



THE UNIVERSITY OF
CHICAGO

COMPUTATIONAL AND APPLIED MATHEMATICS
Inverse Problems & Imaging Seminar

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Structured Prediction for Molecular Inverse Problems

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Jones 226, 5747 South Ellis Avenue

ABSTRACT

Inverse problems are a well-studied branch of applied mathematics where we attempt to invert a well-understood forward model in an attempt to learn the properties of some hidden source. Classical examples include seismography in geoscience and tomography in medical imaging, where boundary-value measurements are used to infer properties of the interior. Many scientific problems can be cast as inverse problems with structured outputs — graphs, discrete point sources, and more. I will present some of our recent work developing machine learning techniques for structured prediction to inverse problems in neuroscience, computational microscopy, and nuclear spectroscopy. By leveraging advances in scalable compute, deep models, and function approximation, we can solve these problems faster, more accurately, and even compensate for more complicated physical generative processes.