

# SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

## A Study of Sampling Strategies for Helical CT

MS Dissertation Defense

By

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**Abstract:** Two classes of sub-sampling strategies, partially inspired by the ideas from compressed sensing (CS), are developed and tested using real medical x-ray CT data with a helical geometry. A version of the Feldkamp algorithm for helical x-ray CT is described. An alternating minimization (AM) algorithm for finding the maximum-likelihood estimates of attenuation functions in transmission X-ray tomography, developed by O'Sullivan and Benac is then introduced. The derivation of this AM algorithm is extended to include an optional regularization term, which makes it a MAP estimate. A Newton's method with trust region modification is implemented for the regularization. In addition, the alternating minimization (AM) algorithm when using data from a subset of detectors developed by Snyder is illustrated. Ordered subsets techniques are used to increase the convergent rate. Results of sub-sampling strategies are demonstrated on the real data by subsampling the actual measurements.

DATE: Wednesday, December 11, 2013  
TIME: 1:00 p.m.  
PLACE: Green Hall. Room 0120

**Research Advisor:**

Dr. Joseph O'Sullivan

This seminar is in partial fulfillment  
of the Masters Degree