Track 2: CFD Methods

Sponsors: Fluids Engineering Division

Topic 2-1: Recent development in CFD methods and Verification and Validation (CFDTC)

Organizers:

Zhongquan (Charlie) Zheng: zzheng@usu.edu
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Kevin Dowding: kjdowdi@sandia.gov

Descriptions:

Papers and presentations are solicited in CFD tool development, including, but not limited to, new development of Verification and Validation methods in CFD, covering theory and algorithms. Of special interest are methods for structured/unstructured, body-fitted or immersed-boundary mesh methods. Dissemination of knowledge by presenting research results, new developments, and novel concepts in CFD and Verification and Validation will serve as the foundation upon which the conference program of this area will be developed.

Topic 2-2: DNS, LES and Hybrid-RANS/LES Methods (CFDTC)

Organizers:

Daniel Garmann: daniel.garmann@us.af.mil
Shanti Bhushan: bhushan@me.msstate.edu
Keith Walters: keithw@uark.edu

Descriptions:

The topic DNS, LES and Hybrid-RANS/LES Methods focuses on the simulation of unsteady flows through DNS, LES, or Hybrid RANS/LES techniques, representing the state-of-the-art in numerical simulation. Contributors are encouraged to highlight application of these methods, development efforts furthering their accuracy, robustness, or tractability, or analysis techniques for large-scale unsteady simulation such as big-data mining, compression, or feature extraction.

Topic 2-3: Emerging Methods in CFD (CFDTC)

Organizers:

Javid Bayandor: bayandor@buffalo.edu
Shanti Bhushan: bhushan@me.msstate.edu

Descriptions:

This topic provides a platform for presenting results and disseminating recent research and developments in emerging CFD methods. These can include, but are not limited to, application or development of the following: 1) Meshfree discretization techniques. Meshfree, also referred to as meshless, schemes avoid mesh generation by discretizing the domain of interest with a set of scattered points among which there is no predefined connectivity. They offer a number of advantages including simplification of geometry updates and efficient implementation on massively parallel processing units. 2) Mesoscopic methods such as the Lattice Boltzmann method, which connect the microscopic and

macroscopic descriptions of fluid dynamics and, among others, promise benefits for multiphase flows, particular flows, porous media as well as computational efficiency.

Topic 2-4: Panel: Quantum Computing for Fluids (CFDTC)

Organizers:
Elia Merzari: ebm5351@psu.edu
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Descriptions:
Quantum computing is emerging as a key new technology, potentially able to address computational challenges that remain daunting for classical computers. How will this impact the field of Computational Fluid Dynamics? In this panel we review some early and ongoing efforts at simulating the Navier-Stokes equations with quantum computers. We will discuss where the potential for the use of quantum computers is the greatest in fluid dynamics. Finally, we discuss how the field is likely to evolve in the near future.