

# LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: Nov. 16- 23, 2009.

## **Newsweek profiles the advantages of NIF**



### **The NIF target chamber**

The 10-story National Ignition Facility at the Laboratory may not look any different from any other building from the outside. But what will happen on the inside may just create endless amounts of clean energy to the world.

*Newsweek* reporter Dan Lyons recently visited the Laboratory and interviewed NIF Director Ed Moses.

NIF will take a tiny pellet containing a few milligrams of deuterium and tritium, isotopes of hydrogen that can be extracted from water, and will blast it with a powerful laser. That reaction, also called fusion, will create a reaction like the one that takes place at the center of the sun.

Harness that reaction, and you've created a star on Earth, and with the heat from that star you can generate electricity without creating any pollution. Don't worry about nuclear plants, coal, oil or wind and solar. "This is the real solar power," Moses said.

Fusion experiments are scheduled to begin in 2010.

To read the full story, go to <http://www.newsweek.com/id/222792/page/1>

## **Supercomputer replicates purrfect brain**



Researchers from IBM have simulated a cat's cerebral cortex, the thinking part of the brain, using a Lawrence Livermore Laboratory supercomputer.

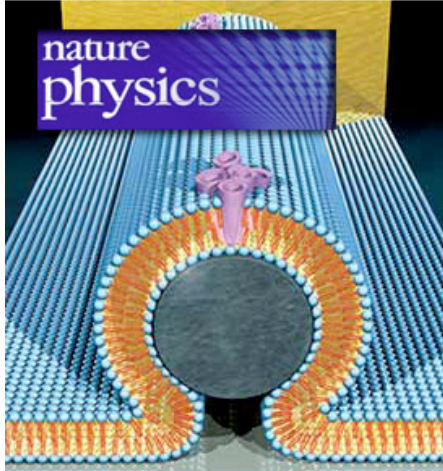
The computer has 147,456 processors (most modern PCs have just one or two processors) and 144 terabytes of main memory -- 100,000 times as much as that of a typical desktop computer has.

The scientists had previously simulated 40 percent of a mouse's brain in 2006, a rat's full brain in 2007, and 1 percent of a human's cerebral cortex this year, using progressively larger supercomputers.

The latest feat, which was presented at the SC09 supercomputing conference in Portland, Ore., last week, doesn't mean the computer thinks like a cat, because it actually runs 100 times slower than an actual cat's brain. Instead, it allows researchers to observe how thoughts are formed in the brain and how the roughly 1 billion neurons and 10 trillion synapses in a cat's brain work together.

To read more, go to  
<http://www.abcnews.go.com/Technology/AheadoftheCurve/wireStory?id=9111680>

## **LLNL biomaterials research receives wide recognition**



### **An artist's conception of a bioelectronic device.**

The November 2009 issue of *Nature Physics* contains a News and Views article about the recent *Proceedings of the National Academy of Sciences (PNAS)* paper by the Lawrence Livermore's Alex Noy and his team.

The research focuses on combining manmade devices with biological machines to produce bionanoelectronic devices that could give a boost in operating efficiency in laptops and other electronic devices.

Noy and his team devised a versatile hybrid platform that uses lipid-coated nanowires to build prototype bionanoelectronic devices. Mingling biological components in electronic circuits could enhance biosensing and diagnostic tools, advance neural prosthetics such as cochlear implants, and could increase the efficiency of future computers.

To read more, go to <http://www.nature.com/nphys/journal/v5/n11/full/nphys1434.html>

### **Lab contributes to U.S.-China carbon capture collaboration report**



Lawrence Livermore's Julio Friedmann, in collaboration with the Center for American Progress, the Asia Society Center and the Monitor Group, recently released the report, "A Roadmap for U.S.-China Collaboration on Carbon Capture and Sequestration."

The report provides a framework for long-term bilateral cooperation in the development and use of carbon capture and sequestration (CCS) technologies, and sets out the benefits of the job creation opportunities and consumer savings. In addition, CCS offers a potential pathway for helping achieve the scientifically required reductions in global greenhouse gas emissions that energy efficiency, conservation and renewable energies are unlikely to meet on their own.

CCS is a process that separates and captures carbon dioxide from industrial and power plant flue streams, then compresses the gas and stores it underground, most likely in geological formations. The process essentially captures the greenhouse gas emissions before they enter the atmosphere and stores them underground. The report identifies three areas of cooperation on CCS.

To watch an interview with Friedmann, click on the first video at <http://sites.asiasociety.org/climate/videos>

**Livermore Lab Report takes a break**

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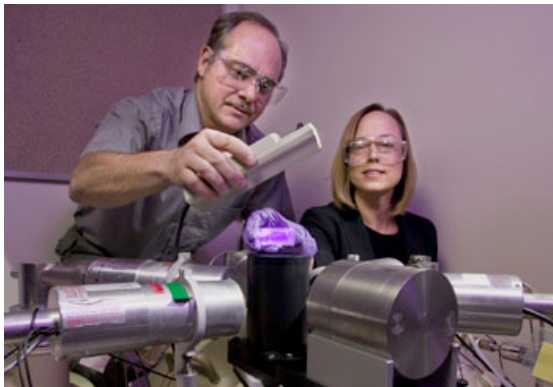
The *Livermore Lab Report* will be taking a break for the Thanksgiving holiday. Look for a new edition to appear Dec. 7.

## Latest *Newsline* available



*Newsline* provides the latest Lab research and operations news. See the most recent issue at <https://newsline.llnl.gov>

## Photo of the week



**Hot stuff:** Nerine Cherepy, right, holds a sample of strontium-iodide doped with europium that is being tested for use in locating weak gamma rays from illicit radioactive materials. Steve Payne helped develop the SLYNCI (Scintillator Light Yield Nonproportionality Instrument) seen in the foreground, which is crucial in evaluating the physics of these new materials.

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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>.

The Livermore Lab Report archive is available at:  
[https://publicaffairs.llnl.gov/news/lab\\_report/2009index.html](https://publicaffairs.llnl.gov/news/lab_report/2009index.html)

