Matrix Computations & Scientific Computing Seminar

Organizer(s): James Demmel & Ming Gu

Wednesday, 12:00–1:00pm, 380 Soda

Sept. 9 **Prof. Eric Darve**, Stanford University

Hierarchical Matrix Structure for Fast Linear Algebra

Hierarchical matrices are a broad class of matrices that enable fast $O(N)$ linear algebra. Examples include the fast multipole method and hierarchically semi-separable matrices. We will present applications of this format to fast matrix vector products with application to machine learning, and fast linear solvers (direct and iterative) with $O(N)$ complexity. Some of these algorithms will show that the usual distinction between dense and sparse algebra is less significant than one would expect. We will make connections between these algorithms and algebraic multigrid and incomplete LU/Cholesky factorizations.