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S E M I N A R

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A Ring-Resonator-Based Silicon Photonics Transceiver with Bias-Based Wavelength-Stabilization and Adaptive Power-Sensitivity Receiver

by

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Abstract: Data rates continue to scale up rapidly to meet the continuous growth of data volume due to the increased multimedia applications and cloud computing services. This rapid growth has led to bandwidth limitation problem for metal-based inter/intra-chip interconnects. In contrast, silicon photonics provide a unique opportunity to deliver distance-independent connectivity, whose pin-bandwidth scales with the degree of wavelength-division multiplexing (WDM). In this work, an optical interconnect transceiver is fabricated in 1V 65nm CMOS. The transmitter incorporates a pre-emphasis driver and bias-based tuning circuit to improve the modulation speed and stabilize resonance wavelength of carrier-injection silicon ring resonator. An adaptive sensitivity-bandwidth receiver self-adapts for uncertainties in input capacitance, modulator/photodetector performance, and link budget. The transceiver consumes 6.24mW and occupies 0.148 mm^2.

Cheng Li received the B.S. degree in electrical engineering from Southeast University, China in 2001, and the M.S. degree in computer engineering from Illinois Institute of Technology, IL in 2009. From 2001 to 2007, he was with Alcatel, shanghai, where he worked on the design of broadband access system. He is currently pursuing the Ph.D. degree in electrical engineering at Texas A&M University, College Station, TX. His research interests include high-speed optical links and photonic interconnects for Network-on-Chip system.