## Analysis and Applied Mathematics Seminar

*Inverse Random Source Scattering Problems*

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**Abstract:** This talk concerns the source scattering problems for acoustic wave propagation, which is governed by the two- or three-dimensional stochastic Helmholtz equation. As a source, the electric current density is assumed to be a random function driven by an additive colored noise. Given the random source, the direct problem is to determine the radiated random wave field. The inverse problem is to reconstruct statistical properties of the source from the boundary measurement of the radiated random wave field. In this work, we consider both the direct and inverse problems. We show that the direct problem has a unique mild solution via a constructive proof. Using the mild solution, we derive effective Fredholm integral equations for the inverse problem. A regularized Kaczmarz method is developed by adopting multi-frequency scattering data to overcome the challenges of solving the ill-posed and large scale integral equations. Numerical experiments will be shown to demonstrate the efficiency of the proposed method. The framework and methodology developed here are expected to be applicable to a wide range of stochastic inverse source problems.

Monday, September 12 at 4:00 PM in SEO 636