



Ming C. Wu

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“Silicon Photonic MEMS”

Friday, September 29, 2017

2:00 - 3:30 pm, EEB 132

Refreshments will be served

Abstract: Silicon photonics has emerged as a compelling platform technology for photonic integrated circuits, with applications ranging from optical interconnect to optical routers, signal processors, and solid state LiDARs. High-speed modulators and transceivers have been successfully commercialized. However, silicon photonics is inefficient in switching optical signals. The refractive index change of free-carrier plasma or thermo-optic effect is less than 1%. In addition, these effects are either too lossy or consumes too much power. In this talk, I will introduce silicon photonic MEMS (micro-electro-mechanical systems). By adding MEMS actuators to physically move Si waveguides, 100% modulation of refractive index is achieved. We have successfully integrated 4,096 vertical adiabatic coupler switching elements to implement 64x64 optical circuit switches in a 1-square-cm chip, with sub-microsecond switching speed. The on-chip loss of 0.058 dB/port (3.7 dB total) is lowest ever reported. In addition to optical switching, similar MEMS tuning elements can also be embedded in programmable photonic integrated circuits.



Biosketch: Ming C. Wu is Nortel Distinguished Professor of Electrical Engineering and Computer Sciences at the University of California, Berkeley. He is also Co-Director of Berkeley Sensor and Actuator Center (BSAC) and Faculty Director of UC Berkeley Marvell Nanolab. Dr. Wu received his M.S. and Ph.D. in Electrical Engineering and Computer Sciences from the University of California, Berkeley in 1988. He has been with AT&T Bell Laboratories, Murray Hill (1988-1992) and UCLA (1993 to 2004) before joining the faculty at Berkeley. His research interests include optoelectronics, nanophotonics, MEMS, and optofluidics. He has published 8 book chapters, over 500 papers in journals and conferences, and 25 issued U.S. patents.

Prof. Wu is an IEEE Fellow, and a Packard Foundation Fellow (1992 – 1997). He received the 2007 Paul F. Forman Engineering Excellence Award, the 2017 C.E.K. Mees Medal from Optical Society of America, and the 2016 William Streifer Award from IEEE Photonics Society.