Argonne NATIONAL LABORATORY

Argonne Leadership Computing Facility

Leading Computing Capability Dedicated to Breakthrough Science and Engineering

Enabling scientific discovery for today and tomorrow

The Argonne Leadership Computing Facility enables breakthrough science—science that will change our world through major advances in biology, chemistry, energy, engineering, climate studies, astrophysics and more.

Operated for the U.S. Department of Energy's Office of Science, the ALCF gives leading scientists access to world-class computation resources and a dedicated team of computational scientists and engineers to support their research efforts.

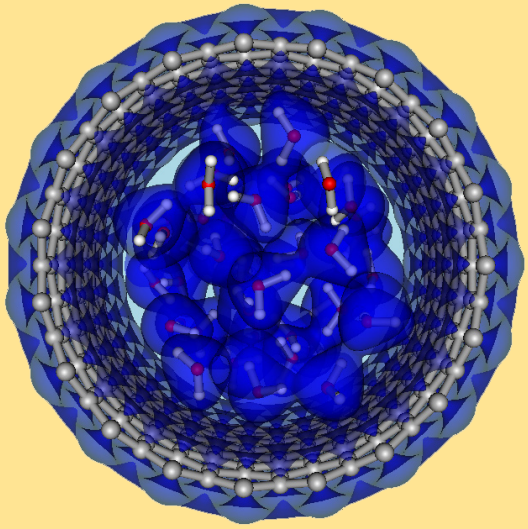
Work underway on twenty projects at the ALCF spans a spectrum of scientific disciplines. For example, current projects will allow researchers to:

- Understand the molecular basis of Parkinson's disease
- Assess the impact of climate change on forest ecology
- Study type Ia supernovae
- Design the next generation of reduced-emissions jet engines
- Gain insight into dangerous heart rhythm disorders
- Understand cell membrane processes in bio fuels and toxic organic waste clean up
- Study how water interacts with the surfaces of various materials

Intrepid—Argonne's Blue Gene/P

The ALCF is home to the next-generation IBM Blue Gene system, the Blue Gene/P. Aptly named, *Intrepid's* initial production configuration features 8,196 quad-core nodes (32,768 processors) and 16 terabytes of memory. *Intrepid* boasts a peak performance of 111 teraflops, solidifying the ALCF's position as a leadership-class center for computation-driven scientific discovery. In response to the demand from the scientific research community for ever-increasing compute and data capabilities, *Intrepid* is being upgraded during 2008, reaching 40,960 quad-core nodes (163,840 processors) and 80 terabytes of memory. Peak performance will jump to a staggering 556 teraflops.

Breakthrough research underway at the Argonne Leadership Computing Facility delves into applied mathematics, climate research, combustion, nuclear physics, computer science and ten other scientific disciplines.



Information derived from computer simulations of water in small spaces will have broad applicability to problems in materials science, biology, and chemistry.

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