Department of Computer Science
University of Houston
DISTINGUISHED LECTURERS SEMINAR
Fall 2010

WHEN: **FRIDAY, JANUARY 21, 2011**
WHERE: PGH 232
TIME: 11:00 AM

SPEAKER: Dr. James S. Duncan, Yale University

Host: Dr. Ioannis Pavlidis

TITLE: Model-Based Strategies for Biomedical Image Analysis

Abstract: The development of methods to accurately and reproducibly recover useful quantitative information from medical images is often hampered by uncertainties in handling the data related to: image acquisition parameters, the variability of normal human anatomy and physiology, the presence of disease or other abnormal conditions, and a variety of other factors. This talk will review image analysis strategies that make use of models based on geometrical and physical/biomechanical information to help constrain the range of possible solutions in the presence of such uncertainty. The discussion will be focused by looking primarily at several problem areas in the realms of neuroanatomical structure analysis and cardiac function analysis, along with some work in cellular image analysis, with an emphasis on image segmentation and motion/deformation tracking. The presentation will include a description of the problem areas and visual examples of the image datasets being used, an overview of the mathematical techniques involved and a presentation of results obtained when analyzing actual patient image data using these methods. Emphasis will be placed on how image-derived information and appropriate modeling can be used together to address the image analysis and processing problems noted above.

Biography: James S. Duncan is the Ebenezer K. Hunt Professor of Biomedical Engineering, as well as a Professor of Diagnostic Radiology and Electrical Engineering at Yale University, New Haven, CT, USA. He trained in Electrical Engineering, receiving the Ph.D. from the University of Southern California, Los Angeles, in 1982. His research and teaching efforts have been in the areas of computer vision, image processing and medical imaging, with an emphasis in biomedical image analysis. Currently, he is the Director of Undergraduate Studies and the Associate Chair of Biomedical Engineering and the Vice-Chair for Bioimaging Sciences research in Diagnostic Radiology. His specific research interests include the segmentation of deformable structure from 3D image data, the tracking of non-rigid motion /deformation from spatiotemporal images and development of strategies for image-guided intervention/surgery. He has published over 180 peer-reviewed articles in these areas and has been the principal investigator on a number of peer-reviewed grants from both the National Institutes of Health and the National Science Foundation over the past 25 years. From 1973-1983, he was a member of the technical staff and Section Head at Hughes Aircraft Company, Electro- Optical and Data Systems Group, El Segundo, California, and joined the Yale faculty in 1983. Professor Duncan is a member of Eta Kappa Nu and Sigma Xi, is a Fellow of the *IEEE* and is a Fellow of the *American Institute for Medical and Biological Engineering* (AIMBE). He was awarded the "MICCAI 2008 Significant Researcher Award," given for his "pioneering research on Statistical and Deformable Model-Based Methods and their multi-organ-based applications." He is on the editorial board of the *Journal of Mathematical Imaging and Vision*, is an Associate Editor for the *IEEE Transactions on Medical Imaging* and is one of the founding co-Editors-in-Chief of the journal *Medical Image Analysis* (Elsevier). He was a Fulbright Research Scholar at the Universities of Amsterdam and Utrecht in the Netherlands during part of the 1993-94 academic year. In 1997, he chaired the 15th international meeting on *Information Processing in Medical Imaging* and was the general chair for the 2005 meeting on *Medical Image Computing and Computer-Assisted Intervention* (MICCAI). From 1999 to 2003, Dr. Duncan was a charter member of the National Institutes of Health (NIH) Diagnostic Imaging Study Section, serving as its Chair from 2001-2003.