The Institute of OPTICS

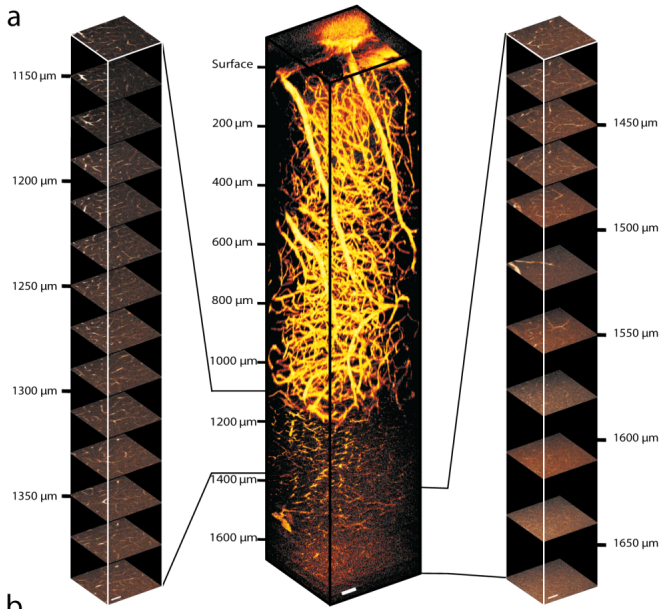
Colloquium

UNIVERSITY OF ROCHESTER

Pushing the Depth Limit of Multiphoton Microscopy

Chris Xu

Assoc Prof of Applied Physics
Cornell University, 2002 -
BS Fudan 1989, PhD Cornell 1997
Bell Labs, 1997-2002



In this talk, the fundamental challenges of deep tissue, high-resolution optical imaging are discussed. Our research in longer wavelength MPM for deep tissue imaging will be presented in detail.

3:00 pm Monday, Feb 27, 2012
Sloan Auditorium, Goergen 101
Refreshments served

HAJIM SCHOOL OF ENGINEERING & APPLIED SCIENCES

Pushing the Depth Limit of Multiphoton Microscopy

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ABSTRACT

Multiphoton microscopy (MPM) has been applied to imaging deep in scattering tissue because of its intrinsic 3D localized excitation. However, the imaging depth of conventional MPM is still limited to less than 1 mm. In this talk, the fundamental challenges of deep tissue, high-resolution optical imaging are discussed. Our research in longer wavelength MPM for deep tissue imaging will be presented in detail. A record 1.6-mm penetration depth is achieved in mouse cortex in vivo. I will show our current efforts in developing new femtosecond sources for MPM at the longer wavelength spectral windows. In particular, preliminary results and future directions enabled by a novel fiber-based femtosecond excitation source to further improve the depth limit will be presented.

BIOGRAPHY

Chris Xu received his B.S. in physics from Fudan University in 1989, and Ph.D. on multiphoton microscopy in Applied Physics, Cornell University in 1996. He joined Bell Laboratories (Murray Hill, NJ) in 1997 as a post-doc and then became a member of technical staff at Bell Labs (Holmdel, NJ) in 1999. His main research focus at Bell Labs was on fiber optics and optical communications, including broadband access and ultralong haul transmission. He returned to Cornell University in 2002, and became an Associate Professor and Director of Graduate Studies in Applied Physics in 2007. His current research areas are fiber optics and biomedical imaging, with major thrusts in multiphoton microscopy for deep tissue imaging and multiphoton microendoscopy for clinical applications.

Dr. Xu has served on a number of conference organization committees and NSF/NIH review panels. He has published more than 180 journal and conference papers, including 7 book chapters and 5 invited reviews, and has 27 patents granted or pending. He has won the NSF CAREER award, Bell Labs team research award, and the Tau Beta Pi and two other teaching awards from Cornell Engineering College. He is a fellow of the Optical Society of America.