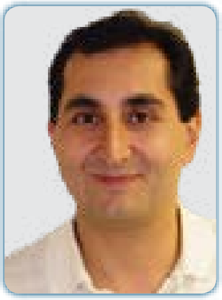
DOI: 10.4172/2469-410X-C5-034

International Conference on
PHOTONICS, OPTOELECTRONICS AND DISPLAY DEVICES
&
International Conference on VEHICLE FIBER-OPTICS AND PHOTONICS
September 19-20, 2018 | Philadelphia, USA



Ali Adibi

Georgia Institute of Technology, USA

Hybrid material platforms for low-power, high-speed and miniaturized integrated nanophotonic devices and systems

The development of ultra-compact integrated nanophotonic structures for communications, sensing and signal processing has been of great interest lately. Recent progress in the development of miniaturized high-Q microresonators has resulted in orders of magnitude reduction in the size of functional integrated photonic structures with great promise for the realization of ultra-low-power devices operating at high data rates. Among existing CMOS-compatible substrates, silicon (Si) and silicon nitride (SiN) has been used the most. Despite impressing progress in both platforms, neither one alone can address all the requirements of the future integrated photonic devices and systems for practical applications. Si (despite its good reconfigurability) suffers from strong nonlinear effects (especially at high light intensities) and relatively large free-carrier loss while the optical properties of SiN (with one order of magnitude lower loss and lower nonlinearity compared to Si) is very hard to tune. Thus, a reliable material system that combines ultra-loss-loss and high-power handling with efficient and fast reconfigurability is of high demand for next-generation integrated nanophotonic devices and systems. In this talk, the recent achievements in the development and optimization of hybrid multi-layer CMOS-compatible material systems (e.g., SiN/Si, multi-layer Si/SiO2, etc.) to address all the practical requirements of ultra-fast, ultra-low-power and miniaturized integrated photonic structures will be discussed. Using these hybrid material systems, a series of ultra-compact and high-performance reconfigurable photonic devices and subsystems (e.g., modulators and switches) that are formed by using high Q resonators will be demonstrated. The use of these devices and subsystems for the realization of densely-integrated reconfigurable photonic chips for state-of-the-art applications will also be discussed.

Biography

Ali Adibi is the director of Bio and Environmental Sensing Technologies (BEST) and a professor and Joseph M. Pettit chair in the School of Electrical and Computer Engineering, Georgia Institute of Technology. His research group has pioneered several structures in the field of integrated nanophotonics for both information processing and sensing. He is the author of more than 160 journal papers and 400 conference papers. He is the editor-in-chief of the Journal of Nanophotonics and the nanophotonic program track chair of the Photonics West meeting. He is the recipient of several awards including Presidential Early Career Award for Scientists and Engineers (PECASE), Packard Fellowship, NSF CAREER Award and the SPIE Technology Achievement Award. He is also a fellow of OSA, SPIE and AAAS.

adibi@ece.gatech.edu

Notes: