

1056-90-1503

Emmanuel Candes* (candes@stanford.edu), Department of Mathematics, Stanford University, Stanford, CA 94305, and **Terence Tao** (tao@math.ucla.edu), Department of Mathematics, University of California, Los Angeles, Los Angeles, CA 90095-1555. *The Power of Convex Relaxation: Near-optimal Matrix Completion.*

This talk considers the problem of recovering a data matrix from a sampling of its entries (this is an instance of the famous Netflix problem). Suppose we observe a few matrix entries selected uniformly at random. Can we complete the matrix and recover the entries we have not seen? Surprisingly, we show that we can recover low-rank matrices exactly from very few sampled entries; that is, from a minimally sampled set of entries. Further, perfect recovery is possible by solving a convex optimization program—a convenient SDP. Our methods are optimal and succeed as soon as recovery is possible by any method whatsoever, no matter how intractable; this result hinges on powerful techniques in probability theory, and is robust vis a vis noise. (Received September 22, 2009)