

## **Title: Materials, Methods, and Applications for Photonics Integration**

### **Speaker:**

Mr. Ta-Ming Shih  
Department of Electrical Engineering & Computer Science  
MIT

**Date:** Friday, 2 July 2010

**Time:** 4:00 pm

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

### **Abstract:**

The development of chip-scale photonic devices is a growing area of research. The aspiration is to construct optoelectronic systems that are monolithically integrated-reducing size, weight, power, and cost, while increasing performance. Materials engineering and fabrication techniques are key components to the successful integration of photonics. The "photonic integrated circuit" paradigm has experienced significant push from the telecommunications and IC industries, as well as national defense and space programs, with wavelengths usually in the near-infrared.

In this talk, current research topics in the area of photonics integration at the Massachusetts Institute of Technology (MIT) will be presented. Focus will be on silicon and III-V semiconductor materials, including quantum dots. Non-CMOS fabrication techniques such as interference lithography and inductively-coupled plasma reactive ion etching, as well as integrated couplers such as asymmetric twin waveguides, are crucial building blocks for photonics integration. The presentation will cover devices such as ridge lasers and amplifiers, modulators, all-optical logic gates, and photonic crystals. Finally, applications and materials for extending wavelengths into the mid-infrared will be touched upon in closing.

### **Biography of the speaker:**

Ta-Ming Shih is a Ph.D. candidate in the Electrical Engineering and Computer Science department at MIT. He received his M.S. from MIT in 2007, and his B.S. from the University of California, Berkeley, in 2006. He has done research at the Lawrence Livermore National Laboratory and the Palo Alto Research Center (PARC), and now works in close collaboration with Lincoln Laboratory. Ta-Ming was the recipient of the Intel PhD Fellowship in 2008, and is a member of Sigma Xi, Tau Beta Pi, and Eta Kappa Nu. He teaches a photonics short course at MIT, and leads a design team for the MIT Engineers without Borders.

**Organizer:** Dr. K.K.Y. Wong