

Matrix Computations & Scientific Computing Seminar

Organizer(s): James Demmel & Ming Gu

Wednesday, 4:00PM–5:00pm, 306 Soda

March 3 **Prof. Emmanuel Candes**, Stanford University
Robust Principal Component Analysis?

This talk is about a curious phenomenon. Suppose we have a data matrix, which is the superposition of a low-rank component and a sparse component. Can we recover each component individually? We prove that under some suitable assumptions, it is possible to recover both the low-rank and the sparse components exactly by solving a very convenient convex program called Principal Component Pursuit; among all feasible decompositions, simply minimize a weighted combination of the nuclear norm and of the L1 norm. This suggests the possibility of a principled approach to robust principal component analysis since our methodology and results assert that one can recover the principal components of a data matrix even though a positive fraction of its entries are arbitrarily corrupted. This extends to the situation where a fraction of the entries are missing as well. We discuss an algorithm for solving this optimization problem emphasizing the suitability of this approach for large scale problems, and present applications in the area of video surveillance, where our methodology allows for the detection of objects in a cluttered background, and in the area of face recognition, where it offers a principled way of removing shadows and specularities in images of faces.

Joint work with X. Li, Y. Ma and J. Wright.

This is a joint EECS Colloquium with refreshments 3:30-4:00PM in Wozniak Lounge.