



THE UNIVERSITY OF  
**CHICAGO**

Department of Statistics

STATISTICS COLLOQUIUM

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Optimization with Nonconvex Functions and Nonconvex  
Constraints

MONDAY, March 27, 2017, at 4:00 PM  
Eckhart 133, 5734 S. University Avenue  
*Refreshments before the seminar at 3:30PM in Jones 111*

ABSTRACT

Nonconvex optimization arises in many applications of high-dimensional statistics and data analysis, including medical imaging via computed tomography (CT) scans where the physical model for data acquisition is inherently nonconvex. While convex programs for structured signal recovery have been widely studied, comparatively little is known about the theoretical properties of nonconvex optimization methods. In this talk I will discuss two types of optimization problems where nonconvexity plays a key role: first, projected gradient descent over nonconvex constraints, where the local geometry of the constraint set is closely tied to its convergence behavior, and second, composite optimization problems, where we must simultaneously minimize multiple terms that may all be nonconvex and nondifferentiable. Image reconstruction results on real data from spectral CT scans, where undersampling poses a substantial challenge, demonstrate the benefit of working with nonconvex models.