Spring 2009 SEMINAR SERIES

F21C Bioprocessing & Biosensing Center

• DIVISION OF FOOD SYSTEMS & BIOENGINEERING •

PRESENTER: **Dr. Walter J. Akers, Instructor of Radiology**
Optical Radiology Lab, Department of Radiology
Washington University School of Medicine, St. Louis, MO

TITLE: **Preclinical Optical Imaging with Near-infrared Fluorescent Molecular Probes and Fluorescence Lifetime Contrast**

ABSTRACT:
Biomedical optical imaging utilizes propagating light to activate chromophores in tissues, and a detector to capture the transmitted or reflected light. Biomedical optical methods provide distinctly new diagnostic capabilities while complementing conventional imaging modalities. Some advantages of optical methods include the use of non-ionizing radiation, detection of picomole quantities of light-absorbing materials in tissue models, capability of continuous data acquisition for real-time monitoring, and the potential availability of low cost, user friendly, and portable imaging apparatus. It also provides flexibility in the mode of chromophore excitation (broadband light source, modulated light, continuous wave or pulsed laser) and signal detection (trans-illumination or reflectance, and scattering, absorption or fluorescence modes), which can furnish valuable diagnostic information. Imaging living systems in the NIR region between 700 and 900 nm is attractive because low tissue absorption of light allows excitation photons to reach deep tissues, thereby extending the utility of optical imaging beyond superficial organs and tissues. Targeted near-infrared fluorescent probes have been developed to increase image contrast and functional information for imaging cancer and other diseases. Besides fluorescence intensity, fluorescence lifetime can also be utilized to probe tissue physiology. Fluorescence lifetime, the average time that a fluorophore remains in the excited state, is specific to the molecule and its environment, but not necessarily to its concentration. Therefore, fluorescence lifetime imaging can be used to probe microenvironments within tissues to differentiate, for example, cancer from surrounding tissue by physiological differences.

BIOGRAPHY:
Dr. Walter Akers is currently an Instructor of Radiology in the Mallinckrodt Institute of Radiology at Washington University School of Medicine. He obtained a DVM from University of Missouri College of Veterinary Medicine in 2001 and a PhD in Biological Engineering from the University of Missouri-Columbia in 2005. Dr. Akers currently heads preclinical imaging studies within the Optical Radiology Laboratory including selection of animal models, careful use of animal research subjects and practical application of both optical and nuclear imaging technologies.

DATE • TIME • LOCATION:

Tuesday, February 24, 2009, 4:00 pm • Ag Eng Bldg 105