AbstractID: 11984 Title: Multi-modality image-guided near infrared spectroscopy: Optimization and clinical applications

Image-guided near infrared spectroscopy (IG-NIRS) provides deep tissue functional characterization at high resolution. This approach combines conventional imaging techniques such as MRI and CT with optical near infrared technologies, giving information directly relating to the vascular and metabolic status of tissue in-vivo. The resultant estimates of total hemoglobin, oxygen saturation, water, lipids and scatter provide a window towards understanding the mechanisms of cancer in terms of angiogenesis, hypoxia, changes in the interstitium and cell organelle structural changes. This type of spectroscopy has been applied for breast cancer diagnosis and treatment monitoring, as well as image-guided fluorescence in small-animals.

Optimization of these systems is essential to provide quantitative and accurate spectroscopy. This optimization encompasses system design for simultaneous multi-modality image acquisition, methods for intelligently combining spatial anatomical structure from MRI/CT into optical recovery, image segmentation, visualization and interpretation of novel combined optical and MRI/CT parameters.

This talk will provide an over-view of these aspects of multi-modality imaging as well as results from in-vivo clinical applications.

Learning Objectives:
1. Understanding the rationale for multi-modality IG-NIRS systems
2. Understanding the type of information and contrast available through these systems
3. Understanding the challenges towards clinical use of these systems.