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HIGH-PERFORMANCE COMPUTING IN COMPUTATIONAL MECHANICS

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ABSTRACT

Computational simulations of multi-scale and coupled problems must use the most powerful hardware systems available to meet ever-increasing demands for solution fidelity. Emerging petascale computing systems confront the computational scientist with unprecedented system complexity as the computing environment spans from grid computing at the intercontinental scale to multi-core processors on individual chips. Successful petascale applications will have to make efficient use of heterogeneous and deeply hierarchical memory, processor and storage architectures. While building on existing parallel computing technology, the next generation of applications will require new computing models, algorithms and numerical methods to meet this challenge.

This minisymposium welcomes presentations on all aspects of high-performance computing, especially those that address some aspect of petascale applications. Topics of interest include, but are not limited to: methods designed to exploit heterogeneous and hierarchical distributed computing architectures; domain decomposition equation solvers and mesh partitioning for problem decomposition; efficient cache management; programming techniques for multi-core processors; management, post-processing and visualization of large-scale distributed data sets; novel numerical methods with scalable structures; scalable algorithms for mesh generation and adaptive analysis of transient problems; and parallel programming languages and development environments.

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