Advanced Scientific Computing Research

The Program
The Advanced Scientific Computing Research (ASCR) program seeks to expand our computational and networking capabilities in order to extend the frontiers of science and technology. This includes supporting the development of computing systems and architectures designed to deliver on the promise of exascale science.

The Request
The President requests $620,994,000 for the ASCR program, an increase of 14.8% over last year's appropriation. This request reflects that exascale computing is a top priority across the Office of Science.

The Reason
Requested funds will go toward efforts such as:

- Exascale computing, including
  - Designing and developing exascale node technologies, as well as exascale hardware and software computer designs at the system level,
  - Developing hardware architectures and system software, and
  - Developing programming for energy-efficient, data-intensive applications.
- Facilities endeavors, including:
  - Ensuring that current facilities operate optimally and with a greater than 90 percent availability,
  - Deploying a 10-40 petaflop upgrade at NERSC https://www.nersc.gov/, and
  - Preparing for 75-200 petaflop upgrades at our Leadership Computing Facilities http://science.energy.gov/ascr/facilities/.
- Accelerating progress in scientific computing through SciDac partnerships http://www.scidac.gov/.
- Fully funding a new cohort of students through the restored Computational Science Graduate Fellowship http://www.krellinst.org/csgf/.
- Conducting mathematics research to address the challenges of increasing complexity; as well as computer science research in order to address the productivity and integrity of HPC systems and simulations and support data management, analysis and visualization techniques.

The Research (and Developments)

- Upcoming Training Program on Extreme Scale Computing at Argonne National Laboratory: https://www.alcf.anl.gov/articles/argonne-training-program-extreme-scale-computing-august-2015

- Simulations Aimed at the Safer Transport of Explosives: http://www.alcf.anl.gov/articles/simulations-aimed-safer-transport-explosives
- Proctor & Gamble and Temple University Scientists Use the Titan Supercomputer at Oak Ridge National Laboratory to Model the Skin's Makeup: https://www.olcf.ornl.gov/2014/11/14/procter-gamble-and-temple-university-scientists-model-skins-makeup/
- DOE Awards $425 Million in Next Generation Supercomputing Technologies: http://science.energy.gov/~/media/_/pdf/news/111414-CORAL.pdf
- DOE's Office of Science Announces 56 Projects Aimed at Accelerating Scientific Discovery and Innovation That Will Share 5.8 Billion Core-Hours on America's Two Fastest Supercomputers Dedicated to Open Science: http://www.doeleadershipcomputing.org/awards/2015INCITEAnnouncement.pdf
- Silicon Shovels for Rare-Earth Solutions http://science.energy.gov/news/featured-articles/2014/10-28-14/
- Simulations Reveal an Unusual Death for Ancient Stars http://cs.lbl.gov/news-media/news/2014/simulations-reveal-an-unusual-death-for-ancient-stars/