PETSc: High-Performance Software for Engineering and Science

Portable, Extensible Toolkit for Scientific Computation (PETSc) is a suite of data structures and routines for the scalable (parallel) solution of scientific applications. Due to its solid mathematical grounding, careful software design, and most importantly, evolution resulting from the usage of many users on various application areas, PETSc is enabling engineers and scientists to solve large scale problems, with previously unreachable resolution, in areas as diverse as groundwater contamination, cardiology, fusion, nuclear energy, astro-physics, and climate change.

As a PETSc developer, I will give an overview of the PETSc, and introduce its basic use in algorithmic research, numerical production simulation and parallel performance evaluation. I will also present our recent research development on extreme-scale computers using million processor cores.