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High-Speed CMOS Optical Interconnect Transmitters

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Abstract – Growing optical interconnect bandwidth-density requirements motivates the use of four-level pulse-amplitude modulation (PAM-4) and wavelength-division multiplexing in datacenter and high performance computing applications. This talk will provide an overview of recent advances in the design of high-speed CMOS optical interconnect transmitters. Topics include a 50Gb/s VCSEL-based PAM-4 transmitter that employs a 2.5-tap nonlinear equalizer to compensate for device nonlinearity and bandwidth limitations, a 40Gb/s optical DAC microring modulator transmitter, and a 14Gb/s microring laser transmitter with an asymmetric 2-tap equalizer.

Bio – Samuel Palermo received the Ph.D. degree in electrical engineering from Stanford University in 2007. From 1999 to 2000, he was with Texas Instruments, Dallas, TX, where he worked on the design of mixed-signal integrated circuits for high-speed serial data communication. From 2006 to 2008, he was with Intel Corporation, Hillsboro, OR, where he worked on high-speed optical and electrical I/O architectures. In 2009, he joined the Electrical and Computer Engineering Department of Texas A&M University where he is currently an associate professor. His research interests include high-speed electrical and optical interconnect architectures, RF photonics, high performance clocking circuits, and integrated sensor systems. He has previously served as a distinguished lecturer for the IEEE Solid-State Circuits Society and currently serves on the TPC for ISSCC, OFC, and CICC.