LLNL-PRES-501654

Numerical Algorithms and FASTMath

Numerical Algorithms and FASTMath Tutorial Goals

- Provide a basic understanding of a variety of applied mathematics algorithms for scalable linear, nonlinear, and ODE solvers as well as discretization technologies (e.g., adaptive mesh refinement for structured and unstructured grids)
- Provide an overview of FASTMath software tools available to perform these tasks on HPC architectures
- Practice using one or more of these software tools on basic demonstration problems

Numerical Algorithms and FASTMath – Track 3

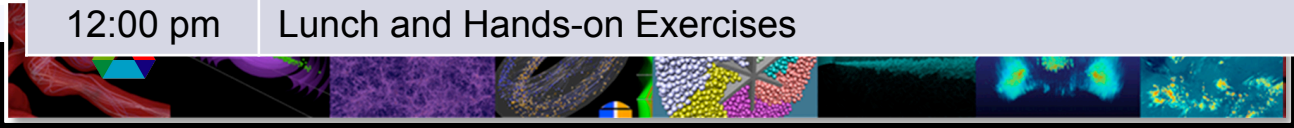
MONDAY, August 1

Time	Title of presentation	Lecturer
4:00 pm	Algorithmic Adaptations to Extreme Scale	David Keyes, KAUST

FRIDAY, August 5

Time	Title of presentation	Lecturer
8:30 am	Introduction to the Session	Lori Diachin, LLNL
8:35 am	FASTMath: An Overview of Numerical Algorithms and Software	Lori Diachin, LLNL
9:15 am	Communication-Avoiding Algorithms for Liner Algebra and Beyond	Jim Demmel, UC Berkeley
10:15 am	Break	
10:45 am	Algebraic Solvers in FASTMath	Lois Curfman McInnes, ANL
11:00 am	PETSc Tutorial	Lois Curfman McInnes, ANL
12:00 pm	Lunch and Hands-on Exercises	

continue

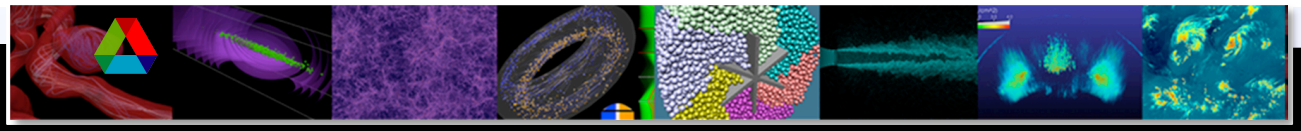


Numerical Algorithms and FASTMath – Track 3

FRIDAY, August 5

Time	Title of presentation	Lecturer
1:00 pm	HYPRE: High Performance Preconditioners	Robert Falgout, LLNL
1:30 pm	SuperLU and STRUMPACK Sparse Direct Solver and Preconditioner	X. Sherry Li, LBNL
2:15 pm	SUNDIALS: Suite of Nonlinear and Differential/Algebraic Equation Solvers	Carol Woodward, LLNL
2:45 pm	Break	
3:15 pm	FASTMath Unstructured Mesh Technologies	Vijay Mahadevan, Mark Shephard and Cameron Smith, RPI, and Glen Hansen, SNL
4:45 pm	Intro to Panel: Challenges in Extreme-Scale Numerical Algorithms and Software	FASTMath Team
5:00 pm	Dinner	
5:40 pm	Dinner Panel: Challenges in Extreme-Scale Numerical Algorithms and Software	FASTMath Team

+ Hands-on



Numerical Algorithms and FASTMath – Track 3

SATURDAY, August 6

Time	Title of presentation	Lecturer
8:30 am	Block Structured AMR Libraries	Brian Van Straalen, LBNL
9:30 am	Panel: Portable Performance for Extreme-Scale Computing	FASTMath Team
10:30 am	Break	

+ Hands-on

MONDAY, August 8

Time	Title of presentation	Lecturer
8:30 am	Adaptive Linear Solvers and Eigensolvers	Jack Dongarra, Univ. of Tennessee