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TRACY EDITION

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Lawrence Livermore National Security assumes management of LLNL

On Oct. 1, Lawrence Livermore National Security, LLC (LLNS) assumed management of Lawrence Livermore National Laboratory (LLNL). LLNS, a limited liability company, took over the reins from the University of California, which had managed the Laboratory for 55 years.

George Miller, Laboratory director and LLNS president, said the event "marks a new chapter in the long and proud history of our Laboratory."

"For 55 years, this Laboratory has served the nation by ensuring and enhancing its safety and security. Through LLNS, we will continue to

"This marks a new chapter in the long and proud history of our Laboratory."

— *Director George Miller*

apply world-class science and technology with enhanced business and operational capabilities to answer the many challenges that lie ahead," Miller said.

LLNS was formed by entities renowned for their expertise and accomplishments throughout the DOE nuclear weapons complex and beyond. The LLNS team includes Bechtel National, the University of California, BWX Technologies, Washington Group International and Battelle.

Bechtel National is the largest project management contractor in the United States. The University of California is the world's largest public research institution. BWX Technologies and Washington Group International are the top two DOE nuclear

facilities contractors and between them manage and operate four of DOE's five safest sites. Battelle is a global leader in science and technology. The team also includes Texas A&M University, which provides an important academic alliance.

The Laboratory will continue to be known as the Lawrence Livermore National Laboratory, a national security facility operated for and funded by the U. S. Department of Energy.

Many of the management-related changes may not be noticeable to the community at large. With the transition, Miller emphasized that the Lab's mission remains unchanged: to apply world-class science, technology and engineering to important national issues, including stockpile stewardship, global security, energy and environment and basic science.



Director George Miller

LLNL scientists contributed to work behind Nobel Peace Prize

"Many PCMDI scientists have worked diligently to improve our scientific understanding of the nature and cause of climate change, and to facilitate the distribution of climate model data to our entire community."

— Ben Santer, one of the Lab contributors during a press interview

More than 40 Lawrence Livermore National Laboratory researchers were key scientific contributors to the reports of the Intergovernmental Panel on Climate Change (IPCC), which, along with former Vice President Al Gore, won the 2007 Nobel Peace Prize.

The Norwegian Nobel Committee announced in October that the Nobel Peace Prize for 2007 is to be shared, in two equal parts, between the IPCC and Gore for their efforts to build and disseminate greater knowledge about manmade climate change and to lay the foundations for the measures that are needed to counteract such change.

The Lab's Program for Climate Model Diagnosis and Intercomparison (PCMDI) has made major contributions to all four of the IPCC reports, from the First Assessment Report in 1990 to the Fourth Assessment Report in 2007.

By awarding the Nobel Peace Prize to the IPCC and Gore, the Norwegian Nobel Committee is seeking to contribute to a sharper focus on the processes and decisions that appear to be necessary to protect the world's future climate, and thereby to reduce the threat to the security of mankind.

First compact proton therapy machine for cancer treatment enters development

The first compact proton therapy system — one that would fit in any major cancer center and cost a fifth as much as a full-scale machine — is one step closer to reality with a technology transfer agreement announced earlier this year.

Proton therapy is considered the most advanced form of radiation therapy available, but size and cost have limited the technology's use to only six cancer centers nationwide.

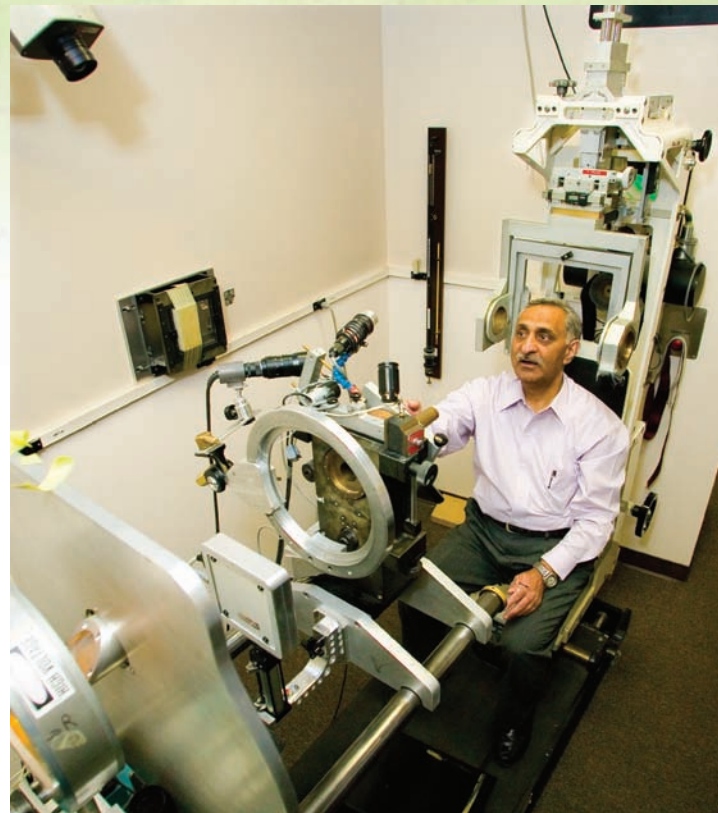
The result of defense-related research, the compact accelerator is being developed by scientists at Lawrence Livermore National Laboratory in a project jointly funded by the Laboratory and UC Davis Cancer Center. In the new technology transfer pact, Lawrence Livermore National Laboratory has licensed the technology to TomoTherapy Incorporated of Madison, Wisconsin.

TomoTherapy will fund development of the first clinical prototype, which will be tested on patients at UC Davis Cancer Center. If clinical testing is successful, TomoTherapy will bring the machines to market.

"We are excited about applying this new technology to the field of cancer treatment, to make proton therapy widely available as a treatment option," said George Caporaso, the lead scientist on the project at Lawrence Livermore.

Conventional radiation therapy kills cancer cells using high-energy X-rays. These X-rays deliver energy to all the tissues they travel through, from the point they enter the body, until they leave it. Doctors therefore have to limit the dose delivered to the tumor to minimize damage to surrounding healthy tissue.

Unlike high-energy X-rays, proton beams deposit almost all of their energy on their target, with a low amount of radiation deposited in tissues from the surface of the skin to the front of the tumor, and almost no "exit dose" beyond the tumor. This capability enables doctors to hit tumors with higher, potentially more effective radiation doses than is possible with gamma radiation.



Inder Daftari, a medical physicist at UC San Francisco, shows how a patient with melanoma of the eye would receive proton beam therapy at the Crocker Nuclear Laboratory at UC Davis. In the future, a proposed compact proton therapy machine would make this treatment much more accessible to cancer patients.

Worldwide, there are 25 proton therapy centers in operation. Together, they have treated an estimated 40,000 patients.

The compact accelerator will be mounted on a frame that rotates about the patient. The compact system is expected to fit in standard radiation treatment suites and cost about one-fifth as much as today's current proton therapy systems.

San Joaquin Expanding Your Horizons conference attracts young women

Approximately 300 girls attended the San Joaquin Expanding Your Horizons conference at the University of the Pacific in Stockton on Oct. 6. Attendees rolled up their sleeves to take part in a variety of hands-on workshops and learned about math and science professions at a career fair. More than 30 LLNL volunteers participated.

The annual conference is sponsored by the Lawrence Livermore and Sandia National Laboratories and the University of the Pacific School of Engineering.

During a workshop entitled "Chemistry and Crime" girls use chromatography to analyze ink mixtures in order to solve a mock forgery crime.



In the community...

Tracy science teacher builds bridges from the classroom to the Laboratory

If you have lived in Tracy during the past two decades and if your children attended Tracy High School, chances are you know Kirk Brown, an amiable and energetic science teacher who has influenced scores of Tracy students.

What you may not know is that Brown also has helped science teachers throughout the San Joaquin and Tri-Valley areas by shaping teacher enhancement programs offered at LLNL.

Currently the science department chair, Brown has been a part of the Tracy High School faculty for 20 years, teaching advanced biology and biotechnology.

A Manteca native, he attended Modesto Junior College and went on to Stanislaus State University to earn a degree in biology and entomology. He then earned a master's degree in education from the University of the Pacific in Stockton.

Over the years, Brown has shared the marvels of science with students — many have gone on to graduate from prestigious colleges and universities like Yale, Stanford, MIT and Edinburgh in the United Kingdom. Graduates who have since become doctors, engineers and scientists often return to Tracy to visit his classroom.

"As a science teacher, my job is to go beyond instruction and show my students all the cool things that are happening," explains Brown. "I try to make it personal; I show them the con-

nection between current research and the projects they are working on in class."

In 1992, Brown was invited to participate in a new teacher education program. Thus began his strong affiliation with Lawrence Livermore National Laboratory, working with scientists and educators to develop programs geared for science teachers, such as the Biotechnology Education Program and the Laser Science and Optics for the Classroom course. These programs focus on teacher development and training with a strong emphasis on integrated instruction. In addition, he has helped to develop classroom-ready materials.

Brown has a long list of awards, including being named teacher of the year, the Milken National Educator award and California's Outstanding Biology Teacher for 2003, sponsored by the National Association of Biology Teachers. This year, he garnered a DINA award, Northern California's life science "Oscar" sponsored by BayBio, a life science trade association based in South San Francisco. He received the award for his key role in life science advancements, making him the first educator to receive this honor.

"I have risen in my field of expertise — biology. At the same time, I have been able to build bridges that link the research breakthroughs at LLNL to the science projects that students are exploring in the classroom. I believe I am making a difference."



Tracy High School science teacher Kirk Brown surrounds himself with curious students. Here they examine an amulet containing DNA.

"As a science teacher, my job is to go beyond instruction and show my students all the cool things that are happening."

- Kirk Brown



Science on Saturday debuts at Tracy's Grand Theater

The Lawrence Livermore National Laboratory's Science on Saturday lecture series arrived in Tracy in grand style. After appearing over the past decade at locations in the Tri-Valley and San Joaquin Valley, this November marked the first time the lectures were brought to Tracy at the newly refurbished Grand Theater in the heart of the city's downtown.

More than 400 students, teachers and community members spent two consecutive Saturday mornings sharpening their science savvy and learning about the Laboratory's current research in the areas of energy and the environment.

On Nov. 10, "Driving a Rocket Fueled Car: 500 Miles at 400 Degrees below Zero," was presented by LLNL scientist Gene Berry, and Tracy High School teacher Dean Reese. Berry and Reese teamed up to discuss the promise and challenges

of generating hydrogen from water and storing hydrogen fuel as a pressurized gas or cryogenic liquid. Along for the ride was a recent Lab breakthrough — a hydrogen-operated Toyota Prius.

On Nov. 17, "Energy Crisis: Will Technology Save Us?" was presented by LLNL scientist John Ziagos and Tracy High School teacher Ken Wedel. They talked about the latest scientific understanding of Earth's total energy budget and what the U.S. energy system might look like in 2050.

The Science on Saturday lecture series is intended for middle and high school students and teachers. For more information about upcoming lectures, go to the Web at <http://education.llnl.gov/sos>. In addition, past lectures are viewable via the Web at <http://education.llnl.gov/>



James Franco, superintendent of the Tracy Unified School District, takes a peek at the hydrogen-operated Toyota Prius parked in front of the Grand Theater before the Science on Saturday lecture in Tracy.

Calling all fifth-grade classes: Let's take a Super Science field trip



This is what students and teachers have said about the trips:

"The children's interest in science was truly sparked."

"We really loved the experiments. You taught us a lot of science facts."

"Thanks for teaching my class about the wonders of science and how they can be involved in it."

Field trips to LLNL's Discovery Center for individual fifth-grade classes are available Monday through Friday mornings during the school year.

Students will enjoy science displays, group activities and hands-on experiments. Activities are aligned with the California State Science Standards. Prior to the field trip, teachers receive a packet of information to motivate students. Follow-up lessons and resources for classroom use are provided during the visit. Field trips also are available for scout troops and science clubs.

Reservations are required. For more information, go to the Web at http://www.llnl.gov/pao/com/school_tours.html or call (925) 423-3272.

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 at lucchetti1@llnl.gov or call (925) 422-5815.

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