The House Research and Development Caucus Invites You to Attend a Congressional Briefing on:

On the Road to Exascale – Extreme Computing-Based Modeling and Simulation

September 23, 2010
12:00pm – 1:30 pm
2168 Rayburn House Office Building
(Gold Room)
Lunch will be provided

The development and application of markedly advanced computing platforms known as Exascale computers, supercomputers 1,000 times more powerful than the fastest currently in existence, promises dramatic progress in transformational breakthroughs and solutions in the development and deployment of clean, reliable, affordable and sustainable energy supplies, and achieving national energy security and sustainable environment goals. Supercomputing has become a "third leg" of leading-edge science and engineering, complementing theory and experiment; and is increasingly becoming a key tool in technological innovation, advanced manufacturing and rapid prototyping, and successful product commercialization. Exascale machines will enable solving challenging scientific and engineering problems of increasingly greater complexity (and uncertainty), such as:

- Predictive modeling of nano-materials and chemistry for order-of-magnitude improved battery, photovoltaics, and superconductor performance;
- Improved understanding of combustion processes for higher efficiency engines and reduced emissions, and development and use of next-generation biofuels;
- Extending the operational lifetime of commercial nuclear reactors, expediting the design, licensing and construction of advanced nuclear power plants and fuel cycles;
- Dynamic modeling of a national "smart" grid to best plan for, incorporate, and manage renewable/distributed energy sources, and the electrification of the transportation sector;
- Comprehensive modeling, simulation, and visualization of large-scale sequestration of carbon dioxide and its fate in underground reservoirs; and
- Increasingly realistic climate modeling, leading to high-fidelity regional climate information, including extreme events, for mitigation, adaptation, and impact analysis.

Exascale computing will also require major advances in computer design and architecture (i.e., power efficiency, scalability, concurrency, memory, reliability, etc.), operating systems, and applications software. This development has broad applicability across many areas of science and engineering, and will help ensure that the U.S. retains leadership in high-performance computing and applications, arguably a linchpin to major scientific and technological advances, and the larger information technology industry and infrastructure that underpins our global economic leadership and competitiveness. Experts will discuss the vision and challenges of an estimated decadal research and development, demonstration, and deployment program, involving a partnership among government, industry, and academia, to achieve Exascale capability and applicability.

Moderator:

Dr. Cynthia McIntyre, Senior Vice President for Strategic Operations & HPC Initiative
Council on Competitiveness

Speakers:

Dr. Rick Stevens, Associate Director for Computing, Environment and Life Sciences
Argonne National Laboratory

Dr. David Turek, Vice President for Deep Computing
IBM Corporation

Dr. Venkatachalam Ramaswamy, Director, Geophysical Fluid Dynamics Laboratory
National Oceanographic and Atmospheric Administration

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