

NCCS Snapshot

The Week of October 15, 2007

NATIONAL CENTER
FOR COMPUTATIONAL SCIENCES



Oak Ridge National Laboratory
U.S. Department of Energy

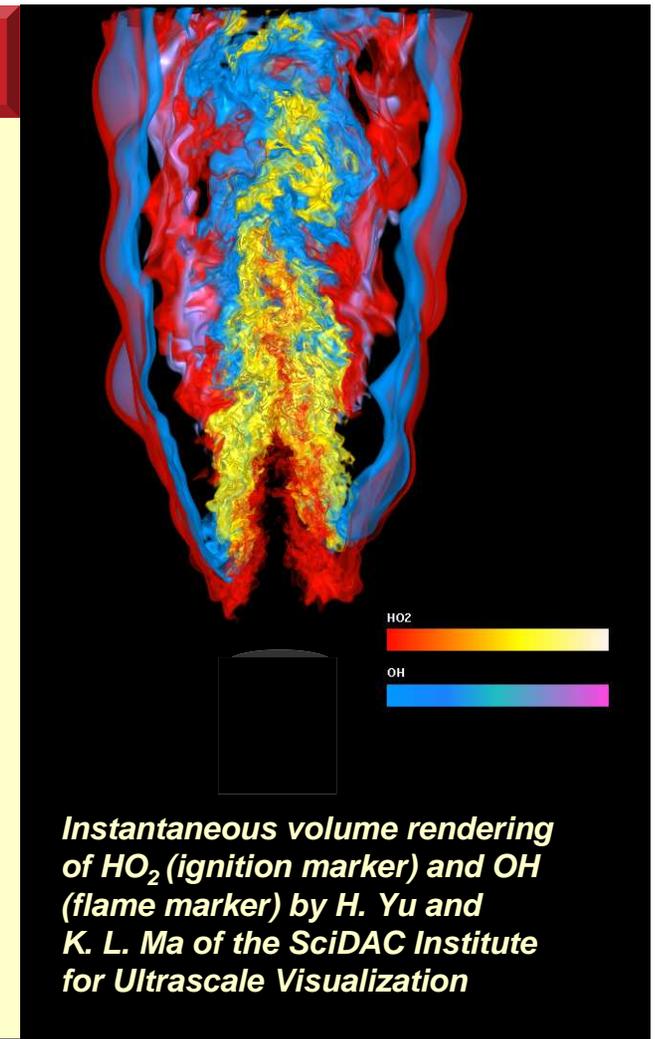
Dissecting Fire: Model Fully Resolves Diesel Ignition Process for First Time

Research may save energy, cut emissions

- Chen, Chun Yoo, and Ramanan Sankaran created the first 3-D simulation that fully resolves flame features such as chemical composition, temperature profile, and flow characteristics
- Jackie Chen used Jaguar to generate 35 terabytes of data (more than three times as much data as contained in the printed contents of the U.S. Library of Congress) on flames similar to those occurring during ignition and stabilization of diesel-engine jets

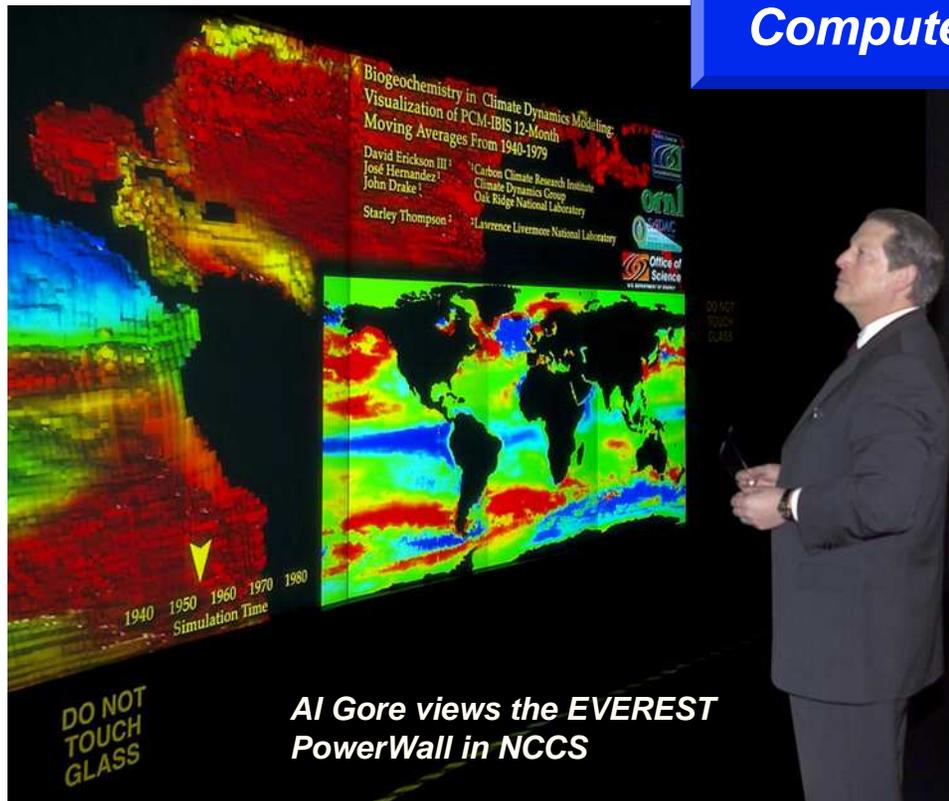
“If low-temperature compression ignition systems employing lean, dilute fuel mixtures make their way into next-generation autos, fuel efficiency could increase by as much as 25 to 50%.”

Jackie Chen, Sandia National Laboratories



ORNL Researchers Contribute to 2007 Nobel Peace Prize

Computer at ORNL a key player in U.N. report



Al Gore views the EVEREST PowerWall in NCCS

- Cheetah, an IBM pSeries supercomputer at the NCCS, provided more than one-third of the simulation data for the joint DOE/NSF data contribution to the United Nation's IPCC Fourth Assessment Report
- This year the IPCC shares the 2007 Nobel Peace Prize with former Vice President Al Gore for contributions to raise public awareness of man-made climate change

"Access to DOE leadership-class, high-performance computing assets at ORNL and NERSC significantly improved model simulations." Lawrence Buja, atmospheric scientist, National Center for Atmospheric Research

Blue Gene/P Comes to ORNL

- Oak Ridge National Laboratory and IBM are teaming up to bring the next generation of the IBM Blue Gene supercomputer, the Blue Gene/P, to ORNL
- The new system was accepted in late September and features 8,192 compute cores and will be capable of more than 27 trillion calculations a second, or 27 teraflops

“Selected chemistry and materials applications especially have shown strong performance on the Blue Gene. We look forward to seeing researchers produce cutting-edge science on this system.”

**Thomas Zacharia, ORNL’s Associate Laboratory
Director for Computing and Computational Sciences**



Chemistry and materials applications show promise

New Storage Device Online at the NCCS



Extra storage keeps NCCS running

- The NCCS recently received an upgrade to its High Performance Storage System (HPSS) with the addition of the Sun StorageTek SL8500 modular library system
- When running simulations of the intricacies of the human genome or climate change, supercomputers need to quickly access massive amounts of data.
- HPSS is now able to store more overall data and transfer it faster, giving one of the nation's top super-computing centers even more capability with which to tackle today's Grand Challenge Science



Spider File System to Free Users from Web of Chores

- Centerwide file system is being installed in stages
 - First stage installed for limited testing
 - Final stage (2008) to offer 10 petabytes of storage and 200 GB/second of bandwidth
- Researchers will be able to focus on groundbreaking science
 - No need to move data between systems in order to use visualization/data analysis tools
- Currently performing head-to-head comparison of the latest storage technology from LSI and DDN



“What we want is for researchers to focus on the science and the discovery. We don’t want them to worry about how to move data from system to system.”

Shane Canon, leader, NCCS Technology Integration Group

State-of-the-art file system will let scientists focus on science