

**Title: Research in Millimeter Wave: From CMOS Imaging System to Multi-Gigabit Wireless Protocols**

**Speaker:**

Dr. Ada Poon  
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Department of Electrical Engineering  
Stanford University

**Date:** Tuesday, 6 July 2010

**Time:** 11:00 am

**Venue:** Room 603, Chow Yei Ching Building

**Abstract:**

My research focus spans from medical electronics for in vivo diagnostics to millimeter wave systems. As I had given an overview of the work in medical electronics last November, this time I will switch gear and talk about millimeter wave systems. I will first talk about our 60-GHz 3D active imaging system for concealed item detection. I will introduce the physical principle behind, algorithms, and our 65-nm CMOS test chip measurement results w/wo antennas. In the test chip, we utilize the mathematical idea of over-complete expansion and coarse quantization to implement an RF beamformer. The phase resolution of our test chip is almost an order of magnitude better than that of other designs with comparable noise figure, linearity, and power consumption. The increased phase resolution not only improves the resolution of the imaging system but also can be utilized to speed up the establishment of connections in a millimeter-wave network. To this end, I will talk about a fast beam training algorithm that utilizes coding to reduce the number of training packets from being polynomial with the number of antennas to a fixed constant of 2 to 4 training packets.

**Biography of the speaker:**

Ada received her B.Eng. degree from the University of Hong Kong and her Ph.D. degree from the University of California at Berkeley in 2004. Her dissertation was in the area of information theory. Upon graduation, she spent one year at Intel as a senior research scientist building digital chips. Afterwards, she joined her advisor's startup company, SiBeam Inc., architecting Gigabit wireless transceivers leveraging 60 GHz CMOS and MIMO antenna systems. After two years in industries, she returned to academic and joined the faculty of the ECE department at the University of Illinois, Urbana-Champaign. Since then, she has been interested in medical electronics. In particular, she is interested in applying electrical engineering to advance surgical instruments, and in vivo diagnostics and therapeutic treatments. In 2008, she moved back to California and joined the faculty of the Department of Electrical Engineering at Stanford University. She is a Terman Fellow at Stanford University.

**Organizer:** Dr. H.K.H. So