Matrix Computations & Scientific Computing Seminar

Organizer: James Demmel & Ming Gu

Wednesday, 12:10–1:00pm, 380 Soda

Sept. 28 **Ming Gu**, UCB

Low-Rank Matrix Approximations and Randomized Sampling

A classical problem in matrix computations is the efficient and reliable approximation of a given matrix by a lower ranked one, with applications throughout wide areas of computational sciences and engineering. The truncated singular value decomposition (SVD) is known to provide the best such approximation for any given fixed rank. However, the SVD is also known to be very costly to compute. Recently, a number of randomized algorithms for low-rank matrix approximations have attracted researchers' attention due to their surprising reliability and computational efficiency in different application areas.

In this talk, we present a novel analysis based on a connection between randomized algorithms and the traditional subspace iteration methods, allowing us to estabilish new and better error bounds for both. We present various numerical experimental results that are in support of our analysis and show that different domain applications lead to different accuracy requirements, and therefore different oversampling sizes.