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News Release

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Argonne Advancing DOE INCITE Scientific Research Projects

ARGONNE, Ill. (December 18, 2008) — Based on their potential for breakthroughs in science and engineering research, 28 projects have been awarded 400 million hours of computing time at Argonne's Leadership Computing Facility (ALCF) through the Department of Energy's (DOE) Innovative and Novel Computational Impact on Theory and Experiment (INCITE) program.

The awards are part of a competitively selected group of 66 scientific projects announced by DOE's Office of Science (SC). INCITE is a DOE program supported by SC's Office of Advanced Scientific Computing Research that provides access to computing power and resources to support computationally intensive, large-scale research projects to researchers from industry, academia, and government research facilities.

"From understanding the makeup of our universe to protecting the quality of life here on earth, the computational science now possible using DOE's supercomputers touches all of our lives," said DOE Under Secretary for Science Dr. Raymond L. Orbach, who launched INCITE in 2003. "By dedicating time on these supercomputers to carefully selected projects, we are advancing scientific research in ways we could barely envision 10 years ago, improving our national competitiveness."

"INCITE is critical for advancing our nation's scientific leadership, but it also impacts our competitiveness and standard of living," said Argonne Director Robert Rosner. "The



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research addresses society's concerns about healthcare, the environment, climate change, creating clean and efficient energy, all while reducing time-to-market and prototyping costs through advanced simulation and modeling that would not be possible without facilities like ours.”

Some of the new INCITE awards at Argonne include investigating the circulation of water in the deep sea for storing CO₂ and another that will use computer simulations to conduct cerebral blood flow experiments--instead of potentially dangerous work on actual patients--to study cerebral blood flow and its role in the understanding, diagnosing and treatment cardiovascular disease. Other new and returning projects feature research in:

Energy, including advanced systems for fusion energy and nuclear power, and improving combustion to increase efficiency and reduce emissions

Biology, such as studying the causes of Parkinson’s disease, simulating electrical activity in the heart, and understanding protein membranes

Climate change, including improving climate models, studying the effects of turbulence in oceans, and simulating clouds on a global scale

Astrophysics, such as modeling supernova explosions and simulating black holes

“The INCITE program goes beyond providing access to supercomputers. A key aspect of the program is expanding the horizons of scientific thinking by connecting researchers with scientific and technical staff at DOE’s computing facilities,” said Pete Beckman, director of Argonne’s Leadership Computing Facility. “Future breakthroughs will stem from the fusion and knowledge of different fields applying high performance computing and multi-disciplinary science.”

Of the 28 INCITE projects that will use the energy-efficient Blue Gene/P at Argonne, 10 are new projects and 18 are projects renewed from 2008. The ALCF is home to DOE's Intrepid, a 40-rack IBM Blue Gene/P capable of a peak-performance of 557 Teraflops (557 trillion calculations per second). The Blue Gene/P features a low-power, system-on-a-chip architecture and a scalable communications fabric that enables science applications to spend more time computing and less time moving data between CPUs, both reducing power demands and lowering operating costs.

As part of DOE's Innovative and Novel Computational Impact on Theory and Experiment program, the ALCF provides in-depth expertise and assistance in using ALCF systems and optimizing applications to help researchers from all different scientific disciplines to scale successfully to an unprecedented number of processors to solve some of our nation's most pressing technology challenges.

Over the past 30 years, the Department of Energy's (DOE) supercomputing program has played an increasingly important role in scientific research by allowing scientists to create more accurate models of complex processes, simulate problems once thought to be impossible, and to analyze the increasing amount of data generated by experiments.

To advance scientific discovery, DOE supports a portfolio of national high performance computing facilities and has allocated nearly 900 million processor-hours for supercomputing and data storage resources located at Argonne, Oak Ridge, Pacific Northwest and Lawrence Berkeley national laboratories.

Additional information:

To read more about all of the INCITE research taking place at Argonne's Leadership Computing Facility, please visit: <http://www.alcf.anl.gov/collaborations/incite.php>

To read the Department of Energy's INCITE announcement, please visit:

<http://www.energy.gov/news/6804.htm>

For more information on the INCITE program, please visit

<http://www.sc.doe.gov/ascr/incite/index.html>

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