

# Winter 2007 SEMINAR SERIES

## F21C Bioprocessing & Biosensing Center

• DIVISION OF FOOD SYSTEMS & BIOENGINEERING •

**PRESENTER:**

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**TITLE:**

**Near-Infrared Optical Tomographic Imaging: the "Inside" Story**

**ABSTRACT:**

The unique characteristic information of biological tissues in near-infrared (NIR) window has prompted the use of optical imaging as a “surrogate biomarker”. Specifically, the hemoglobin has much stronger NIR attenuation relative to water in parenchymal tissue, and the spectra of hemoglobin between oxygenated and deoxygenated states are distinctly different. Optical technology thus renders non-invasive evaluation of vasculature or angiogenesis changes that are correlated to many physiological conditions.

Over the past two decades, near-infrared optical tomography has demonstrated the acquisition of unique tissue-specific contrast, and advanced steadily by finding key applications in characterization of breast cancer, assessment of brain functionality, and evaluation of extremity abnormality, etc. All these applications have focused on using external applicator arrays, yet it is feasible to extend this approach to endoscopy geometries for imaging internal organs such as prostate, color-rectum and cervix.

Recently we have introduced the concept, technique, and application of implementing NIR tomography in endoscopic mode to image “inside” the body, which has the potential of providing pathognomic contrast for imaging of internal organs. This talk will present the challenges in system development, issues related to image reconstruction, phantom experiments, and results of recent in vivo imaging. The potential impacts will be discussed, and an attempt of dual-modality imaging to further advance the application is highlighted.

**BIOGRAPHY:**

Dr. Piao received BS degree in 1990 from Tsinghua University in Beijing, and had been employed in biomedical industry for 9 years. He received MS degree in 2001 and PhD in 2003, both from University of Connecticut with the award of Best PhD Thesis of UCONN Engineering College. After 2 years of post-doctoral training in UCONN and Dartmouth College, Dr. Piao joined Oklahoma State University in 2005 as the first Bioengineering faculty member recruited by OSU College of Engineering, Architecture, and Technology (CEAT) under the college-wide multidisciplinary bioengineering initiative on its Stillwater and Tulsa campuses. Dr. Piao has been awarded a Pre-Doctoral Fellowship from DOD Breast Cancer Research Program, and is the recipient of a New Investigator Award from DOD Prostate Cancer Research Program. Dr. Piao currently holds 23 journal/magazine publications, and 1 US patent.

**DATE • TIME • LOCATION:**

**Tuesday, February 6, 4:00pm**  
**Ag Eng Bldg 105 • Refreshments**