



The Department of Physics at the University of Cyprus  
Is organizing a seminar on

**Wednesday, 6 April 2016, time 4:30p.m.**

Room B228, Building 13, New Campus

Speaker:

**Prof. Evan Morris**  
Yale University

### **“PET Studies of Medications for Addictions and Cancer”**

Positron Emission Tomography (PET) is a powerful functional medical imaging modality for studying *in vivo* biochemistry in humans and animals. The molecular specificity of PET is achieved through the use of targeted radiotracer molecules, typically labeled with Carbon-11 or Fluorine-18, and administered in microdoses. These tracers bind specifically to a receptor or transporter with high selectivity. There are three main modes of use of receptor-tracers for research. (1) Identify and quantify the distribution of the target receptor, (2) quantify changes in the endogenous ligand that binds to the targeted receptor, (3) quantify the occupancy of a targeted receptor by an exogenous drug. Complete quantification requires the acquisition of dynamic data and the application of kinetic models to describe the uptake and retention of the tracers over time.

This talk will present the basics of the common calculated endpoints in PET for research and the rationale for kinetic modeling. Examples of each of the three main research modes of PET will be demonstrated using examples related to targeted therapy for lung cancer, addiction to cigarettes and treatment for alcoholism. The study of cigarette smoking relies on the use of a novel mathematical model that produces dynamic images of dopamine changes in the brain during a stimulus. These images, “dopamine movies”, reveal differences in the responses of men and women to cigarettes and could be the basis for development of future, sex-specific, medications for addiction.

**Evan D. Morris** received SB degrees in Biology and Chemical Engineering from MIT. He earned the PhD in Biomedical Engineering from Case Western Reserve University in 1991 and trained in Radiological Sciences at Massachusetts General Hospital where he began to specialize in kinetic modeling and PET (Positron Emission Tomography). From 2001-2009, he was on the faculty at Indiana University and Purdue University, Indianapolis. He is now Associate Professor of Radiology and Biomedical Imaging, Biomedical Engineering, and Psychiatry at Yale University and Co-director for Imaging at the Yale PET Center. At Yale, Morris teaches a popular course for neuroscientists and biomedical engineers called, “Imaging Drugs in the Brain”. He is a 2015/16 Fulbright Scholar for Teaching and Research at Hadassah Hospital and Hebrew University Medical School in Jerusalem. His research interests include the development of kinetic models to aid in the understanding of dynamic PET data and their application to drug addiction and cancer. He uses PET to study the action of medications at molecular targets and relate drug binding to efficacy. His work is currently funded by grants from different Institutes of the US National Institutes of Health (NIH).

Dr. Morris is the primary inventor of ‘ntPET’, a mathematical technique for detecting short-lived fluctuations in the brain’s dopamine levels using PET. He and his colleagues at Yale have used ntPET to identify differences in the brains of male and female smokers while they are smoking (in the PET scanner). These findings could help to direct sex-specific medications for addiction.

For more information please contact: Department of Physics, telephone: 22892826