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LLNL



The Community Newsletter of Lawrence Livermore National Laboratory

Winter 2008

Governor visits Laboratory



Gov. Arnold Schwarzenegger is briefed while standing in front of NIF's target chamber. From left, LLNL Director George Miller; Bruce Goodwin, principal associate director of the Weapons Program; Susan Kennedy, governor's chief of staff; the Governor; Edward Moses, principal associate director of the National Ignition Facility; George Shultz, former U.S. Secretary of State.

Gov. Arnold Schwarzenegger toured the Lab's National Ignition Facility Nov. 10, and held a press conference to discuss the nearly completed laser and applications, particularly the Laser Inertial Confinement Fusion-Fission Energy project, or LIFE.

The governor said LIFE could help the state's future energy needs while simultaneously decreasing dependence on fossil fuels. Schwarzenegger said fusion energy would not only assist the state in meeting future energy demands, but also would help reduce greenhouse gas emissions that negatively impact climate.

"This laser technology has the potential to revolutionize our energy future," Schwarzenegger said. "If successful, this new endeavor could generate thousands of megawatts of carbon-free nuclear power but without the drawbacks of conventional nuclear plants. This type of innovation is why we are a world leader in science, technology and clean energy, and I could not be prouder that this work is happening right here in California."

LIFE would lead to sustainable, carbon-free energy that is safe and drastically shrinks the nation's and world's inventories of nuclear waste.

See more photos on page 2

LLNL-developed radiation detector monitor

A radiation detection technology developed by a team of Laboratory scientists and engineers is being employed by state and local governments to monitor for nuclear materials that could be part of a "dirty bomb" or nuclear device.

The radiation detector, called the adaptable radiation area monitor (ARAM), is small and versatile enough to be deployed in a host of ways – as a portable detector in an SUV, as a vehicle monitor alongside freeways, as a pedestrian portal monitor, as a package or luggage detector, or as a fixed or portable maritime detector.

The ARAM system can detect concealed radioactive material about the size of a grain of sand moving at 45 miles per hour, nearly freeway speed.

ARAM has been licensed to and converted into counterterrorism tools by Textron Defense Systems Corp., a firm headquartered in Wilmington, Mass.

"One advantage of the technology," stated Brian Adlawan, program director for detection systems for Textron Defense Systems, "is that it can be rapidly redeployed based on intelligence and new developments. Another bonus is

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The Adaptable Radiation Area Monitor (ARAM), developed by scientists and engineers at Lawrence Livermore National Laboratory, has been licensed by LLNL to Textron Defense Systems, of Wilmington, Mass.



Governor visits Laboratory (cont.)



Photo by Julie Korhummel

Gov. Arnold Schwarzenegger beams over seeing NIF. From left, George Shultz, former U.S. Secretary of State; the Governor; LLNL Director George Miller; and Edward Moses, principal associate director of the National Ignition Facility.



Photo by Jacqueline McBride

The goal of NIF, the world's largest laser, is to create a miniature star on Earth. Here Moses, Miller and Schwarzenegger take in the target chamber.



Photo by Jacqueline McBride

Schwarzenegger signs a poster that describes LIFE: 2020 Fusion Vision. LIFE is the acronym for the Laser Inertial Confinement Fusion-Fission Energy project.

MORE PHOTOS OF SCHWARZENEGGER'S VISIT ARE AVAILABLE AT: [HTTP://WWW.FLICKR.COM/PHOTOS/LLNL/](http://www.flickr.com/photos/llnl/)

Laboratory sets new royalty income record

In its best year ever for securing royalty income from technology licenses, LLNL garnered \$9.4 million in the recently completed 2008 fiscal year. This figure represents one of the highest amounts of royalty income achieved in a fiscal year by a U.S. Department of Energy national laboratory.

“Clearly, our royalty income this year is the best we’ve ever done by nearly 50 percent, and it is a tribute to the quality of the intellectual property that is coming out of the Laboratory,” said Erik Stenhjem, the director of LLNL’s Industrial Partnerships Office.

“The products that are being developed from LLNL technology are helping in both combating disease and protecting national security. All of this success is directly attributable to the creativity of our employees.”

The top four LLNL technologies for producing royalty income are:

- The whole chromosome paints, a cancer and disease diagnostic advance licensed to Abbott Laboratories of Abbott Park, Ill.
- A laser peening technology for strengthening jet engine fan blades and discs as well as other metal components, licensed to Metal Improvement Co. Inc., of Paramus, N.J.
- A rapid polymerase chain reaction microchip technology that heats and cools DNA, licensed to Sunnyvale-based Cepheid.
- A micropower impulse radar technology that is small, inexpensive and accurate and has been licensed to 12 companies for a variety of residential, commercial, medical and security uses.

At nominal royalty rates, this past year’s \$9.4 million of royalty income represents annual sales of approximately \$250 million in products based upon LLNL technology, according to Stenhjem.

“The efforts of the Laboratory’s scientists, engineers, technicians and the Industrial Partnerships Office not only benefit the U.S. economy, but also make important contributions to homeland security,” Stenhjem noted.

Currently, there are more than 20 companies that are manufacturing homeland security products based on LLNL technology that go into the hands of end users to protect the nation.



Detector monitor (cont.)

Continued from page 1

that the technology allows state agencies to continue their normal law enforcement functions, along with monitoring for nuclear materials.”

The U.S. Department of Homeland Security (DHS) announced that it is providing grants through its Securing the Cities initiative to enhance regional capabilities to detect and interdict illicit radioactive materials.

The New Jersey Office of Homeland Security and Preparedness, in concert with the New Jersey State Police, have collaborated in the acquisition and utilization of these detection assets. ARAM-equipped SUVs, known as RadTrucks, have been in operation in New Jersey for more than a year. The Garden State has joined multiple agencies in the New York City region in a federal pilot program that aims to detect terrorist nuclear material before it can be detonated. The prototype for the RadTruck, developed by LLNL, was first fielded in the New York/New Jersey region and was used by DHS and NY/NJ authorities during the 2004 Republican National Convention.

“This type of system gives us a better chance of not only picking up that there’s radiation, but the type of radiation, whether it’s a medical isotope or a terrorist device,” said Dave Trombino, a nuclear engineer at LLNL and one of the ARAM developers.

“The technological breakthrough of this system is buried in the software, which controls the data collection and analysis,” Trombino said. “One of Livermore’s strengths is world-class signal processing capabilities, and we relied on those skills to write our own software to be able to perform our own analysis.

“The ARAM technology has demonstrated its effectiveness through its use by various state agencies. The ‘A’ in ARAM stands for adaptable, and this technology has proven that to be the case as it has been used in trucks, placed along highways and now is being looked at for maritime applications,” Trombino added.

The ARAM inventors have received two patents and in 2005 won an R&D 100 award as one of the top industrial inventions in the world.

STAR intern enlightens Livermore students

Nicole Turner is a graduate of Ripon College who received her teaching credentials from California State University (CSU) San Marcos, near San Diego.

This summer, she completed the Lawrence Livermore National Lab’s STAR (Science and Teacher Research) program, which provides science majors who are planning to be 6-12th-grade science teachers a unique opportunity to engage in a research internship.

When she arrived in Livermore, she thought she would be staying for just eight weeks. Little did she know that she would be relocating soon to the Tri-Valley from Southern California.

Turner completed her internship under the guidance of mentor Brian Bennion of the Lab’s Biosciences and Biotechnology group to develop skills in bioinformatics—skills that can be directly transferable to classroom instruction. She conducted research on proteins that lack a crystal structure.

During her internship, she attended a workshop that included a panel of hiring officials from local school districts. The panel addressed how to prepare for a job interview and to get a teaching position.

One of the panelists, Mike Martinez, the assistant superintendent of Administrative Services in the Livermore Joint Unified School District, encouraged Turner to apply for a science teacher position with the district.

Turner did just that and was awarded the job. This fall, she began teaching life science to 7th-graders at Junction Avenue Middle School.

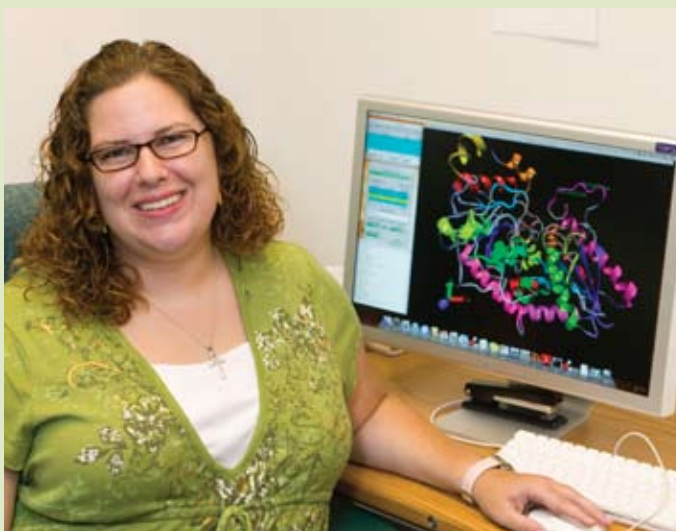
“I am very happy,” Turner said about the teaching position. “I have fallen in love with Livermore.”

Turner was one of four students in the 2008 Lab STAR program who have been successful in obtaining teaching credentials and securing teaching positions at the start of this school year.

“This is one of many examples of how the Livermore Valley Joint Unified School District and students benefit from our ongoing educational partnership with the Livermore Lab,” said Kelly Bowers, assistant superintendent of Educational Services in Livermore. “We value the expertise and professional development opportunities LLNL provides to new and veteran teachers.”

“This is an ideal way to attract and retain high-quality educators in our district,” she said.

The STAR program is a partnership of the California State University (CSU) and Department of Energy (DOE) national labs and NASA Ames Research Center. The program, which was piloted at LLNL last year, was adopted by DOE as a model and implemented this summer at Lawrence Berkeley National Laboratory and Stanford Linear Accelerator Center along with NASA Ames.



Nicole Turner studied bioinformatics during the Lab’s Science and Teacher Research program this summer. She teaches science at Junction Avenue Middle School in Livermore.



Celebrating science

Learn more at <http://www.copusproject.org/yearofscience2009>.

In 2009 the world will celebrate the 200th anniversary of Darwin's birth, the 150th anniversary of his publication *On the Origin of Species*, the 400th anniversary of Galileo's first use of a telescope to study the skies and the 400th anniversary of the publication of Kepler's first two laws of planetary motion.

To mark these significant events, the Coalition for the Public Understanding of Science (COPUS), American Institute of Biological Sciences, the National Academy of Sciences, and more than 150 other organizations have declared 2009 the Year of Science, a national year of engaging the public and enhancing the understanding of science, why it matters and who scientists are.

In recognition of the Year of Science, the Lawrence Livermore National Laboratory will present the following programs for the public:

Science Chat—A series of public discussions with leading scientists

Presented by LLNL and the Livermore Public Library. First session: Jan. 13, 2009, at 7-8:30 p.m., Livermore Public Library, Civic Center branch, community rooms A and B. "Carbon Dating, Anthrax and Forensic Science," by Dr. John Knezovich, LLNL.

This discussion will highlight the principles of carbon dating and will include examples of how this approach is being used to provide insights that are useful for forensic investigations. The use of carbon dating in the recent Amerithrax investigation also will be discussed. *Science Chats are free and open to the public. Bring your family, friends and an open mind—come ready to learn and ask questions. Questions? Contact Rachael Mills, LLNL Public Affairs Office at 925-422-4355.*

Tri-Valley Expanding Your Horizons in Math and Science conference

A daylong conference featuring hands-on workshops and a career fair to inspire young women in grades 6-12 to pursue math and science careers.

Saturday, Feb. 28, 2009, Diablo Valley College, San Ramon Campus. Registration will open at the end of January 2009 at <http://www.tveyh.org>

Science on Saturday Lecture Series

A series of science lectures for middle and high school students and teachers. Admission is free and open to the public.

Saturdays: Jan. 31–Feb. 28, 2009 at 9:30 a.m., Bankhead Theater, Livermore. For more information see <http://education.llnl.gov/sos>

Environmental Report for Lawrence Livermore National Laboratory released

The *Environmental Report 2007* for Lawrence Livermore National Laboratory has been released, showing there was no adverse impact to public health or the environment from Laboratory operations in 2007.

The annual report assesses the impact of LLNL operations on the environment, summarizes regulatory compliance and records results of environmental monitoring for the main Livermore site, as well as for Site 300, the Laboratory's experimental test facility located in the foothills southwest of Tracy.

The report's findings are based on the results of environmental sampling undertaken at the Laboratory and in surrounding communities. Samples were taken from air, water, vegetation, wine, soil and wastewater. The report also looks at progress made in the cleanup of contaminated groundwater at the Lab's two sites, the protection of endangered or sensitive animal and plant life and the Laboratory's efforts toward pollution

prevention. The Lab in 2007 received two Environmental Stewardship awards from the National Nuclear Security Administration, one for recycling and reusing materials and another for its alternative fuel station, which dispenses a fuel blend of 85 percent ethanol and 15 percent unleaded gasoline to the Lab's 267 E85 alternative fuel vehicles.

The *Environmental Report 2007* demonstrates Lawrence Livermore National Laboratory's continuing commitment to providing responsible stewardship of the environmental resources in its care and the integration of environmental stewardship into Laboratory strategic planning and decision-making processes through the LLNL Environmental Management System.

The Laboratory's *Environmental Report 2007* may be viewed on the Lab's website at <https://saer.llnl.gov/>. It also is available in the environmental repositories at the Laboratory's Discovery Center and in the Livermore and Tracy public libraries.

Discover LLNL is a publication of the Public Affairs Office at Lawrence Livermore National Laboratory.

If you would like to be included in the distribution of Discover LLNL, please contact Linda Lucchetti, lucchetti1@llnl.gov, or call (925) 422-5815.

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