

Panel Discussion: Impacting Science through Applied Mathematics and Emerging Architectures

Panelists: Mike Heroux, Mike Minion, John Bell, and Howard Elman

Abstract:

ASCR's goal is to enable science results on current and future leadership-class computing facilities. The Applied Mathematics program focuses on the use of modeling, analysis and simulation to address DOE science problems of increasing complexity. However, there are major changes underway in the computing industry due to the critical importance of power and energy efficiency in computing systems from the desktop to the exascale. These new hybrid, multi-core architectures bring with it many new challenges. Today's mathematical models, techniques and tools may need to be re-examined for these emerging architectures where it's not about the FLOPS, it's about data movement.

In light of these emerging architectures, this panel will discuss:

- * How should we think about and analyze our existing models and algorithms?
- * How should we formulate and design new models, methods and tools?
- * Is there new or missing mathematics?
- * How can we engage and motivate researchers and students to address these challenges?
- * Are there tools out there to help us understand performance on these new machines? What are the benefits and drawbacks to using abstract machine models, simulators, emulators, and other tools?