



High-resolution Biophotonics Imaging Technologies: Advances, Challenges, and Clinical Translation Potential

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Abstract: Non-invasive biophotonics imaging technologies, such as optical coherence tomography (OCT), two photon fluorescence (TPF) and second harmonic generation (SHG) imaging, are emerging as a new modality with a great translational potential for clinical applications, including detection of diseases at early stages, guidance of surgical interventions and monitoring of therapeutic effects without the need for tissue removal. The technologies are drawn upon fiber-optics, offering an extremely compact footprint and providing structural, functional, and potentially molecular or biochemical information of biological tissues at micron-scale resolution and in real time. In this seminar, some exemplary applications of biophotonics imaging technologies will be presented for (1) detection of diseases that are very challenging with current clinically available technologies, and (2) for assessing normal and stimulated wound healing/tissue regeneration processes. We will report on recent advances in ultrathin fiber-optic Endo-microscopy technologies, which are instrumental for translating OCT, TPF and SHG imaging technologies to clinical applications. Furthermore, the development of structured metallic and micellar nanoparticles that can be potentially used for molecular biophotonic imaging will also be discussed.

Biography: Xingde Li received his Ph.D. from the Department of Physics University of Pennsylvania in 1998. He joined the Ultrafast Optics Group at the Research Laboratory of Electronics of MIT as a Postdoctoral Research Associate, conducting research in the area of Biomedical Optics. He became an Assistant Professor at the Department of Bioengineering University of Washington in 2001, and is currently an Associate Professor and adjunct with Departments of EE, Physics, and Oral Biology. He has been serving as the chair of the Emerging Technologies Committee of the IEEE-Engineering in Medicine and Biology Society. He has also served on many conference organization committees (e.g. for Gordon Research Conference, OSA Topical Meetings, SPIE BIOS, CLEO, LEOS etc.) and grant review panels (e.g. for NIH, NSF, and DOD etc). Dr. Li received the Teacher/Mentor of the Year Award (UW Bioengineering) in 2002 and the NSF Career Award in 2004.