Numerical Analysis and Scientific Computing Seminar

D-optimal Experimental Design for Bayesian Inverse Problems

Dr. Arvind Krishna Saibaba
NC State University

Abstract: Optimal Experimental Design seeks to control experimental conditions in order to maximize the amount of information gained about parameters of interest, subject to physical or budgetary constraints. The parameters we wish to infer are represented on fine-scale grids; consequently, the experimental design problem is extremely computationally challenging and efficient algorithms are needed. We develop a computational framework for the D-optimality criterion in PDE based inverse problems. Our approach exploits a certain low-rank structure in the covariance matrices using novel randomized estimators. This approach allows us to reduce the computational costs by several orders of magnitude compared to naive approaches. We demonstrate our algorithms on an optimal sensor placement problem from contaminant source identification.

Joint work with Alen Alexanderian, Ilse CF Ipsen (both at Department of Mathematics, NCSU)

Friday, October 6, 2017, 2:00 pm
Mathematics and Science Center: W301

Mathematics and Computer Science
Emory University