Title: Near-Linear Lower Bound for Dimension Reduction in L1
Speaker: Alexandr Andoni

Abstract: Given a set of n points in ℓ_1, how many dimensions are needed to represent all pairwise distances within a specific distortion ?

This dimension-distortion tradeoff question is well understood for the ℓ_2 norm, where $O((\log n)/\epsilon^{2})$ dimensions suffice to achieve $1+\epsilon$ distortion. In sharp contrast, there is a significant gap between upper and lower bounds for dimension reduction in ℓ_1. A recent result shows that distortion $1+\epsilon$ can be achieved with n/ϵ^{2} dimensions.

On the other hand, the only lower bounds known are that distortion δ requires $n^{\Omega(1/\delta^2)}$ dimensions and that distortion $1+\epsilon$ requires $n^{1/2-O(\epsilon \log(1/\epsilon))}$ dimensions. In this work, we show the first near linear lower bounds for dimension reduction in ℓ_1. In particular, we show that $1+\epsilon$ distortion requires at least $n^{1-O(1/\log(1/\epsilon))}$ dimensions.

Joint work with Moses Charikar, Ofer Neiman, and Huy L. Nguyen.