

# LAWRENCE LIVERMORE REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Oct. 18-Oct. 22, 2010

## LLNL goes to Washington



**This climate simulation challenges users to meet the world's energy needs while keeping carbon emissions in check.**

This weekend, the Laboratory will join hundreds of other research institutions, universities, high-tech industries, professional societies, museums and science centers in a two-day expo on the National Mall in Washington, DC, held as part of the first-ever USA Science and Engineering Festival.

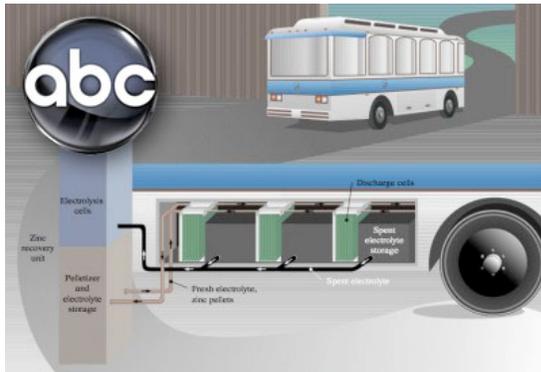
More than 750 exhibits, spanning aerospace, energy, medicine, biotechnology, genetics, botany, climate science, robotics, nanotechnology and many other disciplines, will provide activities that allow participants, young and old, to experience first-hand the fun of science.

The Lab will feature an energy-related theme with two major components. The first includes a 3D virtual ride on a beam of light as it races through the National Ignition Facility (NIF) -- the world's largest laser system -- and smashes into a BB-sized target filled with fusion fuel, all in a quest to develop fusion as a future energy source.

The second area focuses on finding solutions for the energy-climate challenge. Visitors can try out a brand-new "sim" developed by LLNL scientists as a learning tool about energy and climate change. Players face the challenge of meeting the world's 21st century energy demands on a fixed budget while keeping carbon emissions at a minimum.

To read more, go to the [Web](#).

## Zinc-powered vehicles may revolutionize transportation



**Nearly continuous use of fleet vehicles, such as buses, is possible with 10-minute refueling at 4- to 6-hour intervals, using the process illustrated here.**

Laboratory scientists are experimenting with a common metal that shows great promise for revolutionizing electric cars.

Researcher John Cooper is working on what he believes could be the future of transportation. He spent decades at LLNL developing a fuel cell battery that uses the common metal zinc to generate electricity.

"It's low cost, it's non-toxic and as a natural resource it's essentially inexhaustible, there's enough zinc around the world to convert most of the world's cars to electric driven," Cooper said.

Unlike the batteries in hybrid vehicles like the Toyota Prius, the zinc-air fuel cell is designed to be refilled like a gas tank. When the pellets are placed in the cell, they trigger a chemical reaction. Electrons migrate from one side to the other creating a charge. After a few weeks, the battery is drained and refilled and the zinc recycled.

To see the video, go [here](#).

## Adding lustre to HPC data storage solutions



In a partnership announced this week, the Laboratory, industry and Oak Ridge National Laboratory launched the Open Scalable File Systems, Inc. (OpenSFS) -- a California nonprofit mutual benefit corporation. OpenSFS will support the requirements of the data-intensive computing community by fostering the practical development of high-performance computing (HPC) storage software technology.

OpenSFS is a technical organization focused on high-end, open-source file system technologies. The goals of the organization are to provide a forum for collaboration among entities deploying file systems on leading edge HPC systems, to communicate future requirements to the Lustre file system developers, and to support a release of the Lustre file system designed to meet these goals

One of the great challenges HPC faces is the storage and management of the enormous quantities of data produced by ever more powerful HPC systems. By bringing together leaders from industry and the national labs, OpenSFS aims to improve current and future HPC Lustre deployments and accelerate the development of Lustre file system technologies that will advance scientific research and improve economic competitiveness.

To read more, go to the [Web](#).

**Your project of the year winner: NIF**



The National Ignition Facility (NIF), the first laser expected to achieve fusion ignition in a laboratory setting, has been awarded the Project Management Institute's (PMI's) 2010 Project of the Year.

The award recognizes the year's most innovative and successful project.

Located at the Laboratory, NIF is the world's largest and most energetic laser, focusing 192 beams on a capsule the size of a pencil eraser. Inside that capsule a fuel pellet, made from isotopes of hydrogen, is heated to temperatures hotter than the sun's core, fusing the hydrogen atoms' nuclei and producing more energy than the laser energy required to spark the reaction. The result is ignition -- the same process that powers the sun and the stars.

To see a video about NIF, go to [YouTube](#).

#### **Atmospheric assessment center gets the weather bug**



**Maureen Alai, Ron Baskett and Matthew Simpson of the National Atmospheric Release Advisory Center (NARAC) monitor gases emitted from Kilauea volcano in Hawaii.**

The Laboratory has partnered with AWS Convergence Technologies, owner of the WeatherBug(R) brand of weather products and services, to enhance situational awareness for the National Atmospheric Release Advisory Center (NARAC).

This public/private partnership will enhance NARAC's emergency response system and operations by incorporating a vastly expanded set of live weather information from the real-time WeatherBug Network.

NARAC is the Department of Energy's plume modeling center and serves as the operations hub of the Department of Homeland Security (DHS)-led Interagency Modeling and Atmospheric

Assessment Center (IMAAC).

To see the interview, go to [here](#).

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail <mailto:labreport@llnl.gov>.

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