SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

FREQUENCY-HOPPING CODE DESIGN FOR MIMO RADAR ESTIMATION

DISSERTATION DEFENSE
by

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Abstract: We solve the problem of multiple-target estimation using a colocated multiple-input multiple-output (MIMO) radar system transmitting frequency-hopping waveforms. We employ block-sparse modeling to estimate the unknown target parameters (delays, Dopplers). Additionally, we adaptively design the transmit waveform parameters (frequencies, amplitudes) to improve the estimation performance. First, we derive analytical expressions for the correlations between the different blocks of columns of the dictionary matrix. Using these expressions, we compute the block coherence measure of the dictionary and optimally design the sensing matrix by selecting the hopping frequencies for all the transmitters. Second, we adaptively design the amplitudes of the transmitted waveforms during each hopping interval to improve the estimation performance. We initialize by transmitting constant-modulus waveforms of the selected frequencies to estimate the radar cross section (RCS) values of all the targets. Then, we use these RCS estimates to optimally select the waveform amplitudes. Using numerical simulations, we demonstrate the performance improvement due to the optimal design of waveform parameters. Further, we employ compressive sensing to perform accurate estimation from far fewer samples than the Nyquist rate.

DATE:	Friday, March 23, 2012
TIME:	3:10 p.m.
PLACE:	Green Hall, Room 0120

Dissertation advisor:
Dr. Arye Nehorai

This seminar is in partial fulfillment
of the Doctor of Philosophy degree

Washington University in St. Louis
SCHOOL OF ENGINEERING & APPLIED SCIENCE