LIVERMORE LAB REPORT

A weekly compendium of media reports on science and technology achievements at Lawrence Livermore National Laboratory, Aug. 4-8, 2014. Though the Laboratory reviews items for overall accuracy, the reporting organizations are responsible for the content in the links below.

Jeff Wisoff, in front of the world's largest laser at Lawrence Livermore.

Inside the Lawrence Livermore Lab there is a supercomputer so fast and powerful that it generates simulated models to better understand everything from irregular human heartbeats to earthquakes. Picture tiny brain implants that can restore sight and possibly memory. Or what about the world's largest laser, with powerful beams, zooming rocket-like across three football fields -- research that protects the nation and could lead to future sources of clean energy?

This is the world at Lawrence Livermore National Laboratory.

Inside Livermore's mile-square campus, some 6,000 employees hover over hundreds of projects that span multiple industries, including oil and gas, health care and transportation.

Livermore, like other labs, often collaborates with private companies to create solutions such as more fuel-efficient, long-haul trucks, and more resilient airplane components.

To read more, go to *CNBC*.

The Fresno Bee

THE NEXT GENERATION

Merced students use a new computer modeling program at UC Merced. High school teachers from around the region are testing the teaching tool this week with the help of Lawrence Livermore.

A few high school teachers from Merced and Madera counties are training this week at UC Merced to use a new technology in high school classrooms with the help of federal researchers.

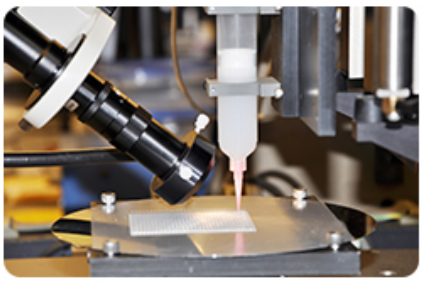
Lawrence Livermore National Laboratory is providing the training for science, technology, engineering and math teachers, who are learning a relatively simple version of computer programming that sets up computer models for use in classrooms.

Eventually, students will use the technology and be able to create experiments on their laptops, said Jon Fuller, a teacher from San Jose Conservation Corps.

To read more, go to *The Fresno Bee*.

Los Angeles Times

ROCKET ENGINES IN 3-D



The additive manufacturing machine creates three-dimensional structures.

Space X is printing rocket parts, including the thrust chamber on the engines for its Dragon V2 spacecraft, which it hopes will one day deliver NASA astronauts to the International Space Station.

The Hawthorne rocket maker recently announced that a Falcon 9 launch in January marked the first time it flew a part into space that was created using an additive manufacturing technique, popularly known as 3-D printing.

Lawrence Livermore National Laboratory also is developing 3-D-printed rocket engines for low-cost launch vehicles for carrying small satellites into space. It printed a working prototype engine for a proposed launch vehicle in eight days at a cost of $10,000.

To read more, go to the *Los Angeles Times*.

THE HUFFINGTON POST

I SPY A GAS GIANT

The interior of the target chamber at the National Ignition Facility. The object entering from the left is the target positioner, on which a millimeter-scale target is mounted. Researchers recently used NIF to study the interior state of giant planets. Image by Damien Jemison/LLNL

Diamond has been exposed to millions of times of atmospheric pressure to reveal secrets of giant gas planets.

Lawrence Livermore researchers used the world's largest laser at the National Ignition Facility to expose a sample of diamond -- one of the hardest substances known -- to pressures as high as those at the center of Saturn, or 50 million times those normally found at Earth's surface.

The results could help reveal how matter behaves in the depths of giant planets, including Saturn and Jupiter or even worlds outside of our solar system.

To read more, go to the *Huffington Post*.

PRODUCT DESIGN & DEVELOPMENT

GETTING A CHARGE

Lawerence Livermore researchers are working on models that could lead to longer living Li-ion batteries.

New research indicates that lithium-ion batteries could benefit from a theoretical model created at Lawrence Livermore and Rice University that predicts how carbon components will perform as electrodes.

The growing demand for energy storage emphasizes the urgent need for higher-performance batteries. Several key characteristics of lithium-ion battery performance -- capacity, voltage and energy density -- are ultimately determined by the binding between lithium ions and the electrode material. Yet subtle changes in the structure, chemistry and shape of an electrode can significantly affect how strongly lithium ions bond to it, in a way researchers don't fully understand.

The new model predicts the strength of this binding based on intrinsic characteristics of carbon materials used as battery anodes.

To read more, go to *Product Design & Development*.

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