

EE 298-12  
Solid State Technology and Devices Seminar

Friday, 24 January 2014  
1-2pm  
Hogan Room - 521 Cory Hall

**NanoLEDs and Phototransistors for Energy Efficient Optical Interconnect**

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Abstract

Optical antennas convert optical currents (or voltages) at nanoscale into propagating waves (in free space or waveguides) and vice versa. As a result, they can greatly enhance the light-matter interaction in nanoscale devices. In this talk, I will describe recent researches at Berkeley on optical antenna-coupled nanophotonic devices, including nano-LEDs, and nano-phototransistors. Using short-distance optical communications (such as on-chip optical interconnect) as an example, we will show that nanoscale devices are key to achieve energy efficient communications with minimum number of photons. In particular, we will discuss how spontaneous emission can be greatly enhanced by attaching optical antenna to nanoscale emitters. We will present circuit models that can be effectively used to design and tailor antenna properties to achieve optimum device performance.

Bio

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 B.S. degree in Electrical Engineering from National Taiwan University, Taipei, Taiwan, and M.S. and Ph.D. degrees in Electrical Engineering and Computer Sciences from the University of California, Berkeley in 1986 and 1988, respectively. From 1988 to 1992, he was a Member of Technical Staff at AT&T Bell Laboratories, Murray Hill, New Jersey. From 1992 to 2004, he was a professor in the Electrical Engineering department at the University of California, Los Angeles. He has been a faculty member at Berkeley since 2004. His research interests include semiconductor optoelectronics, silicon photonics, MEMS (micro-electro-mechanical systems), MOEMS, nanophotonics, and biophotonics. He has published

8 book chapters, over 200 journal and 300 conference papers. He is the holder of 22 U.S. patents.

Prof. Wu is a Fellow of IEEE. He was a Packard Foundation Fellow (1992 – 1997), and received the 2007 Paul F. Forman Engineering Excellence Award from Optical Society of America.