

September 2004



Partners in Education



THE Lawrence Livermore National Laboratory (LLNL) has a long and successful history of contributing to science and technology education. In fact, the Laboratory is committed to help train the nation's next generation of scientists and engineers through its outreach programs that span all educational levels. With the start of the new school year,

LLNL would like to update you on the wealth of education programs currently available. This bi-annual newsletter specifically highlights programs that target grades K–12 and community colleges in the Tri-Valley and Central Valley. Many of these programs allow for online, web-based registration. Web page addresses are provided where available.

Mark Your Calendar

- September 24 – 25, 2004..... Edward Teller Science & Technology Symposium for Teachers
- October 2, 2004..... San Joaquin Expanding Your Horizons for Middle & High School Girls
- October 2004 – June 2005..... Fun with Science Van for Elementary and Middle Schools
- October 2004 – June 2005..... LLNL School Tours for 4th & 5th Grade Students
- February 5 – March 5, 2005 Science on Saturdays for Middle & High School Students, Pleasanton
- March – April (dates TBD) 2005 ... Science on Saturdays for Middle & High School Students, San Joaquin
- March (date TBD) 2005 Tri-Valley Expanding Your Horizons for Middle & High School Girls
- March (date TBD) 2005 Mills College Expanding Your Horizons for Middle & High School Girls
- March 16 – 19, 2005 Tri-Valley Science & Engineering Fair for 7th–12th Grade Students



Reflections on Summer...

MORE than 2000 people came to **Got Science?** Discover Science Saturday, a fun-filled family-oriented science extravaganza held at the Lab's Discovery Center on July 24. Children could ride an energy bike, simulate an earthquake, make their own DNA jewelry, learn the physics

"It was great to see so many families come out to see the things we do. We reached out to quite a few budding scientists."

Michael Anastasio, Laboratory Director

of auto racing, and interview mystery scientists to discover what they do. Other displays highlighted the science of robotics, rocketry, lasers, and sun spots. Scientific Jam, a local musical group featuring Livermore science teacher Jeff Hale, mixed science and sounds, playing original tunes like "Fathom the Atom" and "Moving Molecules." The program was so popular that it will be repeated next summer.



Crowds enjoy Got Science? event.

The Laboratory successfully piloted a new **Science Adventure Institute at LLNL (SAIL): CSI Livermore Lab** in August. Two one-week sessions were conducted for children entering 7th and 8th grades. Students were immersed in forensic science as they investigated, documented and analyzed a mock crime scene; conducted DNA, fingerprint, soil, handwriting and various chemical analyses; and held a mock trial to present their findings and solve the crime. The program was developed and conducted with the help of Pauline Huben, a fifth-grade teacher at Livermore's Altamont Creek Elementary School, and Mark Pelham, an elementary school science specialist from the San Ramon Valley Unified School District. Gena Steward, from the Livermore Police Department's Crime Lab, discussed evidence from a real-life criminal case. Students also toured LLNL biotechnology labs and heard presentations from Lab scientists about real crime cases and new techniques being developed to aid investigations. The forensic science study developed for SAIL is currently being modified to a 5th grade curriculum and will be offered to Livermore elementary schools this school year. After piloting in Livermore, the curriculum will be made available to other school districts.

"I had a blast, pretty cool. I liked all the science stuff and the blood and the soil."

Jeff Rivera, Student, Salida Middle School

LLNL assisted Alameda County Supervisor Keith Carson's office with a new science/engineering summer camp for West Oakland middle school students, called **SCI FY (Science for Youth)**. The program, which attracted 50 students over a two-week period in August, covered a wide range of topics, from cleaning up an oil slick to building a replica of a lung. Lab volunteers assisted with camp planning and taught a number of the workshops.

Crime scene investigation at LLNL.



Project CURE students touring lab.

The Laboratory continues to host **student academic enrichment programs** to highlight science and technology careers to gifted students. This past July, Project CURE, a curricular initiative between Mills College and College Track designed for incoming high school freshmen in the Oakland area, visited LLNL to tour the Biology and Biotechnology Research Program and hold career discussions with a panel of Lab scientists. Project CURE offers students rigorous preparation for high school academics, while providing opportunities to learn core content as applied to the context of their lives. Students with the California State Summer School for Mathematics and Science (COSMOS) and the Young Scholars Program, both summer programs at the University of California Davis for top high school students, also toured Lab facilities during the summer. This coming school year, LLNL will play host to high school girls from the Tri-Valley Making Electives Count for Career Achievement (MECCA) Project.

"It was such a treat to see the students interacting with the panel of scientists. What I think they gained the most from was how scientists think about problems and how they tackle their research. That exchange increased the students' science language comprehension and allowed them to make connections that I as their teacher could not do."

Elsie Ovrahim, Project CURE Director, Mills College

The annual summer **Teacher Research Academy** is held at the Edward Teller Education Center (ETEC), located at LLNL, each July. More than 100 teachers throughout California participated this year, up from 80 teachers in 2003, the initial year of operation. The Academy provides teacher development in a variety of scientific disciplines, including biotechnology, environmental science and biophotonics. Participating teachers receive instructional materials and equipment for use in their classrooms (<http://education.llnl.gov/teacher.html>).

More than 320 teachers attended this summer's **Computer Technology Workshops for Educators**, offered free of charge by the Lab during July and August. These one-day workshops provide



teachers with the skills to make better use of their school's computer technology and to access teaching resources available through the Internet (<http://education.llnl.gov/technology/>).

Some 450 **student employees** from colleges and universities around the world converged on LLNL this summer to work alongside Lab scientists and researchers. Students came from the United States, Germany, China, the Netherlands, Poland, Russia, England and France. The summer student employee program is one of the many ways in which LLNL reaches out to help educate the next generation of scientists and engineers.



Lab Director Mike Anastasio meeting summer student employees.



Student Enrichment Programs

WITH school back in session, the **Fun with Science** traveling science show (<http://education.llnl.gov/fws/>) and **School Tour Program** (<http://www.llnl.gov/llnl/06news/Community/schooltours.html>) are up and running again. Fun with Science presenters visit up to two area schools a week and entertain students in K-8th grades with demonstrations on chemistry and physical and environmental sciences. The popular School Tour Program for 4th–5th graders includes a half-day morning visit to the Lab's Discovery Center followed by an interactive, hands-on Fun with Science show. Register early. Both programs, offered without cost to the schools, fill up fast.

"This is one of the best field trips I have taken my class on. The kids loved it and were excited. The parents also loved it!"

Connie Ormond, Teacher, Arroyo Seco, Livermore

The Department of Energy **Joint Genome Institute Production Genomics Facility (JGI)** in Walnut Creek offers school tours for high school and college students. JGI is one of the most prolific DNA sequencing operations in the world. A tour typically includes a 15-minute overview of the historic context of sequencing. Then, JGI researchers conduct a 45-minute tour of the actual production floor where students glimpse the dynamic world of biotechnology, increasingly automated and dependent on robotics and computation, and see how industrial-strength DNA sequencing can be brought to bear on some of the fundamental challenges of biology. Afterward, a JGI biologist presents the evolutionary context and importance of the organisms that have been sequenced by JGI. To schedule a tour, contact David Gilbert, (925) 296-5643, gilbert21@llnl.gov.

Livermore and Sandia National Labs co-sponsor three annual **Expanding Your Horizons (EYH)** conferences for middle and high school girls. EYH is intended to spark the interest of young women in mathematics and science through positive, hands-on experiences and career discussions with

professionals. Some 1,500 girls attend the three conferences each year. The San Joaquin conference, held at the University of the Pacific in Stockton, is scheduled for October 2, 2004. The Tri-Valley and Mills College conferences will be held on a Saturday in March 2005 (<http://www.llnl.gov/eyh/>).

Save your Saturdays from February 5 through March 5, 2005 for the exciting **Science on Saturday (SOS)** lecture series. These free lectures and demonstrations target students 6th grade and older and are held at Amador Theater in Pleasanton. Some of this year's lectures will include DNA fingerprinting of the universe, finding new galaxies by studying black holes, and the application of forensic science to biodefense. SOS has been extended by popular demand to the San Joaquin Valley, in collaboration with UC Merced and Merced College, to help



Students tour Joint Genome Institute.

develop college-bound student interest in science and technology (<http://education.llnl.gov/sos/>).

Science Chat is a one-hour informal discussion with a scientist following the Science on Saturday lectures. High school students have the opportunity to question SOS presenters about their research and career choices to help determine if a technical career may be the right choice for them. Attendance is limited and requires pre-registration via the web (<http://education.llnl.gov/sciencechat/>).

It's time again to get ready for the **Tri-Valley Science and Engineering Fair** (TVSEF), the Lab co-sponsored science and engineering competition for Tri-Valley 7th–12th graders, to be held March 16-19, 2005, at the San Ramon Valley Conference Center. A record 362 students from over 20 local schools entered projects in 2004. Teacher instruction packets will be out in September. Procedural changes are occurring this year, and applications must be received by February 11, 2005, without exception, for a student to qualify for the fair. Teacher and student training sessions will be offered to participating schools. Senior sweepstakes winners from TVSEF are invited to compete at the Intel International Science & Engineering Fair (<http://tvsef.llnl.gov/>).

The Laboratory will be offering **Science Fair 101 for Elementary and Middle Schools** and **Science Fair 101 for High School—Boot Camp in Microbiology**. Science Fair 101 was created collaboratively with the Livermore Valley Joint Unified School District and instructs students on how to prepare science fair projects. It will be presented at four locations in the Tri-Valley for 100 students and parents. Boot Camp helps high school students create science fair projects using microbiology

Tri-Valley
Science and
Engineering
Fair.

technology. The curriculum will be presented at three locations in the Tri-Valley, serving an estimated 75 students. Both events will be conducted during November 2004 through January 2005, with dates and location TBD. To register for email notification for either or both events, contact Richard Farnsworth at farnsworth1@llnl.gov.

The Laboratory's **2005 Teller Scholarship**, offered in collaboration with the Livermore Valley Joint Unified School District, will be awarded to a graduating senior from Livermore High School and Granada High School who demonstrate exemplary scholarship in the study of science during their high school career. The recipients for 2004 were Nicole Sadler, Granada, and Lauren Tracy, Livermore.



Professional Development Opportunities

THE Edward Teller Science and Technology Symposium, scheduled for September 24-25, 2004, is a two-day event that immerses secondary science teachers and community college faculty in one of six specific themes consistent with the California Science Education Standards. Themes include physics, chemistry, biology, biophotonics, environmental science, radiation science and astrophysics. Each participant will tour laboratories related to their chosen theme, discuss current research achievements with scientists and engineers, and work side by side with science professionals using hands-on activities developed for classroom application. Educators receive a first-hand look at state-of-the-art research facilities and research projects, classroom-ready lessons to take back to their schools, and one semester unit of college credit. (<http://education.llnl.gov/symposium2004/>)

Additional Resources

Community & External Relations: <http://www.llnl.gov/llnl/06news/community.html>

Edward Teller Education Center: <http://etec.ucdavis.edu>

Joint Genome Institute: <http://www.jgi.doe.gov/index.html>

Science & Technology Education Program: <http://education.llnl.gov>

Technical Literacy Project, East Bay Chapter: http://www.ebste.org/TechLit/TL_Front.html

TOPScience: <http://www.edserv.sjcoe.net/TOPS>

DOE Science for Kids of All Ages: http://www.science.doe.gov/Sub/For_Kids/For_Kids.htm

For general questions or comments:

Contact Ann Willoughby, Public Affairs Office, (925) 423-4234, willoughby1@llnl.gov

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For questions regarding the Edward Teller Education Center:

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