



THE UNIVERSITY OF  
CHICAGO

Computational and Applied Mathematics  
&  
Statistics Student Seminar

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Analysis of a Computational Framework for Bayesian Inverse Problems

Monday, April 17, 2023

12:30 PM

Jones Laboratory,  
Room 226

ABSTRACT

We analyze a popular computational framework to solve infinite dimensional Bayesian inverse problems, discretizing the prior and the forward model in a finite dimensional weighted inner product space. We demonstrate the benefit of working on a weighted space by establishing operator norm bounds for finite element and graph-based discretizations of Matern-type priors and deconvolution forward models. For linear-Gaussian inverse problems, we develop a general theory to characterize the error in the approximation to the posterior. More broadly, we embed the computational framework into ensemble Kalman methods and MAP estimators, and show how our operator norm bounds guarantee the scalability and accuracy of these algorithms under mesh refinement.