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ELECTRICAL & COMPUTER ENGINEERING
TEXAS A&M UNIVERSITY

S E M I N A R

Room 1003 ETB

February 25, 2016 3:55-5:10 P.M.

Comprehensive Adaptive Tuning of Silicon RF Photonic Filters

by

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Abstract: RF photonic filters are capable of achieving very high selectivity and dynamic tuning over multi-GHz ranges. However, the high-order photonic filters necessary in an RF system are sensitive to fabrication variations. This talk presents a mm-wave silicon photonic fourth-order tunable elliptic digital filter designed in the optical domain with ring-resonator-based all-pass filter (APF) unit cells. Inclusion of tunable phase shifters and Mach-Zehnder interferometer (MZI) couplers in the filter's rings and front-end provides comprehensive tuning to compensate for variations in ring resonance frequency, coupling ratio, and phase mismatches. A monitor-based adaptive tuning algorithm is proposed to calibrate the optical filter response with high accuracy.

Shengchang Cai received the B.S. degree from Fudan University, Shanghai, China, in 2012 in Microelectronics. He is currently working towards the Ph.D. degree at Texas A&M University, College Station, TX, USA. During 2015, He was a Serdes architect intern at Freescale Semiconductor Inc, Chandler, AZ, USA. His research interests include design and modeling of high-speed analog/mixed-signal integrated circuits and systems and RF photonics.