COLUMBIA | ENGINEERING
The Fu Foundation School of
Engineering and Applied Science

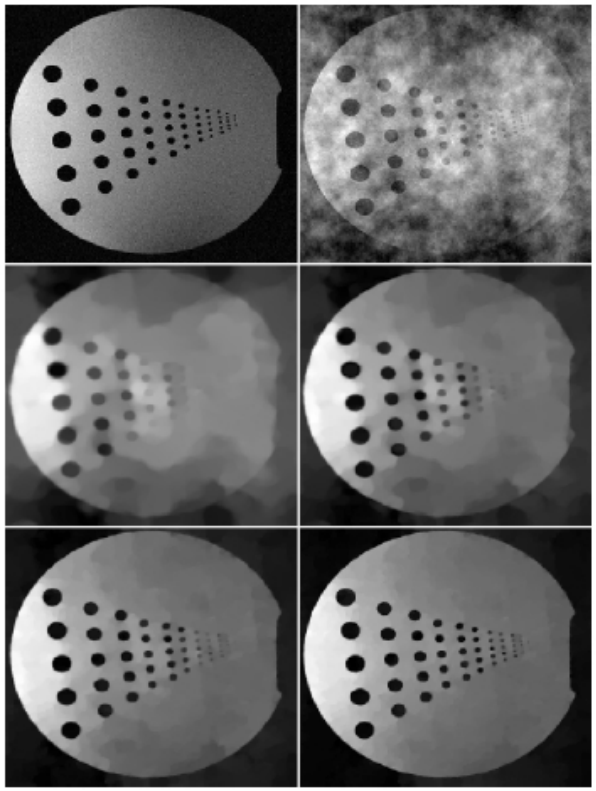
Distinguished Colloquium Series in Interdisciplinary & Applied Mathematics

Tuesday, March 25, 2014

4:30-5:30 p.m., Davis Auditorium, CEPSR (Shapiro Center)
Refreshments served at 4:00 p.m. in 200 SW Mudd

Stanley Osher

Professor of Mathematics & Director of Applied Mathematics, University of California, Los Angeles



"What Sparsity and L^1 Optimization Can Do for YOU"

Sparsity and compressive sensing have had a tremendous impact in science, technology, medicine, imaging, machine learning and now, in solving multiscale problems in applied partial differential equations, developing sparse bases for Elliptic eigenspaces and connections with viscosity solutions to Hamilton-Jacobi equations. L^1 and related optimization solvers are a key tool in this area. The special nature of this functional allows for very fast solvers: L^1 actually forgives and forgets errors in Bregman iterative methods. I will describe simple, fast algorithms and new applications ranging from sparse dynamics for PDE, new regularization paths for logistic regression and support vector machine to optimal data collection and hyperspectral image processing.

Image: Split Bregman compressed sensing reconstruction of an MR image using 30% of the k-space data. (top left) Original image reconstructed using the full k-space. (top right) Image reconstructed using 30% of k-space data. Reconstruction was done using the conventional method, which lls in missing samples with zeros. (middle left) Results of Split Bregman algorithm after 10 inner iterations (2 outer iterations). (middle right) Results of Split Bregman algorithm after 20 inner iterations (4 outer iterations). (bottom left) Results after 30 inner iterations. (bottom left) Optimal results obtained after 40 inner iterations.

For information, please contact Professor M.I. Weinstein, miw2103@columbia.edu
Organizing Committee: D. Goldfarb (IEOR), E. Grinspun (Computer Science & APAM),
I. Karatzas (Mathematics), M.I. Weinstein (APAM & Mathematics) F