IEEE Canada Technology Leadership Webinar Series

IEEE Canada is hosting a webinar series on Technology Leadership. We are inviting professional associations, think tanks, governmental agencies, and other institutions to participate and contribute speakers. This webinar series is a platform bringing our thought leaders from different stakeholders, from all walks of life to present their views and advocate their positions on science, technology, society, and future economy. It will be open and free to the general public. Many, among the audience, will be members of IEEE.

Date:	Tuesday February 22, 2022
Time:	03:00 PM to 04:00 PM EDT
Speaker:	Dr. Amr Helmy
Topic:	How can metal optics enable CMOS scalability within System in a Package?
Registration:	https://events.vtools.ieee.org/m/298800

Note:

Summary:

In this talk we plan to discuss a novel class of nanoscale devices that address unmet performance demands for applications in data communications. The performance of emerging generations of high-speed, integrated electronic circuits is increasingly dictated by interconnect density and latency as well as by power consumption. To alleviate these limitations, data communications using photons has been deployed, where photonic circuits and devices are integrated on platforms compatible with conventional electronic technologies. Within the dominant platform; namely Si, dielectric waveguides confine light via total internal reflection. This imposes bounds on minimizing device dimensions and density of integration. Those bounds arise due to the diffraction limit and the cross-coupling between neighboring waveguides. Nanoscale Plasmonic waveguides provide the unique ability to confine light within a few 10s of nanometers and allow for near perfect transmission through sharp bends as well as efficient light distribution between orthogonally intersecting junctions. With these structures as a building block, new levels of optoelectronic integration and performance metrics for athermal transceivers with achievable bandwidths of 100s Gbps and detection sensitivity better than -55 dBs, will be overviewed in this talk. In addition, opportunities for the role that 2D materials may pay in propelling these record performance metrics even further will be projected.

Finally, quantum optical applications including quantum-enhanced target detection including LIDAR and scalability expansion of quantum computing fabrics using photons will be briefly highlighted.

Speaker:

Amr is a professor in the department of electrical and computer engineering at the University of Toronto. Prior to his academic career, he held a position at Agilent Technologies, R&D division, in the UK between 2000 and 2004. At Agilent his responsibilities included developing InP-based photonic semiconductor integrated circuits and high-powered submarine-class 980 nm pump lasers. He received

his Ph.D. and M.Sc. from the University of Glasgow with a focus on photonic devices and fabrication technologies, in 1999 and 1995 respectively.

His research interests include photonic device physics and characterization techniques, with emphasis on nonlinear and quantum optics in monolithically integrated structures as well as plasmonic devices and circuits.

Amr is the IEEE Photonics Society Distinguished Lecturer for 2022. He has also received the Distinguishes Service Award for the same society in 2019. He has served as an associate editor for the IEEE Photonics Journal, Optics Express and Optica. He has served as the Chair for IEEE IPC and CLEO conferences. In addition, he has served as the Vice president of the IEEE Photonics Society.

For more information or to inquire about speaking opportunities, please contact, Dale Tardiff, IEEE Canada Outreach and Partnership Committee Chair, opc@ieee.ca

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