

# Physics Colloquium

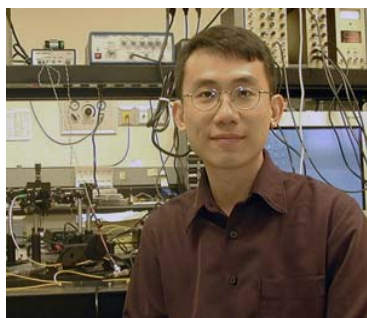
**Michigan Technological University**

Thursday, November 5, 2009

4:00 pm

Room 139 Fisher Hall

**Novel Optical Approaches for Biomedical Applications-  
From dime-size microscopes to time-  
reversal based suppression of tissue turbidity**



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**Abstract:** Biophotonics is a rapidly evolving research area aimed at providing new light-based imaging, diagnostic and therapeutic tools for biologists and clinicians. I will be talking about two areas of biophotonics research that are occurring in my lab: 1) The Optofluidic Microscope – This project fuses the advantages of optical and microfluidic technologies to create small and cheap microscope systems that do not contain any optical elements. The working principle is similar to the way we see floaters in our eyes. This new way of formulating microscopes also allows for remarkably simpler and easier phase and darkfield microscope designs. 2) Tissue Scattering Suppression by Time Reversal Optical Phase Conjugation – An approach for turning biological tissues transparent through the use of holography. Light scattering in tissues may look random but their trajectories are deterministic. As such, it is possible to create a situation where light scattered from a tissue will retrace their paths through the tissue. I will report on our recent findings and point out a few applications for this phenomenon.

**Biography:** Professor Yang graduated from MIT in 2002 and has steadily moved towards warmer climate thereafter. After short stints at ESPCI (Paris) and Duke University, he settled down in Caltech in Dec 2003. Professor Yang received the NSF CAREER award and the Coulter Foundation Early Career Phase I and II Awards. In 2008 he was named one of Discover Magazine's '20 Best Brains Under 40'.