

Matrix Computations & Scientific Computing Seminar

Organizer: James Demmel & Ming Gu

Wednesday, 12:10–1:00pm, 380 Soda

Feb. 8 **Aydın Buluç**, LBNL

Parallel algorithms for sparse matrix product, indexing, and assignment

Generalized sparse matrix-matrix multiplication (or SpGEMM) is a key primitive for many high performance graph algorithms as well as some linear solvers, such as algebraic multigrid. SpGEMM also yields elegant parallel algorithms for commonly used sparse matrix primitives, such as sparse matrix indexing ($B=A(v,w)$) and sparse matrix assignment ($A(v,w) = B$) for v,w being arbitrary distributed vectors of indices, provided that the underlying SpGEMM implementation is sufficiently flexible and scalable. We demonstrate that our 2D SpGEMM algorithm, together with our serial hypersparse kernels, are indeed highly flexible, scalable, and memory efficient in the general case. This algorithm is the first to yield increasing speedups for an unbounded number of processors, and our experiments show scaling up to thousands of processors in a variety of test scenarios.

Based on joint work with John R. Gilbert.