

# Advances in Computational and Statistical Inverse Problems

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*Abstract*

Image reconstruction using indirect data is a common problem in many fields, including remote sensing and medical imaging. Oftentimes, it is desirable for the reconstructed image to have certain characteristics, such as sparsity in some transform domain. Many methods have been developed to solve these kinds of problems by incorporating this a priori knowledge, but most focus on finding point estimates of the solution and do not provide uncertainty information regarding it. Bayesian techniques offer powerful tools that allow practitioners to not only recover an unknown of interest from observed indirect data, but also to enforce prior beliefs and learn uncertainty information as well. In this talk, we explore two novel statistical inversion methods, one of which is applied to remote sensing, and the other which seeks to learn a complex-valued variable of interest from different forms of indirect data. We will discuss numerical results for both of these methods as well as next steps for improving the techniques.