A Scalable Parallel Sparse Linear System Solver

Numerous computational science and engineering applications give rise to large sparse linear systems for which one needs approximate solutions that yield only modest relative residuals. Further, obtaining approximate solutions for these linear systems often consumes a significant percentage of the total time required by a given simulation. This situation is further aggravated on parallel computing platforms. In this presentation, we describe a robust parallel algorithm for solving banded linear systems (SPIKE) that achieves significant speed improvement over the classical LU-factorization schemes used in ScaLapack. This banded solver is then generalized to handle general sparse linear systems via the use of sparse matrix reordering schemes. The parallel scalability of our sparse linear system solver (PSPIKE) is compared with ILU- and AMG-preconditioned Krylov subspace methods.

Light Refreshments will be served
@ 1:30pm is E424A