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COLLEGE OF ENGINEERING
Department of Electrical Engineering

Department of Electrical Engineering Proudly Presents a Seminar on

Adaptive Sinusoidal Models for Voice Synthesis

By Dr. Mark J. T. Smith
Dean of the Purdue University Graduate School and Professor of Electrical and Computer Engineering

Time: 10:00 am **April 11, 2014** **Location: EENG B242**

Over the last few decades, many computer models have been developed for synthesizing the human voice. The typical goal of any voice synthesizer is to produce high quality, natural sounding speech using algorithms that are low complexity, have low storage requirements, and can be implemented in real time. Features that are often important are the ability to perform time-scale modification, pitch-scale modification, and vocal enhancements. Implementing these features with high quality over a wide range of speakers can be challenging when large modifications are performed.

The work discussed in this presentation is based on the Analysis-by-Synthesis sinusoidal model, where speech is represented by windowed segments composed of sums of sinusoids, each with a prescribed amplitude, frequency, and phase. The talk will include an overview of the model, application of the model to time-scale and pitch-scale speech modification, and application to singing voice enhancement. The incorporation of a new adaptive analysis windowing method will be presented and the benefits of that model will be illustrated through several audio examples.

Dr. Mark J. T. Smith received his B.S. degree from the Massachusetts Institute of Technology and his M.S. and Ph.D. degrees from the Georgia Institute of Technology, all in electrical engineering. He joined the electrical engineering faculty at Georgia Tech in 1984 and later served as the executive assistant to the president of the institute from 1997-2001. In January 2003, he joined the faculty at Purdue University as head of the School of Electrical and Computer Engineering. Presently, he serves as Dean of the Graduate School and holds the Michael & Katherine Birck endowed professorship. Dr. Smith is a fellow of the IEEE and a former IEEE Distinguished Lecturer in Signal Processing. He has authored many papers in the areas of speech and image processing, filter banks, and wavelets and is the co-author of two introductory books titled, Introduction to *Digital Signal Processing* and *Digital Filtering*. He is also co-editor of the book, *Wavelets and Subband Transforms: Design and Applications*, and the co-author of the textbook, *A Study Guide for Digital Image Processing*. In addition to professional service, teaching, and research, Dr. Smith's past includes athletic training and competition in the sport of fencing. He was National Champion of the United States in 1981 and 1983 and a two-time member of the U.S. Olympic Team in 1980 and 1984.