U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY

HEARING CHARTER

Supercomputing and American Technology Leadership

Wednesday, January 28, 2015
9:00 a.m. – 11:00 a.m.
2318 Rayburn House Office Building

Purpose

The Energy Subcommittee will hold a hearing titled *Supercomputing and American Technology Leadership* at 9:00 a.m. on January 28th in room 2318 of the Rayburn House Office Building. This hearing will assess the Advanced Scientific Computing Research (ASCR) program within the U.S. Department of Energy's (DOE) Office of Science as a mechanism to support technological advancement in the United States. This hearing will focus on high performance computing (HPC) facilities' unique ability to accelerate innovation and inform the Committee regarding the applications and benefits from sustained investment in the ASCR program.

Witnesses

- **Mr. Norman Augustine**, Board Member, Bipartisan Policy Center
- **Dr. Roscoe Giles**, Chairman, DOE Advanced Scientific Computing Advisory Committee
- **Mr. Dave Turek**, Vice President, Technical Computing, IBM
- **Dr. James Crowley**, Executive Director, Society for Industrial and Applied Mathematics

Background

The DOE Office of Science is the federal government's largest supporter of basic research in the physical sciences. The Office of Science provides direct funding to researchers and also develops, constructs, and operates large-scale user facilities.[1] Within the Office of Science, the ASCR program develops and maintains world-class computing facilities and provides funding for research in applied mathematics, computer science, and advanced networking.[2] ASCR was funded at $541 million for FY15.

[1] See generally, DOE Office of Science website: http://science.energy.gov/about/
[2] See generally DOE ASCR website: http://science.energy.gov/ascr/about/

ASCR's programs fund discovery-based science in the areas of modeling, analysis, and simulation that may enable breakthroughs in other fields of research and technology development. In May 2013, the Subcommittee held a hearing on one of ASCR's major new initiatives involving exascale computing.[3] The exascale initiative is an effort to develop the next generation of high performance computing systems that are three orders of magnitude faster than current systems, and therefore able to process larger amounts of data more quickly. Scientific discovery in which large volumes of data is gathered and mined to exploit information, sometimes referred to as "big data," has transformed computing technology needs. The greater availability and utilization of these high-speed supercomputers allows increasingly complex scientific research to be achieved. Medical research, energy and environment system simulations, computational chemistry, and innumerable other scientific problems directly benefit from HPC modeling.

Additionally, in a recent report, the Council on Competitiveness, an organization comprised of U.S. corporations, universities, labor organizations, and laboratories, stated the following:

> "High performance computing (HPC) is inextricably linked to innovation, fueling breakthroughs in science, engineering, and business. HPC is a tool used by leaders in diverse fields to help design new products, to improve existing products, and to bring products to market more efficiently. HPC is viewed as a cost-effective tool for speeding up the R&D process, and two-thirds of all U.S.-based companies that use HPC say that 'increasing performance of computational models is a matter of competitive survival.'"[4]

Office of Science and ASCR Budget

ASCR's budget is divided into two main subprograms. The High Performance Computing and Networking Facilities subprogram constructs and maintains cutting-edge facilities supporting researchers across the United States. The Mathematical, Computational, and Computer Sciences Research subprogram supports, among other things, research in mathematics for modeling systems, software, middleware, and new algorithms to efficiently make use of new high performance computing systems. This subprogram develops applied mathematicians and computer scientists to addresses challenges associated with managing large amounts of raw data, a key input for maintaining technical leadership in this field.

[3] See House Committee on Science, Space, and Technology Subcommittee on Energy Hearing- America's Next Generation Supercomputer: The Exascale Challenge *Available at:* http://science.house.gov/hearing/subcommittee-energy-hearing-exascale-computing-challenges-and-opportunities

[4] See "The Exascale Effect: the Benefits of Supercomputing Investment for U.S. Industry", Council on Competitiveness, October 2014. *Available at*: http://www.compete.org/images/uploads/File/PDF%20Files/Solve_Report_Final.pdf