

LAWRENCE LIVERMORE **REPORT**

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: Nov. 30-Dec. 7, 2009.

Purr-suing the simulation of a feline brain



Earlier this month, researchers from IBM announced they simulated a cat's cerebral cortex using a Laboratory supercomputer. The scientists say they've made a breakthrough in their pursuit of computers that "think" like a living thing's brain -- an effort that tests the limits of technology.

By simulating the thinking part of the cat's brain, the computers operate more like a brain thinks -- by reasoning and dealing with abstractions -- and new breakthroughs could be made in fields such as medicine and economics.

The computer that simulated the feline's brain, BlueGene/P, 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 your 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 bigger supercomputers.

To read more, go to <http://www.foxnews.com/story/0,2933,575553,00.html>

Underground cleaning technology puts the steam on ABC



Roger Aines

Dynamic Underground Stripping, developed at the Laboratory in the 1990s, was recently featured on ABC. Just weeks ago, in Visalia, it was used in the first complete cleanup of a Superfund site.

Nearly every wooden utility pole is protected from dry rot and insects because it is soaked in creosote -- dark, smelly coal tar. Places where that soaking was done have been declared Superfund sites by the Environmental Protection Agency.

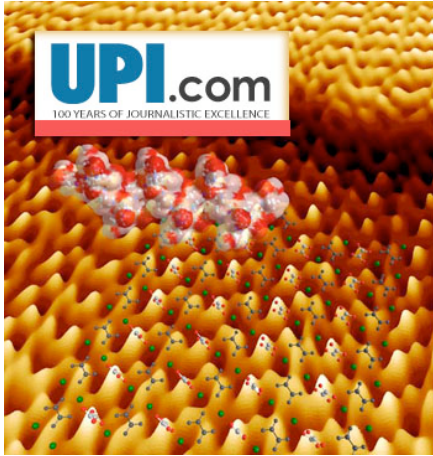
Visalia was the first to be removed from the list thanks to steam cleaning, a technique first used to remove a decades-old gasoline spill by the Navy at Lawrence Livermore National Laboratory.

Lab geophysicist Roger Aines, one of the original developers, also added a new technology in which the steam-loving microbes kill half of the bad stuff while it is still underground. That is what helped clean up Southern California Edison's Visalia Pole Yard.

To see the story, go to

http://abclocal.go.com/kgotv/story?section=news/drive_to_discover&id=7132763

Peptides manipulate crystal growth



Peptides absorbed on a crystal surface.

Laboratory scientists have created images with the resolution showing a single molecule of the interaction between peptides and a mineral surface.

The scientists -- from LLNL, the Molecular Foundry at the Lawrence Berkeley National Laboratory, the University of California-Davis and the University of Alabama -- said they were able to create images of individual atomic layers of a mineral interacting with peptides -- protein fragments -- by improving the performance of an atomic force microscope.

"We were able to watch peptides adhere to the surface, temporarily slow down a layer of the growing crystal, and surprisingly 'hop' to the next level of the crystal surface," said Raymond Friddle of the Lawrence Livermore lab.

To read more, go to http://www.upi.com/Science_News/2009/11/25/Peptide-mineral-interaction-images-created/UPI-66031259164006/

LLNL named to top five geoscience institutions



The Laboratory has come in No. 3 of the Top 20 institutions in geoscience as ranked by *Times Higher Education* from Jan. 1999-June 2009.

LLNL scored just below the Met Office Hadley Centre for Climate Prediction and Research, which ranked No. 1, and Harvard University, which came in at No. 2. LLNL, on average, had 24.34 citations per the 924 published papers.

The data were extracted from the Essential Science Indicators database of Thomson Reuters. This database surveys only journal articles (original research reports and review articles) indexed by Thomson Reuters. Articles are assigned to a category based on the journals in which they were published and the Thomson Reuters journal-to-category field-definition scheme.

For more information on the Thomson Reuters' Essential Science Indicators database, go to http://thomsonreuters.com/products_services/science/science_products/az/essential_science_indicators

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Photo of the week



Crystal clear: Natalia Zaitseva works with synthesis and characterization of new nanocrystal materials, which may be used in miniature thermal neutron detection equipment.

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.

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