

SCALABLE SOLUTION METHODS AND ENABLING SOFTWARE TECHNOLOGIES FOR LARGE-SCALE AND ADVANCED FLUID FLOW SIMULATIONS

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Key words: Scalable Methods, Large-Scale Problems, Fluid Dynamics, Multi-physics, High-Performance Computing.

ABSTRACT

Efficient high-fidelity simulations of fluid flow phenomena are still a major challenge. Complexities arise from discretization and solution methods for fluid flows with strongly coupled multiphysics, transient problems with widely varying time and spatial scales, nonlinearities, etc. Additional challenges arise due to the difficulties in exploiting next generation computer architectures including many-core processors and accelerators.

The goal of this minisymposium will explore these issues for fluid flow simulations, including fluid flow with additional physics, for example magnetohydrodynamics, fluid structure interaction, etc. Topics include but are not limited to: highly scalable preconditioners, multiphysics solvers, nonlinear preconditioning, multiscale solvers, space-time solvers, large-scale parallel computing techniques, scalable matrix assembly techniques on many core processors and accelerators, high-performance computing towards extreme-scale, etc.