SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

STATISTICAL NESTED SENSOR ARRAY SIGNAL PROCESSING

DISSERTATION DEFENSE

By

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Abstract: Nested sensor arrays employ nonuniform geometric structures to greatly increase their degrees of freedom (DOFs) for direction of arrivals (DOAs) estimation. The higher DOFs make it possible to detect more sources using a smaller number of sensors than in conventional uniform linear arrays. In this talk, we focus on four topics, extending the existing strategies of nested arrays to more practical scenarios.

First, we investigate the self-calibration problem for perturbed nested arrays. Current work on nested arrays requires certain modeling assumptions, for example, an exactly known array geometry, including sensor gains and phases. In practice, however, the actual sensor gains and phases are often perturbed from their nominal values, which adversely affects the performance. We propose robust algorithms to improve the DOA estimation performance. The partial Toeplitz structure of the covariance matrix is employed to estimate the gain errors, and the sparse total least squares is used to tackle the phase errors. Next, we extend the conventional nested-array strategies from narrowband sources, point sources, and scalar sensors to wideband sources, distributed sources, and vector sensors. Novel signal models and corresponding algorithms are proposed to achieve improved estimation performance. Numerical examples are provided to demonstrate the effectiveness of the proposed strategies.

DATE: **Thursday April 16, 2015**
TIME: **10:10 am**
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