

Matrix Computations and Scientific Computing Seminar

Organizer: Jim Demmel and Ming Gu

Wednesday, 12:10–1:00 pm, 380 Soda Hall

Oct 29 **Dave Anderson**, UC Berkeley

An Efficient Algorithm for Spectral Graph Sparsification

Spectral graph sparsification has emerged as a useful tool in the analysis of large-scale networks by reducing the overall number of edges, while maintaining a comparable graph Laplacian matrix. This talk will provide a brief introduction to graph sparsification and its applications. Then a novel graph sparsification algorithm will be presented for the construction of a new type of spectral sparsifier, the unweighted spectral sparsifier.

The graph sparsification algorithm will be derived using a purely linear algebra result: a deterministic algorithm for finding a well-conditioned submatrix by selecting columns from a row orthonormal matrix. For any graph, this algorithm will find a subgraph with a comparable Laplacian. While current methods accomplish this by reassigning edge weights, this algorithm will find a sparsifier and will leave edge weights intact.