



The Singapore Bioimaging Consortium (SBIC)
presents a seminar

on

**"Photoacoustic Tomography : Ultrasonically Beating Optical
Diffusion and Diffraction"**

Speaker: Prof Wang Lihong
Gene K. Beare Distinguished Professor
Department of Biomedical Engineering
Washington University
Date : Tuesday, 21 October 2014
Time : 4.00pm – 5.00pm
Venue : SBIC Seminar Room
11 Biopolis Way
Level 2, Helios Building, Singapore 138667
(Please use Level 1 entrance)

Abstract

Photoacoustic Tomography (PAT) provides *in vivo* multiscale non-ionizing functional and molecular imaging by combining optical and ultrasonic waves via the photoacoustic effect. High-resolution pure optical imaging (e.g., confocal microscopy, two-photon microscopy, and optical coherence tomography) offers rich tissue contrast but is limited to depths within the optical diffusion limit (~ 1 mm in the skin). In PAT, pulsed laser light penetrates the tissue and generates a small but rapid temperature rise, which induces emission of ultrasonic waves due to thermoelastic expansion. The ultrasonic waves, ~ 1000 times less scattering than optical waves in tissue, are then detected to form high-resolution images at depths up to 7 cm, breaking through the optical diffusion limit. Super-resolution beyond the optical diffraction limit has also been achieved. PAT is the only modality capable of imaging across the length scales of organelles, cells, tissues, and organs with consistent contrast. Such a technology has the potential to enable multiscale biology and accelerate translation from microscopic laboratory discoveries to macroscopic clinical practice. PAT may also hold the key to the earliest detection of cancer through *in vivo* label-free quantification of hypermetabolism, the quintessential hallmark of cancer. The technology has been commercialized by several companies. The annual conference on this topic has been doubling in size approximately every three years since 2003 and has become the largest in SPIE's Photonics West as of 2010.

About the Speaker

Prof Wang Lihong holds the Gene K. Beare Distinguished Professorship of Biomedical Engineering at Washington University in St. Louis. His book entitled "Biomedical Optics: Principles and Imaging," one of the first textbooks in the field, won the 2010

Joseph W. Goodman Book Writing Award. He also edited the first book on photoacoustic tomography. Professor Wang has published 415 peer-reviewed journal articles and delivered 400 keynote, plenary, or invited talks. His *Google Scholar h-index and citations* have reached 90 and over 32,000, respectively. He is the Editor-in-Chief of the *Journal of Biomedical Optics*. He chairs the annual conference on Photons plus Ultrasound, and chaired the 2010 Gordon Conference on Lasers in Medicine and Biology and the 2010 OSA Topical Meeting on Biomedical Optics. Wang serves as the founding chairs of the scientific advisory boards of two companies, which have commercialized photoacoustic tomography. He received NIH's FIRST, NSF's CAREER, *NIH Director's Transformative Research*, and *NIH Director's Pioneer awards*. He was awarded the *OSA C.E.K. Mees Medal*, *IEEE Technical Achievement Award*, and *IEEE Biomedical Engineering Award* for "seminal contributions to photoacoustic tomography and Monte Carlo modelling of photon transport in biological tissues and for leadership in the international Biophotonics Community

--- Admission is free and all are welcome ---