ELECTRICAL & COMPUTER ENGINEERING BIO-SEMINAR Spring 2017

When: **Friday 15:00 – 16:00**

Where: **ETB 1003**

Speaker: **Prof. Javier A. Jo**

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Department of Biomedical Engineering
Texas A&M University

Title: **Label-Free Fluorescence Lifetime Imaging Endoscopy For Early Detection Of Oral Cancer**

Date: **04-28-2017**

Abstract: Early detection of both new and recurrent oral cancer holds great promise for improving both the survival rate and the quality of live of these patients. Unfortunately, benign oral lesions are sometimes difficult to distinguish from dysplasia or early invasive cancer even for healthcare professionals. As a result, only 31% of patients are diagnosed at early stages despite the fact that the oral cavity is easily accessible for direct examination. Hence, there is a critical need for new clinical technologies for reliable early diagnosis of oral cancer and dysplasia.

Several diagnostic tools for oral cancer have been commercially available including exfoliative cytology, vital staining, salivary test, and optical imaging; however, none of them have been demonstrated to have sufficient sensitivity and specificity for early detection of oral cancer and dysplasia. We hypothesize that several biochemical and metabolic biomarkers for oral cancer and dysplasia can be accurately quantified using endogenous fluorescence lifetime imaging (FLIM) thus enabling levels of sensitivity and specificity adequate for early detection.

In this seminar, we will provide an overview of our current efforts to develop: 1) multispectral FLIM endoscopes for in vivo imaging of epithelial tissue in the oral cavity, and 2) algorithms for fast and automated FLIM based early detection of oral epithelial cancer and dysplasia. We will also report on our ongoing pilot clinical study, in which endogenous multispectral FLIM images have been acquired from clinically suspicious oral lesions of 52 patients undergoing tissue biopsy. Preliminary results from this study already indicate that early stage oral cancer and dysplasia can be detected using our FLIM endoscopes with high sensitivity (>80%) and specificity (~100%).

Biography: Dr. Javier A. Jo received the B.S. in electrical engineering from the Pontificia Universidad Católica del Peru in 1996. In 1998, he joined the University of Southern California, Los Angeles, obtaining the M.S. in electrical engineering (signal and image processing) and the Ph.D. in biomedical engineering (physiological modeling), in 2000 and 2002, respectively. During 2002-2005, he was a postdoctoral fellow in biophotonics within the Department of Surgery, at Cedars-Sinai Medical Center, Los Angeles. Prior to joining Texas A&M University, he spent a year as a project scientist in biomedical engineering at the University of California, Davis. Dr. Jo's primary teaching and research interests lie in the areas of systems analysis, signal and image processing, and biomedical instrumentation, with applications to biomedical optics. The Laboratory for Optical Diagnosis and Imaging (LODI) was established within the Department of Biomedical Engineering at Texas A&M University in 2007. The focus of the laboratory is to develop optical spectroscopy and imaging instrumentation and related signal and image processing tools for quantifying nondestructively the structure, molecular composition, and physiological state of biological tissues with both macroscopic and microscopic resolutions.