot laser based on adhesive (DVS-BCB) bonding, operating at 1310 nm. Maximum optical power in a continuous-wave regime is 3 mW and the threshold current density is 2.41 kA/cm2.

IWC4 • 11:45

Optimally Coupled Hybrid III-V Photonics Crystal Wire Cavity CW Lasers on Passive SOI Waveguides, *Yacine Halioua[1,2], Alexandre Bazin[1], Timothy Karle[1], Paul Monnier[1], Isabelle Sagnes[1], Rama Raj[1], Fabrice Raineri[1,3]; [1]CNRS-LPN, France; [2]Intec-Photonics group, Ghent Univ., Belgium; [3]Univ. Paris Diderot, France.* CW Laser operation of an efficiently coupled III-V wire cavity to a silicon wire is demonstrated. Transmission characteristics of the system are explored via pump-probe experiments revealing high coupling efficiency (>80%).

10:30–12:15
IWD • Modeling and Simulation IV: Coupled Waveguides and Resonators
Ya Yan Lu, City University of Hong Kong, China, Presider

IWD1 • 10:30 Invited

Coupled Mode Theory for Optical Waveguides, *Weiping Huang[1], Jianwei Mu[1]; [1]McMaster Univ., Canada, Canada.* Resonant coupling to radiation field in optical waveguides has been simulated by complex coupled mode theory. Salient features of complex mode theory are demonstrated by investigation of transmission spectra in short/long period gratings.

IWD2 • 11:00

Adiabatic Wavelength Conversion in Travelling-Wave and Resonant Photonic Structures, *Yuzhe Xiao[1], Govind P. Agrawal[1], Drew N. Maywar[2]; [1]Inst. of Optics, Univ. of Rochester, USA; [2]Electrical, Computer, and Telecommunications Engineering Technology, Rochester Inst. of Technology, USA.* We present a simple and intuitive linear system model to study adiabatic wavelength conversion in integrated photonic structures and to reveal how this process affects the shape and spectrum of optical pulses.

IWD3 • 11:15

Analytical Method for Designing Strongly Coupled Microring Resonator Networks, *Alan Tsay[1], Vien Van[1]; [1]Dept. of Electrical and Computer Engineering, Univ. of Alberta, Canada.* We present a method for synthesizing strongly coupled microring networks of general 2D coupling topologies. The method is based on the power coupling formalism of coupled microrings and can be used to design broadband filters.

IWD4 • 11:30

Microcavity Filter Design Using Convex Optimization Methodology, *Mohamed A. Swillam[1], Osman S. Ahmed[2], Mohamed H. Bakr[2], Xun Li[2]; [1]ECE/Physics, Univ. of Toronto, Canada; [2]ECE, McMaster Univ., Canada.* We propose a novel and efficient approach for filter design using multiple microcavities. This approach is suitable of large number of coupled cavities and can be exploited to get wide range of responses.

IWD5 • 11:45

Generating a Frequency-Bin Entangled Comb of Photon Pairs via Four-Wave Mixing in a Silicon-on-Insulator Microring Resonator, *Jun Chen[1,2], Zachary H. Levine[1], Jingyun Fan[1,2], Alan Migdall[1,2]; [1]Natl. Inst. of Standards and Technology, USA; [2]Joint Quantum Inst., Univ. of Maryland, USA.* We present a quantum theory for generation of frequency-bin entangled comb of photon pairs via four-wave mixing in a Silicon-on-Insulator microring resonator. We also provide design principles of such a microring through numerical simulations.

Sessions continue on page XX.

Pier 2 & 3 — Slow and Fast Light

Harbour Salon A — Optical Sensors

Pier 5 — Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

10:30–12:15
SLWB • Slow/Fast Light Systems
Holger Schmidt, Univ. of California at Santa Cruz, USA, Presider

SLWB1 • 10:30 Invited
Dynamic Manipulations of Light Pulses in an Optically Dense Coherent Medium, *Irina Novikova[1]; [1] College of William and Mary, USA.* We present experimental and theoretical studies of EIT-based quantum memory that go beyond three-level system and account for enhanced nonlinear interactions at high optical depth.

SLWB2 • 11:00
Magnetically Induced Simultaneous Slow and Fast Light by Phase Control, *Bin Luo[1], Hong Guo[1]; [1]School of Electronics Engineering and Computer Science, Peking Univ., China.* Λ-type atom coupled by additional driving light and radio frequency (RF) field can generate controllable simultaneous slow and fast light at two frequencies. Distortions by radiative dampings are discussed and compensation method is suggested.

SLWB3 • 11:15
Designer Media and Pulses for Optimally Long-Lived and Reversible Energy Storage, *Scott Glasgow[1]; [1]Brigham Young Univ., USA.* Given a dielectric resonance structure and geometry, we outline design of pulses stored most reversibly. Given a pulse and medium geometry, we outline design of a resonance structure for most reversible pulse storage.

SLWB4 • 11:30
Simplified Brillouin fiber slow light systems in loss regime using step current modulation, *Sanghoon Chin[1], Luc Thévenaz[1]; [1]Ecole Polytechnique Federale de Lausanne, Switzerland.* We propose a simple technique to realize Brillouin slow light in nearly transparent regime. A current-modulated semiconductor laser by a step function is used as Brillouin pump to generate a Brillouin loss doublet.

SLWB5 • 11:45
Noise Figure of Slow Light Cascaded SOA based Microwave Photonic Phase Shifters, *Juan Lloret[1], Juan Sancho[1], Ivana Gasulla[1], Francisco Ramos[1], Salvador Sales[1], José Capmany[1]; [1]iTE Research Inst., Spain.* The noise figure of Slow and Fast Light Microwave Photonic phase shifters made up by SOA followed by optical filtering stages is experimentally evaluated. Noise figure results show compression when adding the third cascaded stage.

10:30–12:30
SWB • Biochemical Sensors II
Tomoyuki Yoshie, Duke Univ. USA, Presider

SWB1 • 10:30 Invited
Photonic Crystal Biosensor Chip for Label-Free Detection of Bacteria, *Martin Kristensen[1], Asger Krüger[1], Nathaniel Groothoff[1], Jaime García-Rupérez[2], Veronica Toccafondo[2], Javier García-Castelló[2], Maria Jose Bañuls[2], Sergio Peransi-Llopis[2], Angel Maquieira[2]; [1]ASE and IFA, Aarhus University, Denmark; [2]UPV, Spain.* Narrow polarization-mixing resonances in planar photonic crystals are studied as candidate components for label-free refractive index sensors for detecting bacteria causing sepsis through the identification of DNA strands.

SWB2 • 11:00
Crossed-polarization Analysis of Guided Modes in Photonic Crystal Slab Biosensors, *Ryan D. Schilling[1,2], Deniz Aydin[1,2], Hooman Akhavan[1], Mohamed El Beheiry[2], Ofer Levi[1,2]; [1]Institute of Biomaterials and Biomedical Engineering, University of Toronto, Canada; [2]Edward S. Rogers Sr. Department of Electrical and Computer Engineering, University of Toronto, Canada.* We present the crossed-polarization analysis of guided resonance modes in photonic crystal slab biosensors. A good agreement between experimental resonance peaks and theoretical modeling is presented, revealing high-Q values in these biosensors.

SWB3 • 11:15
Optical Resonance Sensing in Surface Bloch Modes on Woodpile Photonic Crystals, *Shu-Yu Su[1], Lingling Tang[1], Tomoyuki Yoshie[1]; [1]ECE, Duke University, USA.* Low loss and high sensitivity are confirmed in surface Bloch modes on (100) and (001) dielectric woodpile photonic crystals. A flat-top (100) woodpile surface is also designed for optical resonance sensing.

SWB4 • 11:30
Photonic Crystal Sensor for monitoring the vibration of a laser beam, *Andy Y. Fuh[1]; [1]Physics, National Cheng Kung Univ., Taiwan.* Photonic crystals based on polymer dispersed loquid crystals are fabricated using continuous multi-exposures of two-beam interference. It can be applied for use as a beam-vibration sensor for laser beams. Details are reported.

SWB5 • 11:45
Sensing Technique for the Development of Real-time and Low-cost Biosensors Using Photonic Bandgap Structures, *Jaime Garcia-Ruperez[1], Javier Garcia-Castello[1], Veronica Toccafondo[1], Antoine Brimont[1]; [1]Nanophotonics Technology Center, Universidad Politecnica Valencia, Spain.* We present experimental sensing results achieved using a novel technique based on the use of photonic bandgap structures where only the output power from a broadband source is monitored, providing a real-time and low-cost system.

10:30–12:15
SOWB • Hollow Core Fibers
Liang Dong, Clemson Univ., USA, Presider

SOWB1 • 10:30 Invited
Low Loss Antiresonant Hollow core Fibres, *Francesco Poletti[1], J. R. Hayes[1], D. J. Richardson[1]; [1]Optoelecotrnics Research Centre, Southampton University, UK.* We study the loss mechanisms in novel antiresonant hollow-core fibres and demonstrate the importance of optimising the air-cladding thickness and reducing the node size. Based on these rules we fabricate fibres with wide-bandwidth and low-loss.

SOWB2 • 11:00
Stimulated Rotational Raman Scattering in a Deuterium-filled Hollow-Core Photonic Bandgap Fiber, *Charlotte Falk[1,2], Jan Hald[1], Karsten Rottwitt[2], Jan C. Petersen[1]; [1]Danish Fundamental Metrology, Denmark; [2]DTU Fotonik, Denmark.* Pure rotational stimulated Raman scattering is generated in a 10 m hollow-core photonic bandgap fiber filled with deuterium at 20 bar. About 50% of the transmitted power is converted to the first Stokes line.

SOWB3 • 11:15
Confinement Loss of Tube Lattice and Kagome Fibers *Luca Vincetti[1], Valerio Setti[1], Maurizio Zoboli[1]; [1]Information Engineering, University of Modena and Reggio Emilia, Italy.* Confinement loss of two kinds of broad band hollow core fibers, the tube lattice fibers and the kagomé fibers, are numerically investigated and compared.

SOWB4 • 11:30
Hollow-Core Fiber for Transmission of CO2 Laser Radiation, *Alexey Kosolapov[1], Andrey Pryamikov[1], Alexander Biriukov[1], Maxim Astapovich[1], Vladimir Shiryaev[2], Gennady Snopatin[2], Victor Plotnichenko[1], Mikhail Churbanov[2], Evgeny Dianov[1]; [1]Fiber Optics Research Center of RAS, Russian Federation; [2]Institute of Chemistry of High-Purity Substances, Russian Federation.* A new, technologically simple structure of hollow-core optical fiber is proposed; the propagation of CO2 laser radiation in a hollow-core chalcogenide glass fiber is demonstrated.

SOWB5 • 11:45 Invited
Gas Raman Lasers in Hollow-core Fibers, *Fetah Benabid[1]; [1]University of Bath, UK.* We review the recent progress on hollow-core photonic crystal fibers and its integrated form of photonic microcells in both their design and fabrication and in their applications in Raman fibre lasers.

Sessions continue on page XX.

Pier 7 & 8	Harbour Salon B	Harbour Salon C
Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

IWC • Photonic Integration II—Continued

IWC5 • 12:00
Heterogeneous Integrated InGaAsSb Detectors on SOI Waveguide Circuits for Short-Wave Infrared Applications, *Nannicha Hattasan[1], Gassenq Alban[1], Bart Kuyken[1], Laurent Cerutti[2], Jean-Batiste Rodriguez[2], Eric Tournie[2], Gunther Roelkens[1]; [1]Univ. of Gent - INTEC, Belgium; [2]Univ. Montpellier 2, France.* We present evanescently coupled, heterogeneous integrated InGaAsSb photodetectors on SOI waveguide circuits for short-wave infrared applications. A responsivity of 0.13 A/W is obtained at a wavelength of 2.17µm. The dark current is 3.5 µA at -1V

IWC6 • 12:15
Hybrid Transmitter Cells for DWDM Systems, *Hua Zhang[1], Matt Pearson[1], Serge Bidnyk[1], Ashok Balakrishnan[1]; [1]Enablence Technologies Inc., Canada.* A compact 10 Gb/s transmitter cell for 100 Gb/s DWDM transmission has been successfully developed using hybrid PLC technology. It is confirmed that the hybrid transmitter cell provides high performance on output power and wavelength stabilization.

IWD • Modeling and Simulation IV: Coupled Waveguides and Resonators—Continued

IWD6 • 12:00
Design of One-Dimensional Photonic Crystal Coupled Resonator Optical Waveguides Embedded in Air-Slot Waveguide, *Yuki Kawaguchi[1], Kunimasa Saitoh[1], Masanori Koshiba[1]; [1]Hokkaido Univ., Japan.* We propose design methods of slow-light slot waveguide based on one-dimensional photonic crystal coupled resonator optical waveguides (1-D PC-CROWs). We show that slot waveguides proposed here realize small group velocity and low-loss simultaneously.

12:30-1:30 Lunch Break *(on your own)*

NOTES

Pier 2 & 3	Harbour Salon A	Pier 5
Slow and Fast Light	Optical Sensors	Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SLWB • Slow/Fast Light Systems—Continued

SLWB6 • 12:00
Loss-induced dead-zone in CROW rotation sensor, *Roman Novitski[1], Jacob Scheuer[1], Ben Z. Steinberg[1]; [1]Tel-Aviv Univ., Israel.* We study the properties of a lossy coupled resonator optical waveguide subjected to rotation. A loss-induced dead-zone is found at low rotation rates while no impact is found for high rotation rates.

SWB • Biochemical Sensors II—Continued

SWB6 • 12:00
Liquid filled hollow core photonic bandgap fiber sensor, *Hang Qu[1], Bora Ung[1], Maksim Skorobogatiy[1]; [1]Ecole Polytechnique de Montreal, Canada.* We propose a low-refractive-index-contrast hollow-core Bragg fiber sensor operating with a resonant sensing principle. Clear transmission spectrum shifts are obtained when filling the fiber with liquid analytes of different refractive indices.

SWB7 • 12:15
Optical Current Transducers Incorporating Polymeric Integrated Optical Chip, *Min-Cheol Oh[1], Woo-Sung Chu[1], Kyung-Jo Kim[1], Jun-Whee Kim[1]; [1]Electrical Engineering and Cogno-Mechatronics Engineering, Pusan National University, Republic of Korea.* Various optical devices are integrated on a single chip to construct optical current transducers based on polarization rotated reflection interferometry, which consists of couplers, polarizers, polarization converters, and TO phase modulators.

12:30-1:30 Lunch Break *(on your own)*

NOTES

Pier 7 & 8

Signal Processing in Photonics Communications

Harbour Salon B

Integrated Photonics Research, Silicon and Nano Photonics

Harbour Salon C

Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

13:30–15:30
SPWC • Transmission Systems

Presider??????????

SPWC1 • 13:30 Invited

Digital Signal Processing for Coherent Optical Communications: Current State of the Art and Future Challenges, *Kim Roberts[1]; [1]Ciena, Canada.* This paper reviews examples of signal processing for current coherent transmission systems and the challenges faced by system designers to realize increased bit rates.

SPWC2 • 14:00 Invited

Capacity Limits of Optical Fibre Based Communications, *Andrew Ellis; [1].* Abstract not available.

SPWC3 • 14:30 Invited

Optical Fiber Capacity at its Limits: From Spectrally Efficient Modulation to Spatial Multiplexing, *Peter Winzer[1]; [1]Alcatel-Lucent Bell Labs, USA.* We will discuss the state-of-the-art in high-spectral-efficiency optical transmission systems as well as their theoretical and practical scalability limits. We will then examine spatial multiplexing as an energy- and cost-efficient method to scale beyond WDM.

13:30–15:30
IWE • Photonic Integration III

Christopher Doerr; Bell Laboratories, Alcatel-Lucent, USA, Presider

IWE1 • 13:30 Invited

Silicon Mid-Infrared Photonic Integrated Circuits, *Richard Soref[1]; [1]Sensors Directorate, Air Force Res. Lab., USA.* A review of recent progress in Si-based MIR on-chip components and PICs is given. We survey new OEIC technologies, hybrid and monolithic laser/detector integration, waveguiding, plasmo-photonics, and spectrometer-on-a-chip applications.

IWE2 • 14:00 Invited

Integrated-optic OFDM Demultiplexers Using Silica PLC-Based DFT and FFT Circuits, *Koichi Takiguchi[1]; [1]NTT Photonics Labs., NTT Corp., Japan.* I report recent advances on our integrated-optic OFDM demultiplexers. I describe the configuration, operating principle, and characteristics of the demultiplexers, which consist of optical FFT and DFT circuits fabricated with PLC technology.

IWE3 • 14:30

Integrated GaN Photonic Circuits on Silicon (100) for Second Harmonic Generation, *Chi Xiong[1], Wolfram Pernice[1], Kevin Ryu[2], Carsten Schuck[1], Kingyan Fong[1], Tomas Palacios[2], Hong Tang[1]; [1]Electrical Engineering, Yale Univ., USA; [2]Electrical Engineering, Massachusetts Inst. of Technology, USA.* Second order optical nonlinearity is demonstrated in silicon architecture through heterogeneous integration of single-crystalline gallium nitride on silicon (100) substrates. The $\chi 2$ nonlinear susceptibility is measured to be as high as 16.4±7.0 pm/V.

IWE4 • 14:45

Deep-level Mediated Silicon Micro-ring Power Monitors, *Dylan Logan[1], Philippe Velha[2], Marc Sorel[2], Richard De La Rue[2], Andrew Knights[1], Paul E. Jessop[3]; [1]Engineering Physics, McMaster Univ., Canada; [2]Electronics and Electrical Engineering, Univ. of Glasgow, UK; [3]Wilfrid Laurier Univ., Canada.* Deep-level mediated photodiode power monitors were integrated onto the ports of a silicon waveguide micro-rings operating at 1550 nm. Demonstrated feasibility of rapid, on-chip diagnostic measurements is presently optimized to 20 mA/W/dB.

13:30–15:30
IWF • Devices and Components III

Joyce Poon; Univ. of Toronto Canada, Presider

IWF1 • 13:30 Invited

Silicon-Organic Hybrid (SOH) Electro-Optical Devices, *Christian Koos[1], Luca Alloatti[1], Dietmar Korn[1], Robert Palmer[1], David Hillerkuss[1], Jingshi Li[1], Anna Barklund[2], Raluca Dinu[2], Joerg Wieland[2], Maryse Fournier[3], Jean-Marc Fedeli[3], Hui Yu[4], Wim Bogaerts[4], Pieter Dumon[4], Roel Baets[4], Wolfgang Freude[1], Juerg Leuthhold[1]; [1]Inst. of Photonics and Quantum Electronics (IPQ), Karlsruhe Inst. of Technology (KIT), Germany; [2]GigOptix Inc., USA; [3]CEA / LETI, France; [4]Photonics Research Group, Ghent Univ., Belgium.* Silicon-organic hybrid integration enables electro-optical devices that combine high modulation speed with low power consumption. We give an overview on SOH modulator concepts, underlying material systems, and recent experimental demonstrations.

IWF2 • 14:00 Invited

Germanium on Silicon Lasers and Detectors, *Jurgen Michel[1]; [1]Massachusetts Inst. of Technology, USA.* This paper discusses the most recent advances of Germanium photodetectors and lasers that can be monolithically integrated into a Silicon CMOS process.

IWF3 • 14:30

Waveguide-based Mid-Infrared Up-Conversion Detectors, *Kai-Daniel F. Büchter[1], Harald Herrmann[1], Wolfgang Sohler[1]; [1]Applied Physics, Univ. of Paderborn, Germany.* Nonlinear optical up-conversion detectors for 3.4 μm radiation are realized using Ti:PPLN waveguides. Both, sum-frequency and difference-frequency generation are investigated. Overall power conversion efficiencies of more than 8% are achieved.

IWF4 • 14:45

Nonlinear Notch Blue-Shift in AlGaAs Bragg Grating Waveguides, *Pamela Tannouri[1], Micheal J. Strain[2], Matteo Clerici[1], Marco Peccianti[1,3], Alessia Pasquazi[1], Sze Phing Ho[1,4], Ian Rowe[1], Katarzyna Rutkowska[1,5], Marc Sorel[2], Roberto Morandotti[1]; [1]INRS-EMT, Canada; [2]Univ. of Glasgow, UK; [3]IPCF-CNR, Italy; [4]Univ. Teknologi, Malaysia; [5]Warsaw Univ. of Technology, Poland.* We present an investigation on the nonlinear dynamics of intense pulses in an AlGaAs Bragg waveguide and we report the experimental observation of an intensity dependent blue-shift of the Bragg notch spectral line.

Wednesday 15 June

Sessions continue on page XX.

Harbour Salon A

Optical Sensors

Pier 5

Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

13:30–15:30
SWC • Photonic Crystal Sensors
Limin Tong, Zhejiang University, China, Presider

SWC1 • 13:30 Invited
Metamaterials, Plasmonics, and Nanofluidics for Ultrasensitive Spectroscopy and Bio-detection, *Hatice Altug[1,2], Ahmet Ali Yanik[1,2], A. E. Cetin[1], A. Artar[1], M. Huang[1]; [1]Department of Electrical and Computer Engineering, Boston University, USA; [2]Photonics Center, Boston University, USA.* We will present on-chip integrated plasmonic and metamaterial systems for ultrasensitive spectroscopy and biodetection. We will also introduce opto-fluidic systems for targeted analyte delivery as well as for optical trapping and manipulation.

SWC2 • 14:00
Self-optimized Metal Coatings for Fiber Plasmonics by Electroless Deposition, *Aliaksandr Bialiayeu[1], Christophe Caucheteur[2], Nur Ahamad[3], Anatoli Ianoul[3], Jacques Albert[1]; [1]Electronics, Carleton U., Canada; [2]Electromagnetism and Telecom Unit, Université de Mons, Belgium; [3]Chemistry, Carleton U., Canada.* Observation of the polarization dependent loss spectrum of a tilted fiber Bragg grating during electroless deposition of gold on the fiber allows the process to be stopped exactly when the surface Plasmon resonances are maximized.

SWC3 • 14:15
Role of Localized Surface Plasmon Resonance in Various Nano-structures for Sensing, *Taerin Chung[1], Sookyoung Roh[1], Byoungho Lee[1]; [1]Inter-University Semiconductor Research Center and School of Electrical Engineering, Seoul National University, Republic of Korea.* We numerically investigate the role of localized surface plasmon resonance produced at diverse nano-structures when illuminating visible light for enhanced sensing. The comparisons of optical properties in various nanostructures are illustrated.

SWC4 • 14:30
A New Optical Bio-sensor: Wet-chemical Synthesis and Surface Treatment of Nanocrystalline Zn 1-xS: Mn 2x, *Elham Mohagheghpour[1], Reza Salimi[2], Hassan Sameie[2], Fathollah Moztarzadeh[1], Mahdi Roohnikan[2], Mohammad Ali Mokhtari Farsi[2], Yalda Ebrahimi[2], Hossein Eivaz Mohammadloo[2], Mohammadreza Tahriri[1]; [1]Faculty of Biomedical Engineering, Amirkabir University of Technology, Islamic Republic of Iran; [2]Faculty of Polymer and Color Engineering, Amirkabir University of Technology, Islamic Republic of Iran.* ZnS:Mn nanocrystals were prepared via microemulsion route and the new optical bio-sensors were synthesized after surface treatment. These sensors can detect Avidin concentration in biological mediums by measuring the red emission decreasing rate.

SWC5 • 14:45
High Refractive-index-contrast Polymer Waveguide Platform for Excitation and Sensing in Aqueous Environments, *Bjorn Agnarsson[1], Hamid Keshmiri[1], Jennifer Halldorsson[1], Kristjan Leosson[1]; [1]Department of Physics, Science Institute, Iceland.* A polymer waveguide platform, applicable to a wide range of biophotonic applications, which rely on evanescent-wave sensing or excitation in aqueous solutions, is presented. The platform offers a high level of integration and functionality.

13:30–15:15
SOWC • Poled and Polarizing Fibers
John Marciante, Univ. of Rochester, USA, Presider

SOWC1 • 13:30 Invited
Highly Polarizing Single-Mode Optical Fiber for Sensing Applications, *Bill Jacobsen[1], Abdel Soufiane[1]; [1]Verrillon Inc, USA.* We demonstrate a high performance, highly manufacturable Single-Polarization Fiber (PZF), which offers a wide polarization bandwidth, very high polarization extinction ratio, and consistent performance within lot and from-lot-to-lot. We will also discuss on-going R&D projects involving PZF.

SOWC2 • 14:00
Relating DC-Field to Induced Nonlinear Susceptibility in Periodically Poled Silica Fiber, *Christopher A. Sapiano[1], Stewart Aitchison[1], Li Qian[1]; [1]Electrical and Computer Engineering, University of Toronto, Canada.* The relationship between DC-fields and effective second order nonlinearity is studied. DC-induced processes are modeled and fitted against equivalent natural second order processes. Insight is provided into the disparity between bulk glass and fiber.

SOWC3 • 14:15
Observation of Background Fluorescence in a Poled Fiber, *Eric Y. Zhu[1], Zhiyuan Tang[1,2], Edward A. Lee Kim-Koon[1], Li Qian[1], Lukas G. Helt[2], Marco Liscidini[2,3], John E. Sipe[2], Costantino Corbari[4], Albert Canagasabey[4,5], Morten Ibsen[4], Peter G. Kazansky[4]; [1]Electrical and Computer Engineering, University of Toronto, Canada; [2]Physics, University of Toronto, Canada; [3]Dipartimento di Fisica "A. Volta", Universita degli Studi di Pavia, Italy; [4]Optoelectronics Research Centre, University of Southampton, UK; [5]School of Physics, University of Sydney, Australia.* We observe broadband fluorescence (1260-1610 nm) in a peridically-poled silica fiber pumped at 775 nm; it is a noise contribution to correlated photon pair generation. The fluorescence is significantly lower in an identical, but unpoled, fiber.

SOWC4 • 14:30
Tapered Fiber Devices with Azopolymer Coating, *Amado Manuel Velázquez-Benítez[1], Juan Hernández-Cordero[1]; [1]Instituto de Investigaciones en Materiales, UN, Mexico.* Azopolymer coated fiber devices are demonstrated for in-fiber polarization control using an external laser beam. When placed in a fiber cavity, photo-induced birefringence on these devices modifies the spectral and polarization of fiber lasers.

SOWC5 • 14:45
Optically Tunable Bandpass Filter Using Series-connected Photonic Liquid Crystal Fibers, *Jia-Hong Liou[1], Ta Lin[1], Yan-Jhen Huang[2], Chia-Rong Lee[2], Chin-Ping Yu[1]; [1]Department of Photonics, NSYSU, Taiwan; [2]Institute of Electro-Optical Science and Engineering, National Cheng Kung University, Taiwan.* We demonstrate an optically tunable bandpass filter based on two series-connected photonic liquid crystal fibers filled with different LCs. By using photoresponsive LCs, 115-nm bandwidth tunability can be achieved by 5-second blue-laser irradiation.

Sessions continue on page XX.

Pier 7 & 8	Harbour Salon B	Harbour Salon C
Signal Processing in Photonics Communications	Integrated Photonics Research, Silicon and Nano Photonics	Integrated Photonics Research, Silicon and Nano Photonics

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SPWC • Transmission Systems—Continued

SPWC4 • 15:00
Low Cost 112G Direct Detection Metro Transmission System with Reduced Bandwidth (10G) Components and MLSE Compensation, *Alik Gorshtein[1,2]; [1]Electrical and computer engineering, Ben Gurion University of the Negev, Israel; [2]MultiPhy Networks Ltd., Israel.* MLSE compensation for reduced bandwidth optoelectronic components, CD, and D at multi-wavelength 4x28G transmission with direct detection is proposed. Inclusive comparison analysis with conventional hard decision systems is presented.

SPWC5 • 15:15
A Novel Dispersion and D Tolerant Clock Phase Detector, *Han Sun[1], Kuang-Tsan Wu[1]; [1]Infinera Canada, Canada.* A novel clock phase detector is presented and shown to be tolerant to chromatic dispersion and D. The phase detector can be used in a clock recovery circuit for demodulation of 100Gb coherent transmission system.

IWE • Photonic Integration III—Continued

IWE5 • 15:00
Integration of a Tunable, Optical Delay Generator in a Silicon Photonics Platform, *Kambiz Jamshidi[1], Stefan Meister[2], Aws Al-saadi[2], Hans Joachim Eichler[2], Thomas Schneider[1]; [1]High Frequency Technology, Deutsche Telekom Univ. of Applied Sciences, Germany; [2]Inst. für Optik und Atomare Physik, Technical Univ. of Berlin, Germany.* We propose an integrated optical delay generator based on Frequency-to-Time conversion. The required dispersions are produced by micro ring resonators based on SOI nano wires. Our design can provide delays up to 500 nanoseconds.

IWE6 • 15:15
Stripe-based Collimating Silica Planar Waveguide for a Free-space Wavelength Selective Cross Connect, *Nazirul Afham Idris[1], Keisuke Sorimoto[1], Daiki Tanaka[1], Hiroyuki Tsuda[1]; [1]Keio Univ., Japan.* We propose an integrated beam collimating silica waveguide with stripe-based structure for the use in wavelength selective cross connect (WSXC). The coupling loss of the device is below 0.15 dB within the ideal propagation distance.

IWF • Devices and Components III—Continued

IWF5 • 15:00
Ultrafast Pulse Compression in Integrated Two-Photon Amplifiers, *Amir Nevet[1], Alex Hayat[1], Meir Orenstein[1]; [1]Technion, Israel.* We demonstrate experimentally compression of femtosecond-scale pulses by two-photon gain in an electrically-driven AlGaAs waveguide. Dynamic control of pulse width from 240 to 140 fs is achieved by varying the current injection levels.

IWF6 • 15:15
Noise Reduction Effect of Semiconductor Optical Amplifier Using Fiber Bragg Grating, *Yoshinobu Maeda[1]; [1]School of Science and Engineering, Kinki Univ., Japan.* A negative feedback semiconductor optical amplifier was realized in an InGaAsP-InP amplifier using a fiber Bragg grating. The negative feedback optical amplification effect can be utilized to recover signal loss with a lower error probability.

15.30–16.00 Coffee Break, *Harbour Ballroom Foyer*

NOTES

Wednesday 15 June

Harbour Salon A	Pier 5
Optical Sensors	Specialty Optical Fibers

These concurrent sessions are grouped across two pages. Please review both pages for complete session information.

SWC • Photonic Crystal Sensors—Continued

SWC6 • 15:00
Guided Mode Resonance Sensors for the Monitoring of Film Growth in Atomic Layer Deposition, *Adriana Szeghalmi[1,2], Mato Knez[2], Ernst Bernhard Kley[1]; [1]Institute of Applied Physics, Friedrich Schiller University Jena, Germany; [2]Max-Planck Institute of Microstructure Physics, Germany.* Guided mode resonance optics consisting of linear gratings are highly sensitive optical sensors. Their use for monitoring the film growth during atomic layer deposition will be discussed based on rigorous coupled wave approach calculations.

SWC7 • 15:15
Large Blueshift of Resonance Wavelength Simulated With a Small Refractive-index Change of a Nanoporous Waveguide, *Zhi-mei Qi[1]; [1]State Key Laboratory of Transducer Technology, Institute of Electronics, CAS, China.* Simulation of refractive-index sensitivity of nanoporous waveguide resonance sensors reveals an extraordinary feature, that is, a large blueshift of the resonance wavelength induced by a small change in refractive index of the surrounding liquid.

SOWC • Poled and Polarizing Fibers—Continued

SOWC6 • 15:00
Enhanced Optical Parametric Gain by Cascading Periodically Poled Fiber Segments, *Lijun Zhang[1], Li Qian[1]; [1]ECE, University of Toronto, Canada.* Numerical modeling shows that cascading multiple segments of periodically poled fiber without phase control can nonetheless improve non-degenerate optical parametric gain with high yield if sufficient idler filtering is applied in between segments.

15.30–16.00 Coffee Break, *Harbour Ballroom Foyer*

NOTES

Pier 7 & 8

Signal Processing in Photonics Communications

16:00–17:30
SPWD • Optical Techniques II
Ivan Djordjevic, Univ. of Arizona, USA, Presider

SPWD1 • 16:00
Photonic Temporal Integration of Broadband Microwave Waveforms over Nanosecond Time Windows, *Mohammad H. Asghari[1], Yongwoo Park[1], José Azaña[1]; [1]Energie, Materiaux et Telecommunications, Institut National de la Recherche Scientifique (INRS), Canada.* By cascading an ultrafast time-limited intensity integrator with a discrete-time integrator, a new method for integration of microwave/optical intensity signals is experimentally demonstrated with unprecedented processing time-bandwidth product >140.

SPWD2 • 16:15
Amplitude and Timing Jitter Performance of Spectrally Periodic Phase Filters for Optical Pulse Rate Multiplication, *Antonio Malacarne[1], José Azaña[1]; [1]INRS-EMT, Canada.* We analyze amplitude and timing jitter performance in commonly believed equivalent phase filters for Talbot based optical pulse rate multiplication demonstrating different behaviors than classical Talbot filtering versus spectral periodicity.

SPWD3 • 16:30
Optical Equalization of D-Induced Penalties in 112 Gbit/s Metro Networks, *Matthias Westhäuser[1], Christian Remmersmann[1], Stephan Pachnicke[1], Peter M. Krummrich[1]; [1]Chair for High Frequency Technologies, TU Dortmund, Germany.* We investigate the performance of optical equalization of distortions induced by polarization mode dispersion (D) in 112 Gbit/s metro networks using FIR filters. The D-induced mean OSNR penalties are reduced to < 0.1 dB.

SPWD4 • 16:45
Proposal of a Reconfigurable Ultrafast Optical Pulse Shaping Technique Using Multi-Arm Optical Differentiators, *Mohammad H. Asghari[1], José Azaña[1]; [1]Energie, Materiaux et Telecommunications, Institut National de la Recherche Scientifique (INRS), Canada.* We propose and numerically evaluate a simple, reconfigurable ultrafast optical pulse shaping technique using multi-arm time differentiators with programmable weights that can be implemented using available integrated-waveguide/in-fiber technologies.

Harbour Salon C

Integrated Photonics Research, Silicon and Nano Photonics

16:00–17:
IWG • Devices and Components IV
Presider??????????

IWG1 • 16:00 Invited
Quantum Information Processing on Photonic Chips, *Dirk Englund; [1].*

IWG2 • 16:30
New Photonic components for Quantum Information Science, *Alberto Politi[1], Jonathan C. Matthews[1], Anthony Laing[1], Alberto Peruzzo[1], Konstantinos Poulios[1], Jasmin Meinecke[1], Damien Bonneau[1], Pete Shadbolt[1], Pruet Kalasuwan[1], Xiao-Qi Zhou[1], Maria Rodas Verde[1], Mirko Lobino[1], Terry Rudolph[2], John G. Rarity[1], Mark Thompson[1], Jeremy L. O'Brien[1]; [1]Physics, Univ. of Bristol, UK; [2]Inst. for Mathematical Sciences, Imperial College London, UK.* New photonic components are required to exploit the integrated architecture for Quantum Information science. We demonstrate quantum interference in MMI couplers and two-particle quantum walks in coupled waveguides, showing unique quantum behaviour.

IWG3 • 16:45
Infrared Colloidal Quantum Dot Chalcogenide Films for Integrated Light Sources, *Neil Patel[1], Scott Geyer[2], Jennifer Scherer[2], Moungi Bawendi[2], Nathan Carlie[3], J. David Musgraves[3], Kathleen Richardson[3], Juejun Hu[4], Pao T. Lin[1], Piotr Becla[1], Clara Dimas[5], Anu Agarwal[1], Lionel Kimerling[1]; [1]Dept. of Materials Science and Engineering, Massachusetts Inst. of Technology, USA; [2]Dept. of Chemistry, Massachusetts Inst. of Technology, USA; [3]School of Materials Science and Engineering, Clemson Univ., USA; [4]Dept. of Materials Science and Engineering, Univ. of Delaware, USA; [5]Masdar Inst. of Science and Technology, United Arab Emirates.* Quantum dots and chalcogenide glasses form the basis for photoluminescent films which are fabricated in microcavities to enhance light emission for coupling into waveguides.

Harbour Salon A

Optical Sensors

16:00–18:00
SWD • Speckle and Nonlinear Based Imaging
Ofer Levi, Univ. of Toronto, Canada, Presider

SWD1 • 16:00 Invited
Temporal and Spatial Speckle Contrast in Optical Coherence Tomography (OCT) — Imaging Tissue Structure and Function, *Alex Vitkin, Mcmaster Univ.; Canada.* In this talk, I will discuss speckle as another source of contrast in OCT images. Specifically, research into both its temporal and spatial behaviour will be described.

SWD2 • 16:30 Invited
Wonderful World of Weak Values, *John Howell[1], David Starling[1], Ben Dixon[1], Andrew Jordan[1]; [1]Univ. of Rochester, USA.* An introduction to weak values will be given along with experimental results in precision beam deflection, signal to noise ratio, phase amplification and precision frequency measurements.

Pier 5

Specialty Optical Fibers

16:00–17:30
SOWD • Novel Applications and Effects
Ji Wang, Corning, USA, Presider

SOWD1 • 16:00 Invited
Fiber-based Synchronized Programmable Laser System for Biomedical, Industrial and Defense Applications, *Alain Villeneuve, Bryan Burgoyne, Youngjae Kim, Alexandre Dupuis, Guido Pena, Joseph Salhany, Daniel Cote, Steve Begin, Guy Lamouche, Francis Théberge; [1]Genia Photonics Inc., Canada.* We present a fiber-based fully programmable Synchronized picosecond programmable Laser, composed of a fixed wavelength master-oscillator power amplifier and a fully programmable tunable in wavelength and adjustable in pulse width, and repetition rate Programmable Laser.

SOWD2 • 16:30
Impact of Draw Inhomogeneitites on the Loss and Mode Content of Large-Mode-Area Fibers, *John Marciante[1], Andrew Sarangan[2]; [1]Institute of Optics, University of Rochester, USA; [2]Electro-Optics Program, University of Dayton, USA.* Inhomogeneities in the draw process cause variations in fiber diameter, leading to optical scattering. Beam-propagation simulations reveal that loss is acceptable for 1% RMS variations, but that good beam quality requires RMS variations below 0.1%.

Pier 7 & 8

Signal Processing in Photonics Communications

SPWD • Optical Techniques II—Continued

SPWD5 • 17:00
Fully Optimized Long Period Fiber Grating Designs for Ultrafast Optical Differentiation, *Reza Ashrafi[1], Mohammad H. Asghari[1], José Azaña[1]; [1]Institut National de la Recherche Scientifique - Energie, Matériaux et Télécommunications (INRS-EMT), Canada.* We propose a novel design for arbitrary-order optical differentiation based on a especially-apodized long period fiber grating operated in transmission to fully optimize the energetic efficiency and processing speed of the device.

SPWD6 • 17:15
Sequences for Impairment Mitigation in Coherent SPE-OCDMA, *Yi Yang[1], A. Brinton Cooper III[1], Jacob Khurgin[1], Jin Kang[1]; [1]ECE, The Johns Hopkins University, USA.* Robust performance of spectrally phase encoded OCDMA with key impairments depends on the encoding sequences, according to correlation properties and pulse shapes.

Harbour Salon C

Integrated Photonics Research, Silicon and Nano Photonics

IWG • Devices and Components IV—Continued

IWG4 • 17:00
Compact FIR Filter Architecture for Tunable Optical Dispersion Compensation in Silicon Photonics, *Abdul Rahim[1], Stefan Schwarz[2], Jürgen Bruns[1], Christian Schäffer[2], Klaus Petermann[1]; [1]Institute of High Frequency Engineering, Univ. of Technology, Germany; [2]High Frequency Engineering and Optoelectronics, Univ. of Federal Armed Forces, Germany.* This paper presents the dispersion behavior of a 4-port asymmetric Mach-Zehnder-Interferometer, which can be used as a building block for a novel, compact and easy to control dispersion compensating filter.

IWG5 • 17:15
Femtosecond Three-Photon Counting in a Photomultiplier Tube, *Amir Nevet[1], Alex Hayat[1], Meir Orenstein[1]; [1]Technion, Israel.* We demonstrate experimentally ultrafast three-photon counting by three-photon absorption in a photomultiplier tube, which may serve as a unique tool for ultrafast quantum state characterization as well as for ultrasensitive temporal measurements.

Closing Remarks • 17:30

Harbour Salon A

Optical Sensors

SWD • Speckle and Nonlinear Based Imaging—Continued

SWD3 • 17:00
Quantum Ghost Imaging Through Turbulence, *Ben Dixon[1]; [1]Physics, University of Rochester, USA.* We investigate the effect of turbulence on quantum ghost imaging. We use entangled photons in several experimental configurations and demonstrate that for a novel configuration, the effect of turbulence can be greatly diminished.

SWD4 • 17:15
Beating the Classical Imaging Resolution Limit by Phase-sensitive Optical Parametric Amplifier, *Zun Huang[1], Doug French[2], Igor Jovanovic[2], Hsueh-Yuan Pao[3]; [1]ECE, Purdue University, USA; [2]Mechanical and Nuclear Engineering, Pennsylvania State University, USA; [3]Lawrence Livermore National Laboratory, USA.* When an optical parametric amplifier (OPA) operated as a phase-sensitive amplifier (PSA) is used for point source imaging, the angular resolution improvement can defeat the classical Rayleigh limit, and approach the de Broglie resolution.

SWD5 • 17:30
Enhanced Speckle Microstrain Measurements in PDMS Doped with SiO2 Nanoparticles, *Celso Briones[1], Alejandro Hernández-Suárez[1], Natanael Cuando-Espitia[1], Juan Hernández-Cordero[1], Francisco M. Sánchez-Arévalo[1]; [1]Reología y Mecánica de Materiales, Universidad Nacional Autónoma de México, Mexico.* Measurements of microstrain levels in PDMS membranes doped with SiO2 nanoparticles were obtained using digital image correlation (DIC). The mechanical behavior of PDMS can be analyzed using the enhanced speckle pattern obtained from the samples.

SWD6 • 17:45
3D Fluorescent Imaging with Highly Nonlinear Photosensitive Materials, *Evgueni F. Martynovich[1], D. S. Glazunov[1], A. V. Kuznetsov[1], E. V. Pestriakov[2], A. V. Kirpichnikov[2], S. N. Bagayev[2]; [1]Irkutsk Branch of Institute of Laser Physics SB RAS, Russian Federation; [2]Institute of Laser Physics SB RAS, Russian Federation.* Permanent 3D fluorescent structures were induced with single laser shots with energy < 1 microjoule. Mechanism of nonlinear photosensitivity is explained. Proposed materials can be used in different areas of photonics, sensors and optical memory.

Pier 5

Specialty Optical Fibers

SOWD • Novel Applications and Effects—Continued

SOWD3 • 17:00
FM-to- effect induced by Mode interference in Low NA Large-Mode-Area Fiber, *Dangpeng Xu[1]; [1]China academy of engineering physics, China.* The mode interference effect in LMA fiber was studied, the results showed that the effect can induce mode and spectral distortion, especially for phase modulated pulse, the temporal waveform can generate modulations on the top of the pulse.

SOWD4 • 17:15
Photonic Crystal Fiber for the Simultaneous Transmission of Information and Solar Energy, *Scott Shepard[1], Heath Berry[2]; [1]Louisiana Tech University, USA; [2]Radiance Technologies, Inc., USA.* Photonic crystal fiber permits exciting possibilities for the simultaneous transmission of power and information over future distribution networks. We analyze the information and power distribution capabilities that can currently be achieved.
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Key to Authors and Presiders

(**Bold** denotes Presider or Presenting Author)

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Advanced Photonics Congress Update Sheet

Sensors Keynote Speaker

SMA1 • 8:45-9:45

Optical Biomedical Sensors: What Can Nanophotonics Bring? Dan-Xia Xu, *Inst. for Microstrutual Sciences, National Research Council Canada, Canada.* We discuss how nanophotonics is influencing the field of optical biomedical sensors. View points are exemplified in the context of developing integrated silicon photonic wire molecular sensor systems.

Dan-Xia Xu is a Senior Research Officer with National Research Council Canada, and an adjunct professor with arleton University. She received her B.S. degree from the University of Science and Technology of China in 1985, and her Ph.D. degree from Linköping University in Sweden in 1991 working on silicon-germanium HBTs and multi-quantum-well tunneling diodes. Since joining NRC, she has developed high speed SiGe HBTs, silicides for sub-micron VLSI, SiGe and silicide photodetectors, and later switched her research field to integrated optics. In 2001-2002 she was part of the research team at Optenia Inc. that successfully developed the first commercial glass waveguide echelle grating demultiplexer. In 2003, she pioneered the study of cladding stress induced birefringence in SOI waveguides and its application for polarization independent operation in photonic components. This technique is easy to implement and gives unprecedented control and design freedom in devices such as AWGs, ring resonators and Mach-Zehnder delay interferometers. Since 2005, she has been working on SOI photonic wire biosensors which are shown to be the most sensitive evanescent field sensor platform known to date. The NRC biosensor team has developed compact and high channel count sensors arrays and a reader system which does not require temperature control, and is capable of detecting protein and DNA adsorption of less than a femto-gram. Her current research interest is high index contrast silicon photonics, including biosensors, ring resonators, and optical modulation for biological sensing and optical communications. She has co-authored over 200 publications in technical journals and international conferences, several book chapters, and holds 6 patents.

Presenter Changes

- Chen-Han Du; *Natl. Taiwan Univ. Taiwan* will present **IMC5, Modeling and Simulation II: Periodic Structures and Waveguides**
- Kenji Ishizaki; *Kyoto Univ., Japan,* will present **IMF1, Light Propagation in 3-D Photonic Crystals**.
- Wei-cheng Lai, *Univ. of Texas, USA* will present **IMF2, Experimental Demonstration of Ultra-Low Loss Coupling into Slow Light Slotted Photonic Crystal Waveguide on Silicon Nanomembrane**
- Gilberto Brambilla, *Univ. of Southampton, UK* will present **SMC4, In-Line Evanescent-Wave Microfluidic Absorption Sensor based on an Embedded Optical Microfiber coil**
- Moshe Nazarathy; *EE Technion., Israel,* will present **SPMB3, Low-Complexity Multi-Band Polyphase Filter Bank for Reduced-Guard- interval Coherent Optical OFDM**
- The following talk will be presented in the STuC4 time slot: **STuC4, THz Sensing for Industrial Process Control**, Irl Duling; *Picometrix, USA*
- Yanping Xi, *Mcmaster Univ. Canada* will present **JTuB14, Modeling and Design Optimization of Discrete Mode Lasers for High Speed Single-Mode Operation in Optical Communication Networks**
- Valerio Setti; *Univ. of Modena and Reggio Emilia, Italy,* will present **SOWB3 Confinement Loss of Tube Lattice and Kagome Fibers**
- Georges Humbert; *Univ. de Rouen., France,* will present **SOWB5 Hollow-core Photonic Crystal Fibre based Raman Lasers**
- Jacob Khurgin; *Johns Hopkins Univ , USA* will present **SPWD6, Sequences for Impairment Mitigation in Coherent SPE-OCDMA**
- Kambiz Jamshidi will present **SLWA5, Saturation and Delay in Broadband Brillouin Slow-Light**

Presentation Schedule Updates

IME4, Silicon Photonics Devices for Optical Interconnection, Takahiro Nakamura[1,2], Junichi Fujikata[1,2], Masashige Ishizaka[1,2], and Keishi Ohashi[2], *[1]: Photonics Electronics Technology Research Association , Japan [2]: Green Innovation Research Laboratories, NEC Corporation , Japan,* For optical interconnection, we demonstrated high-speed and high-efficiency optical modulator and photodetector by introducing nanostructure. Also, compact WDM optical source was developed using hybrid integrated SOA and silicon waveguide resonators. **This paper will be presented in the IME4 time slot on Monday, 13 June at 17:00.**

SOMB2, High Power Thulium Fiber Lasers, *Martin Richardson, Univ. of Central Florida, will be presented in the SOWD1 time slot on Monday, 13 June at 16:00.*

SOWD1, Fiber-based Synchronized Programmable Laser system for Biomedical, industrial and defense applications, Alain Villeneuve**,** *Genia Photonics, Canada* will be presented in the SOMB2 time slot on Monday, 13 June at 11:00.

SOWA4, Reliability of Double-Clad Fiber Coatings for Fiber Lasers, K. Tankala, J. Ambramczyk, D. Guertin, N. Jacobson and K. Farley, *Nufern, USA.* In this paper we describe work on the improved reliability of low index polymer coatings used in high power double-clad fiber lasers and amplifiers. **This paper will be presented in the SOW4 on Wednesday, 15 June at 8:30.**

Withdrawn Presentations

IMF7
STuC4
SOTuC1
SOWB2
SPWB4

Advanced Photonics Congress Update Sheet

Program Updates

Please note the title and abstract update for presentation **SMC3, Performance Gains in an Interferometric Fiber optic Gyroscope Operated with a Single-Frequency Laser,** Seth W. Lloyd, Michel J. F. Digonnet, and Shanhui Fan, *Stanford University, Stanford, CA, USA.* We present theoretical and experimental results demonstrating significant performance gains in interferometric fiber optic gyroscopes when the traditional gyroscope broadband source is replaced with a single-frequency laser.

Please note the abstract update for presentation **SOMD2 , Multi-Material Optical Fiber Fabrication and Applications,** Ayman Abouraddy; *Univ. of Central Florida, USA.* I review our progress in the emerging area of multi-material fibers. Applications range from mid-infrared linear and nonlinear chalcogenide glass fibers and fiber tapers, to the scalable and scale-invariant fabrication of micro- and nano-scale structures.

Please note the title and author block update for presentation **ATuA3, Overlapped Subcarrier Multiplexed WDM PONs Enabled by Burst-Mode Receivers,** *David V. Plant[1], Ziad A. El-Sahn[1], Jonathan M. Buset[1], Bhavin J. Shastri[1], [1] McGill Univ., Canada.*

Please note the title update for presentation **ATuB1 Radio-over-Fiber Techniques and Applications for Multi-Gb/s In-Building Wireless Communication,** Anthony Ng'oma, *Corning Inc., USA.*

Please note the corrected author name for presentation **STuA1, Filamentation THz generation in air,** *S.L. Chin, Univ. Laval, Canada*

Please note the update of following poster presentations:

JTuB25, Enhanced Detection of Vibrations using Fiber Fabry Perot Filters and Spectral Estimation Techniques, Balaji Srinivasan, Bibin Varghese, *Harish Achar, IIT Madras, India***.** We report on high sensitivity detection of acoustic signals using Fiber Bragg grating-based Fabry-Perot filters. Our scheme is based on an APD-based receiver with bandpass filter, 16-bit ADC, and novel spectrum estimation techniques.

JTuB26, Self-Assembled Monolayers (SAMs) of Porphyrin Deposited inside Solid-core Photonic Crystal Fibre (SCPCF), A. Veselov[1], A. Efimov[1], A. Chamorovskiy[2], O. Okhotnikov[2], A. Kosolapov[3], A. Levchenko[3], H. Lemmetyinen[1], N. Tkachenko1; *[1]Department of Chemistry and Bioengineering, Tampere Univ. of Technology, Finland; [2]Optoelectronics Research Centre, Tampere Univ. of Technology, Finland; [3]Fiber Optics Research Center of Russian Academy of Sciences, Russia.*

JTuB27, A Bragg Microcavity Filter for Optical Sensing, Aju. S. Jugessur, Mariya Yagnyukova, James Dou, J. Stewart Aitchison; Electrical and Computer Engineering/ECTI, Univ .of Toronto, Canada**.** A Bragg microcavity optical sensor is fabricated using Electron-Beam Lithography and Reactive Ion Etching techniques. An index change of 0.03 corresponds to a peak resonance wavelength shift of approximately 1 nm.

JTuB28, Fiber-Optic Probe with Subwavelength Metallic Nanostructures for Sensing in Infrared Region, Sookyoung Roh, Taerin Chung, Byoungho Lee; *Seoul National Univ., Korea*. We investigate fiber-optic probe with subwavelength metallic nanostructures on the fiber-end facet for sensing. Nanostructures such as 1D/2D gratings in metallic layer are analyzed and utilized for inducing the plasmonic resonance in infrared region.

Presentation **SOMC3, Laser Sintering of c-YAG Fiber**, *Jonathan Goldstein[1], Geoff Fair[1], David Zelmon[1], Heedong Lee[2]; [1]Air Force Research Lab, USA; [2]UES, USA,* **will now be presented as poster JTuB29.**

Please note the abstract update for presentation **IWE5, Integration of a Tunable, Optical Delay Generator in a Silicon Photonics Platform,** Kambiz Jamshidi , Stefan Meister , Aws Al-Saadi , Hans Joachim Eichler , Thomas Schneider, *Deutsche Telekom Hochschule für Telekommunikation Leipzig , Germany.* We propose an integrated optical delay generator based on Frequency-to-Time conversion. The required dispersions are produced by micro ring resonators based on SOI nano wires. Our design can provide high delays in relatively small footprints.

Please note the abstract update for presentation **IWG1, Quantum Information Processing on Photonic Chips,** Dirk Englund; *Columbia Univ., USA.* We describe a technique to deterministically couple a single, pre-selected nitrogen vacancy (NV) center to a high-quality factor photonic crystal nanocavity in a Gallium Phosphide membrane.

Please note the title and abstract update for presentation **SOWA4, Reliability of Double-Clad Fiber Coatings for Fiber Lasers,** *K. Tankala, J. Ambramczyk, D. Guertin, N. Jacobson and K. Farley, Nufern, USA.* In this paper we describe work on the improved reliability of low index polymer coatings used in high power double-clad fiber lasers and amplifiers.

Please note the title update for presentation **SOWB5, Hollow-core Photonic Crystal Fibre based Raman Lasers,** *Fetah Benabid, Univ. of Bath, UK.*

Program Corrections

Please note the correct author block **IMC4, Tailoring the Far Field of Bragg Reflection Waveguides,** *Nima Zareian, Payam Abolghasem, Amr S. Helmy, Univ. of Toronto, Canada.*

Please note the correct affiliation of **SMB1, Subwavelength Hot Spot Generation for Sensor Applications,** *Byoungho Lee, Republic of Korea.*

Presider Updates

- *Francesco Poletti; Univ. of Southampton, UK* will preside over **SMD, Spectral and Biomedical Imaging.**

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