



On behalf of the Program Committee and the IEEE Photonics Society, I wish you a very warm welcome to Bellevue, Washington and the 26th IEEE Photonics Conference (formerly known as the IEEE LEOS Annual Meeting). In keeping with previous meetings, this year's conference features a broad-ranging technical program in addition to some unique events.

The conference opens on Sunday with two dedicated sessions. The first is a panel discussion on 'Silicon Photonics', organized by Susumu Noda, Toshihiko Baba and David Plant, and featuring leaders from academia and industry, which aims to inform the debate about the major challenges, opportunities and future development of this exciting and important field. Following an introduction and short presentations by the panellists, there will be a panel discussion in response to questions and comments from the audience. Come along to pick up the latest news and views and to make your opinions known. The second is a reception on 'Photonics in the Pacific Northwest', organized by Scott Prael (Oregon Tech), Michael Khbeis and colleagues (University of Washington) and Lukas Chrostowski (University of British Columbia) featuring presentations, displays, stands and demonstrations highlighting the strong academic and industrial base of photonics in this beautiful region. This reception aims to provide a forum for showcasing the Pacific Northwest and to promote informal discussion, career development and networking opportunities. These sessions are open to all, with students and young researchers being especially welcome.

There are two plenary sessions, one on Monday afternoon and one on Tuesday afternoon, each featuring a pair of distinguished speakers giving their insights on major current topics in photonics. On Monday, the speakers are Kim Roberts (CIENA) on 'The flexibility of coherent optical transceivers' and Roel Baets (Ghent University/IMEC) on 'Lab-on-chip and point-of-care applications of silicon photonics'. On Tuesday, the speakers are John Rogers (UIUC) on 'Digital cameras in bio-inspired designs: from humans to flies and Yasunobu Nakamura (University of Tokyo) on 'Microwave quantum optics in superconducting circuits.'

The program also features six invited tutorials scheduled throughout the week, given by internationally leading researchers presenting in-depth overviews of selected topical fields: Dieter Bimberg (TU Berlin) on 'Green Nanophotonics for Future Datacom and Ethernet Networks'; Kishan Dholakia (University of St Andrews) on 'Optical micromanipulation'; Brian T. Cunningham (UIUC) on 'Optical sensors in life science and medicine'; Thomas Clark (Johns Hopkins University) on 'Photonic microwave-to-digital conversion'; Ivan Andonovic (University of Strathclyde) on 'Semiconductor optical amplifiers'; and Antonio Mecozzi (University d'Aquila) on 'Nonlinear propagation effects in multimode transmission'.

The main technical program of the meeting this year is very strong. We have introduced one new program subcommittee on 'Optical Micro/Nano Resonators' and renamed another to 'Photonic Materials and Metamaterials' to reflect the growing importance of metamaterials. These, along with the 13 other program committees, have assembled an outstanding program comprising 3 Special Symposia ('Optogenetics', 'Internet of Things', 'Optical Data Storage'), 115 invited talks and 267 contributed papers. There were 18 papers nominated for the Best Student Paper Award, of which 5 were shortlisted for recognition at the Awards Reception.

On behalf of the conference program committee, I wish to express our sincere thanks to all the volunteers who have contributed to the success of this year's meeting. This particularly includes the Chairs and Members of the Society's Program Subcommittees who invested a substantial amount of time in selecting invited speakers, reviewing papers, and organizing the high quality technical sessions. In addition, the hard work and enthusiastic dedication of the Photonics Society conference activities staff is greatly appreciated. Especial thanks go to Mary Hendrickx, Tracy Holle and Ingrid Donnelly for all their help and support.

We hope you have a very rewarding and enjoyable conference!

Martin Dawson
Program Chair, 2013 IEEE Photonics Conference

● Indicates a recorded session

Technical Program Monday 9 September 2013

EVERGREEN H

EVERGREEN G

EVERGREEN E

EVERGREEN C

MC3.6 3:00 PM - 3:15 PM

An Optical Diode Based on Nonlinear Second-Order Silicon Microring Resonator

Y. Long, J. Wang, C. Gui, S. Li and J. Du,
Wuhan National Laboratory for Optoelectronics, Wuhan, China

We present an ultra-compact optical diode using nonlinear second-order silicon microring resonator which is complementary metal-oxide semiconductor (CMOS) compatible. The designed optical diode features high isolation (>20 dB) and more tolerant resonance wavelength mismatch (± 0.35 nm with <1.5 dB isolation degradation).

3:00 PM - 3:30 PM COFFEE BREAK - EVERGREEN FOYER

Plenary Session I 3:30 PM - 5:00 PM Regency Ballroom

Session M14: Plenary Session I **Session Chair:** David Plant, *McGill University, Canada*

3:30 PM - 4:15 PM

The Flexibility of Coherent Optical Transceivers

Kim Roberts, *CIENA, USA*

4:15 PM - 5:00 PM

Lab-onchip and point-of-care applications of silicon photonics

Roel Baets, *Ghent University/IMEC, Belgium*



AWARDS PRESENTATION 5:00PM - 6:00PM - REGENCY BALLROOM

WELCOME RECEPTION 6:00PM - 7:30PM - EVERGREEN D-E-F

PHOTOGRAPHY

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Monday, September 9, 2013: 3:30 PM - 5:00 PM

Session MI4: Plenary Session I

Session Chair: David Plant, McGill University, Canada

3:30 PM - 4:15 PM

The Flexibility of Coherent Optical Transceivers

Kim Roberts, CIENA, USA

Digital coherent methods have transformed high capacity optical communications. 100 Gb/s optical signals are being connected around cities, across continents, and spanning the oceans. In some applications, such as trans-pacific, long unregenerated end-to-end reach is most important. In other cases, it is vital to get more than 20 Tb/s through a single fiber pair. After an introduction to digital coherent systems, measured results on production equipment will be presented showing reach at 100 Gb/s that is greater than that of 40 Gb/s coherent. The use of both transmit and receive digital signal processing allows one set of hardware support various modulation patterns, and so lets one optimize the reach vs. spectral efficiency trade-off for each application.



Kim Roberts is a passionate evangelist of new optical and high-capacity packet technologies and holds the distinction of being Ciena Corporation's (previously Nortel's) leading inventor. Kim holds more than 120 patents with many more pending.

Kim has been a major force in the field of digital signal processing (DSP) for optical transmission systems, and played a key role in virtually every optical innovation developed by Nortel. These range from the Superdecoder (the use of electronic signal processing of optical signals), the OC-48 regenerator, and the original OC-192 (10-Gbit/s) system, to terrestrial optical amplifiers and the revolutionary eDCO precompensating transmitter. Building on these breakthroughs, Kim helped develop the DSP-assisted coherent transceivers that are at the heart of the world's first coherent 40G and 100G optical systems. Today Kim leads an R&D team at Ciena focused on pushing the optical boundaries even further in terms of speed, distance and cost with the WaveLogic 4 transceiver.

In recognition of the pioneering role he has played in the industry, Kim was named a Nortel Fellow and he received the Outstanding Engineer medal in 2008 from IEEE Canada. Kim routinely shares his expertise with the research and education fields, and is in high demand as a speaker and committee member with industry organizations.

Kim holds a Bachelor degree in Electrical Engineering with an emphasis on mathematics, and a Master degree in Electrical Engineering with the topic of processing of brain signals, both from the University of British Columbia.

4:15 PM - 5:00 PM

Lab-on-chip and point-of-care applications of silicon photonics

R. Baets, Ghent University/IMEC, Belgium

Silicon photonics is best known for its application in optical interconnect, optical datacom and telecom, where it is rapidly moving into industrial deployment. But the key asset of this technology – ultra-compact and powerful photonic functionalities made in a CMOS-fab – may be game-changing for many photonics applications with a reasonable volume or a cost-critical market. This is particularly true for lab-on-chip applications where the chip is a consumable and also in point-of-care medical applications where affordability and portability of an instrument is very important.

In this talk I will discuss a number of examples from exploratory research in recent years that build on a generic silicon photonics technology platform to develop devices for biomedical applications. This includes biosensors, gas sensors for breath analysis, laser Doppler vibrometry for blood pulse velocity measurement, optical coherence tomography, continuous glucose monitoring, Raman spectroscopy on chip etc. I will also discuss the potential of nonlinear optics in silicon to implement special functions that may aid biological sensing, such as supercontinuum generation, parametric amplification and stimulated Raman scattering.



Roel Baets is full professor at Ghent University, Belgium. He is also associated with IMEC. He has held part-time professor positions at the Technical University of Delft and at the Technical University of Eindhoven.

Roel Baets works in the field of integrated photonic components and circuits. He has made contributions to research on semiconductor laser diodes, guided wave and grating devices and to the design and fabrication of photonic ICs, both in III-V semiconductors, in silicon and in siliconnitride. The Photonics Research Group, in which he is active, is involved in numerous national and international research programs and also coordinates the Multi-Project-Wafer service ePIXfab that provides access to silicon photonics technology. The silicon photonics research activities of the group are part of a joint research initiative with IMEC.

Roel Baets holds management responsibilities within the Photonics Research Group and the Center for Nano- and Biophotonics (NB Photonics) Ghent University. He was co-founder of the international European MSc programme in Photonics.

Roel Baets is a grant holder of the European Research Council (ERC). He is a Fellow of the IEEE.

PHOTONICS SOCIETY 2013 Program-At-A-Glance

MONDAY, 9 SEPTEMBER 2013

NOTE: ALL SESSIONS IN ORANGE WILL BE RECORDED AND AVAILABLE FOR VIEWING AFTER THE CONFERENCE FOR A FEE. FOR MORE INFORMATION PLEASE CONTACT: INGRID DONNELLY AT I.DONNELLY@IEEE.ORG, VISIT WWW.IPC-IEEE.ORG OR STOP BY THE REGISTRATION DESK

Registration & Speaker Check-in Hours: 7:30AM – 5:00pm in the Evergreen Foyer Post-Deadline Paper Submissions Due by 9:00am

Evergreen H	Evergreen G	Evergreen E	Evergreen C	Evergreen B	Evergreen A	Evergreen F	Evergreen I
8:30-10:00am MA1 BIO 1 Optical Imaging and Cytometry E. McLeod	8:30-10:00am MB1 DISL 1 TFTs For AMOLEDs P. Servati	8:30-10:00am MC1 OI 1 Applications M. Haney	8:30-10:00am MD1 HPIS 1 Flamentation and Novel Lasers J. Itatani	8:30-10:00am ME1 SL 1 Quantum Dot Lasers I P. Smowton	8:30-10:00am MF1 PIP 1 Mid IR and Fluidic Integration A. Helmy	8:30-10:00am MG1 OC 1 OFDM A. Ellis	8:30-9:30am MH1 NLUO 1 Laser Cooling Y. Ding

10:00am - 10:30am COFFEE BREAK

Evergreen Foyer

10:30-11:30am MA2 BIO 2 Advances in OTC D. Sampson	10:30-12:00pm MB2 DISL 2 LED Lighting C. Jagadish	10:30-12:00pm MC2 OI 2 Devices and Architectures E. Johnson	10:30-12:15pm MD2 HPIS 2 Strongfield Ultrafast Interactions T. Ozaki	10:30-12:00pm ME2 SL TUT Green Nanophotonics for Future Datacom and Ethernet Networks, D. Bimberg Chair: V. Tolstikhin	10:30-12:30pm MF2 PIP/PMM 1 Novel Integration Technologies A. Helmy	10:30-12:00pm MG2 OC 2 DSP For Transmission N. Alic	10:30-12:00pm MH2 NANO 1 Excitonics H. Demir
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12:00pm – 1:30pm LUNCH

1:30-3:00pm MA3 SS OG 1 Optogenetics K. Mathieson	1:30-3:00pm MB3 DISL 3 Novel Displays P. Servati	1:30-3:15pm MC3 OI 3 Integration and Devices K. Raj	1:30-3:00pm MD3 HPIS 3 Ultra-Intense and High-Power Lasers S. Kubodera	1:30-3:15pm ME3 SL 2 Hybrid III-V on Silicon Lasers V. Tolstikhin	1:30-2:45pm MF3 PIP 2 Integrating and Packing Technologies J. Poon	1:30-2:45pm MG3 OC3 FEC H. Batshon	1:30-3:00pm MH3 NANO 2 Nanophotonics For Light Emission A. Govorov
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3:00pm -3:30pm COFFEE BREAK

Evergreen Foyer

Plenary Session I 3:30pm – 5:00pm Regency Ballroom

Chair: David Plant

3:30 - 4:15pm The Flexibility of Coherent Optical Transceivers, Kim Roberts, Ciena, USA
4:15 – 5:00pm Lab-onchip and Point-of-Care Applications of Silicon Photonics, Roel Baets, Ghent University/IMEC, Belgium
Awards Presentation 5:00pm - 6:00pm Regency Ballroom

WELCOME RECEPTION 6:00pm-7:30pm Evergreen D-E-F

Indicates a recorded session

