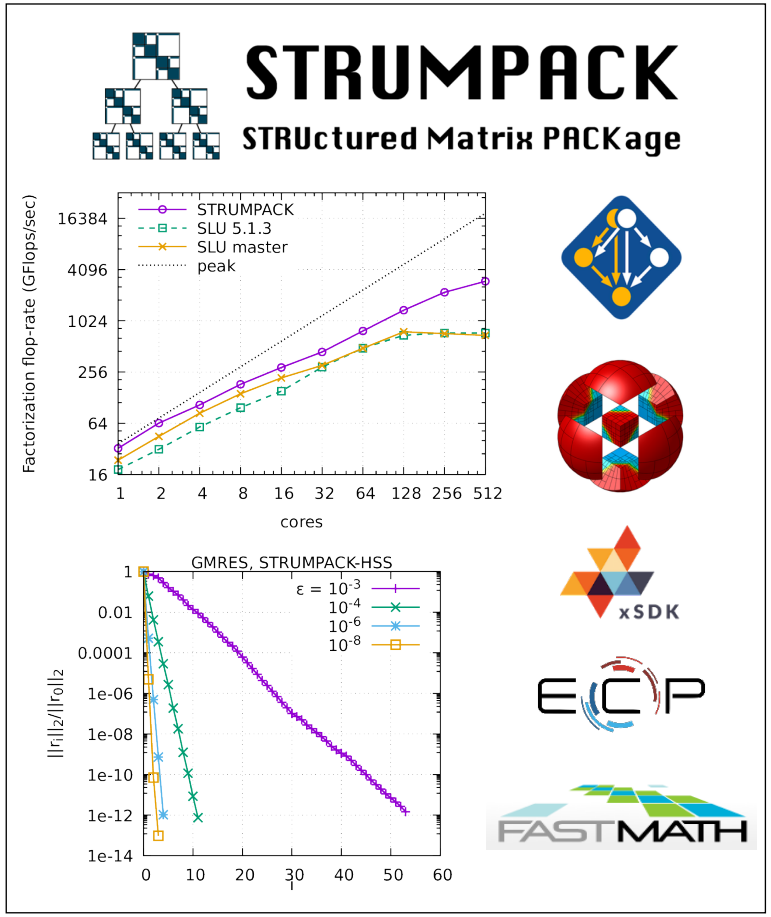
STRUMPACK

STRUctured Matrix PACKage. Hierarchical solvers for dense rank-structured matrices; fast sparse solver and robust and scalable preconditioners.

- **Dense Matrix Solvers, Hierarchical Approximations**
  - Hierarchical partitioning, low-rank approximations
  - Formats: Hierarchically Semi-Separable (HSS), Hierarchically Off-Diagonal Block Low-Rank (HODLR), Block Low-Rank (BLR)
  - Applicable to integral equations discretized with boundary element methods, structured matrices such as Cauchy or Toeplitz, kernel matrices, covariance matrices, …
  - Algorithms with much lower asymptotic complexity than corresponding ScaLAPACK routines
- **Sparse Direct Solver**
  - Multifrontal algorithm, Fill-reducing orderings: Par-METIS, PT-Scotch, RCM, spectral
  - Good scalability, fully distributed, parallel symbolic phase
- **Sparse Preconditioners**
  - Sparse direct solver with dense hierarchical (low-rank) approximations
  - Scalable and robust, aimed at PDE discretizations, indefinite systems, …
  - Iterative solvers: GMRES, BiCGStab, iterative refinement
- **Software**
  - BSD License, MPI+OpenMP, scalable to 10K+ cores
  - Interfaces from PETSc, MFEM (Trilinos coming), available in Spack
  - Under very active development



github.com/pghysels/STRUMPACK