IEEE Ottawa Photonics Chapter, IEEE Ottawa Microwave Theory and Techniques Chapter, and IEEE Ottawa Communications Society, Consumer Electronics Society, and Broadcast Technology Society Joint Chapter

Joint Symposium on Optical Communications

Date and Time:	March 18, 2016, 1:00-4:30 PM
Venue:	ARC 233, University of Ottawa, 25 Templeton St, Ottawa K1N 6N5
Registration:	Free

Program:

1:00 – 1:30 PM	Networking
1:30 – 2:30 PM	**Distinguished Guest Speaker**: Prof. Dan M. Marom, Hebrew University **Title**: Switching technologies for spatially and spectrally flexible optical networks
2:30 – 3:30 PM	**Invited Speaker**: Maurice O'Sullivan, Ciena Title: Flexible, multi-rate coherent transmission and network applications
3:30 – 4:30 PM	**Invited Speaker**: Siegfried Janz, NRC Title: Emerging Photonic Component Technology at the National Research Council Canada

Dan M. Marom is an Associate Professor in the Applied Physics Department at Hebrew University, Israel, heading the Photonic Devices Group. He received the B.Sc. Degree in Mechanical Engineering and the M.Sc. Degree in Electrical Engineering, both from Tel-Aviv University, Israel, in 1989 and 1995, respectively, and was awarded a Ph.D. in Electrical Engineering from the University of California, San Diego (UCSD), in 2000.

His 20 year research career in optical communications started during his Master's degree, where he investigated free-space, polarization rotation based bypass-exchange (2×2) space switches, which later on led to the founding of a start-up company. In his doctoral dissertation he demonstrated real-time optical signal processing using parametric non-linearities applied to spectrally dispersed light, for possible modulation and detection schemes in serial ultrafast communications (tera-baud rate and beyond). From 2000 until 2005, he was a Member of the Technical Staff at the Advanced Photonics Research Department of Bell Laboratories, Lucent Technologies, where he invented and headed the research and development effort of MEMS based wavelength-selective switching solutions for optical networks. Since 2005, he has been with the Applied Physics Department, Hebrew University, Israel, where he is now an Associate Professor leading a research group pursuing his research interests in creating photonic devices and sub-systems for switching and manipulating optical signals, in guided-wave and free-space optics solutions using light modulating de- vices, nonlinear optics, and compound materials.

Prof. Marom is a Senior Member of the IEEE Photonics Society, and a Fellow of the Optical Society of America. From 1996 through 2000, he was a Fannie and John Hertz Foundation Graduate Fellow at UCSD, and was a Peter Brojde Scholar in 2006-2007. He currently serves as Senior Editor for Photonics Technology Letters, handling photonic devices related submissions.

Abstract: Today's fiber-optic communication networks span the globe, delivering broadband information across all market segments and connecting massive datacenters, businesses, and individual user's homes. As such, optical net- works must operate reliably and efficiently when transporting the massive information capacity of the Internet, allowing networks to adapt to growing and changing demand flows and occasional interruptions. Wavelength-selective switches (WSS) have been instrumental in fulfilling this role, enabling all-optical spectral routing of individual wave-length-division multiplexed (WDM) communication channels at network nodes.

The recent introduction of space-division multiplexing (SDM) to the optical communication domain with new fiber types, in order to economically support the exponentially growing capacity, necessitates complementary components for implementing SDM-WDM optical networks. SDM is typically realized with either multi-core or few-mode fibers and great capacity achievements have been demonstrated to-date in each fiber solution. Wavelength-selective switching functionality for these two fiber types has recently been introduced. A joint-switching WSS concept has been realized for multi-core fibers, enabling information to be encoded and routed on the SDM-WDM optical network as a spatial super-channel (single wavelength channel spanning multiple cores). This spatial super-channel routing concept with joint-switching WSS also extends to few-mode fibers. Hence a single WSS can then be used in analogous fashion to the single-mode fiber networks, thereby heralding the cost-savings benefits of SDM. A WSS with direct few- mode fiber interfaces has been demonstrated with the few-mode beams routed in free-space just as the single mode beam does in a conventional WSS. A study on the pass band filtering effect and mode mixing due to the spectral switching of dispersed components revealed the spatial-spectral interplay in the mode-dependent loss attributes of the few-mode fiber WSS. Such advanced WSS prototypes will serve the next generation transport networks when SDM is fully adopted by carriers.

Maurice O'Sullivan has engineered the physical layer of optical transmission for more than 25 years, at first in the optical cable business, developing factory-tailored metrology for optical fiber, but, mainly, in the optical transmission business developing, modeling and verifying physical layer designs and performance of Nortel's (now Ciena's) line and highest rate transmission product including the first commercial 10 Gb/s system, several commercial terrestrial line systems, the first commercial DSP assisted electric field modulation transceiver with complete electronic compensation for optical dispersion and the first commercial coherent 40Gb/s and 100Gb/s transceivers. Now with Ciena, Maurice is engaged in the design of the next generation of flexible high capacity coherent transceivers following on the recent commercial success of Ciena's multi-rate 50G/100G/200G product. Maurice is a Ciena Fellow with more than 30 patents and holds a Ph.D. in physics (high resolution spectroscopy) from the University of Toronto.

Abstract: We survey recent progress in high capacity coherent transmission technology and show how DSP, applied to the optical channel, provides opportunities for network cost reduction by performance and capacity optimizations.

Siegfried Janz is the Program Leader for the Advanced Photonic Components Program at the National Research Council (NRC) in Ottawa. Dr. Janz completed his Ph.D. in physics in 1991 at the University of Toronto, working on nonlinear optics at metal surfaces. He then joined the NRC where he has worked on a wide range of active and passive integrated photonic components for applications in telecommunications, data interconnects, and biological sensing. He is coauthor of 24 patent applications, over 250 scientific papers, and eight book chapters in photonics and bio-sensing.

Abstract: This presentation will give a brief overview the role of the National Research Council and the Canadian Photonics Fabrication Centre in the Canadian photonics research and development community. Then several of the emerging photonics technologies that are being developed by NRC researchers will be described. These include quantum dot lasers for multi-wavelength laser sources, silicon photonics, sub-wavelength engineering for integrated optical components, as well as the application of silicon integrated optics for chemical and biological sensing.

Organizer: Prof. Jianping Yao, Chair of IEEE Ottawa Photronics Chapter, jpyao@uottawa.ca