

Computing Power for Scientific Discovery

At Brookhaven National Laboratory

Purpose:

To provide computational science capabilities through the use of powerful, state-of-the-art computers for science

Sponsor:

U.S. Department of Energy's Office of Science

Features:

- More than 700 teraflops of IBM Blue Gene/Q supercomputing power
- Linux clusters and accelerated clusters with graphic processing units (GPUs) and Intel Phi coprocessors

Partners:

- Stony Brook University's Institute for Advanced Computing
- The New York Center for Computational Sciences
- High Performance Computing Consortium (HPC²)

www.bnl.gov/csc

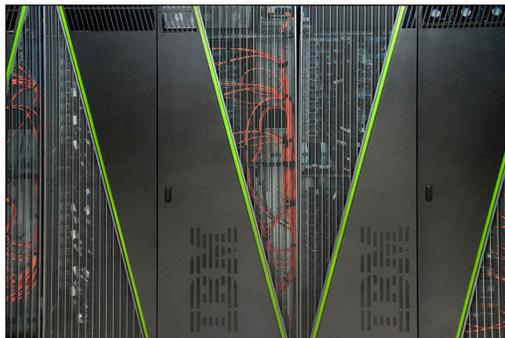
The Computational Science Center (CSC) at Brookhaven Lab has high-power computational resources for scientists and researchers to solve data-intensive problems in many areas of science, including biology, chemistry, physics, medicine, and more. The CSC is home to leading applied mathematicians and computer scientists as well as computers that process trillions of operations every second—clusters containing accelerators such as graphic processing units (GPUs) and Intel Phi coprocessors, and supercomputers based on IBM's latest architecture Blue Gene/Q.

HPC Code Center

At the CSC's High Performance Computing (HPC) Code Center, scientists can supply their own code—or ideas—to process massive datasets on high performance computing platforms. They can also work with CSC programming specialists who port, tune, run, and maintain an active library of code for the Blue Gene/Q and computing clusters. HPC Code Center services are also available to government agencies, academic institutions, and industry.

Blue Gene/Q Supercomputers

Brookhaven Lab, the RIKEN BNL Research Center, and U.S. Quantum Chromodynamics (QCD) Collaboration operate three-and-a-half racks of IBM's latest supercomputer architecture, Blue Gene/Q, with combined processing power of more than 700 teraflops—just one of which equals a trillion floating point operations per second. The Blue Gene/Q supercomputers at Brookhaven contain



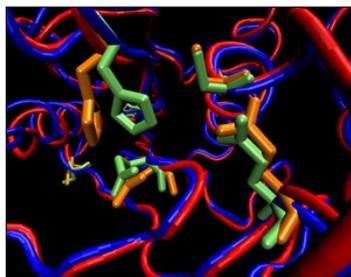
The Blue Gene/Q supercomputer at Brookhaven Lab has combined processing power of more than 700 teraflops—just one of which equals a trillion floating point operations per second.

57,344 processors and rely on parallel programming to speed up code. The machine primarily processes scientific research, but with porting assistance from the HPC Code Center, Blue Gene/Q is available for other applications that require high computing power.

Partnering to Provide Computational Resources for New York State

Brookhaven Lab's CSC is an integral partner for computational centers across New York State, particularly through its relationship with Stony Brook University (SBU). CSC Director Robert Harrison also leads SBU's Institute for Advanced Scientific Computing (IACS), which works to expand the frontiers of computational sciences—exascale and extreme-scale computing. Several other CSC and IACS staff members hold joint appointments as well. The CSC and SBU also created the New York Center for Computational Sciences (NYCCS) to support high performance computing research and industrial partnerships in New York State.

Brookhaven's CSC is also a member of the New York State High Performance Computing Consortium (HPC²), formed to increase the state's competitiveness in research and development, provide education, outreach and training in simulation-based engineering science, and help support job growth. HPC² is a partnership among NYCCS, the nonprofit corporation NYSERNet, Rensselaer Polytechnic Institute's Computational Center for Nanotechnology Innovations, and the State University of New York at Buffalo's Center for Computational Research.



Computer simulation of the structure of adenovirus proteinase