



THE UNIVERSITY OF  
CHICAGO

DEPARTMENT OF STATISTICS

## Statistics Colloquium

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Data Science Institute/Computer Science/Statistics Joint Seminar

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Low Rank Approximation for Faster Convex Optimization

THURSDAY, February 24, 2022, at 4:30 PM

**Remote Only:** Watch via [Live Stream](#) or Zoom  
(details sent via email announcement)

Host: Rebecca Willett

### ABSTRACT

Low rank structure is pervasive in real-world datasets. This talk shows how to accelerate the solution of fundamental computational problems, including eigenvalue decomposition, linear system solves, and composite convex optimization, by exploiting this low rank structure. We present a simple and efficient method for approximate top eigendecomposition based on randomized numerical linear algebra. Armed with this primitive, we design a new randomized preconditioner for the conjugate gradient method, and a method called NysADMM, based on the inexact alternating directions method of multipliers, for composite convex optimization. These methods come with strong theoretical and numerical support. Indeed, a simple implementation of NysADMM solves important large-scale statistical problems like lasso, logistic regression, and support vector machines 2--58x faster than standard solvers.