LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

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A Year of Exceptional Achievements FY 2008

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Disclaimer

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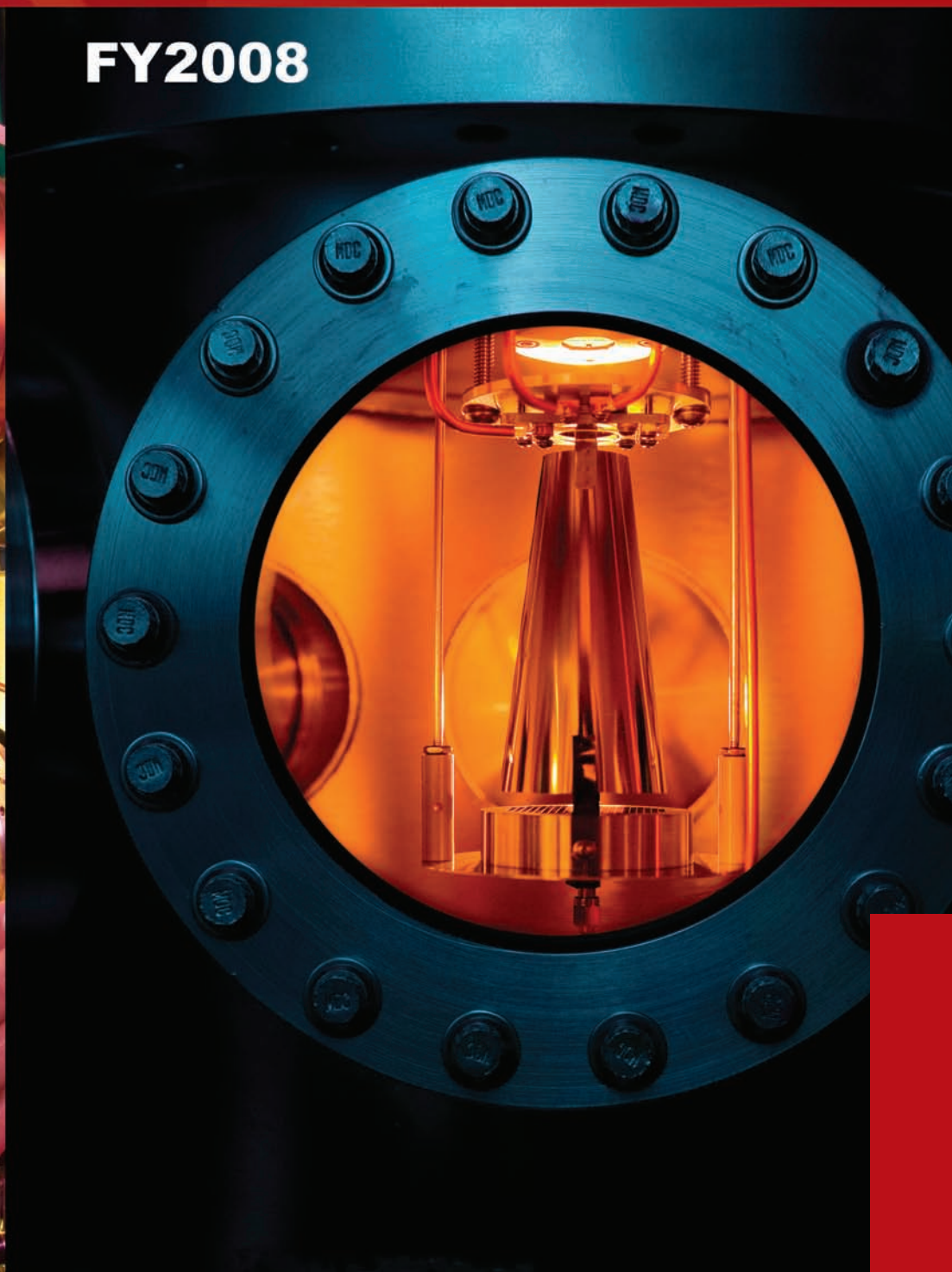
Lawrence Livermore National Laboratory

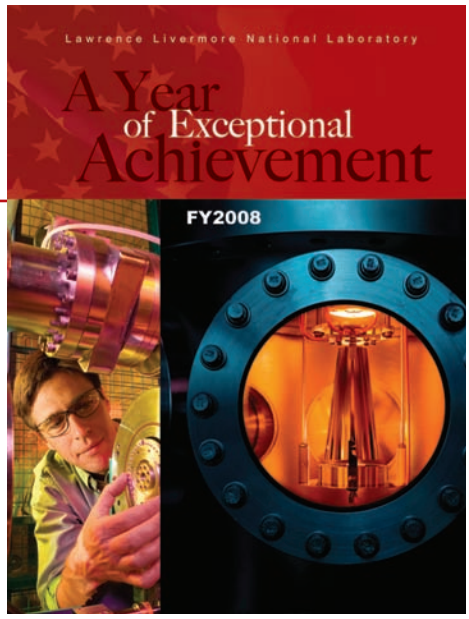
A Year of Exceptional Achievement



FY2008

About the Cover

Scientists at the Center for Accelerator Mass Spectrometry are making unique contributions to studies of the effects of drugs on the human body (left). Laboratory researchers are partnering with a private company and the University of California at Davis to develop proton radiography for cancer treatment (right).



About the Laboratory

Lawrence Livermore National Laboratory was founded in 1952 as a nuclear weapons research facility. Livermore has a core mission in national security and applies its scientific and technical capabilities to solve nationally important problems. With its world-class workforce and atmosphere of intellectual integrity and innovation, the Laboratory has sustained scientific and technical excellence for more than 55 years. The Laboratory is managed by Lawrence Livermore National Security, LLC, for the National Nuclear Security Administration within the U.S. Department of Energy.

Contents

Director's Perspective

George H. Miller
LLNL Director
LLNS President

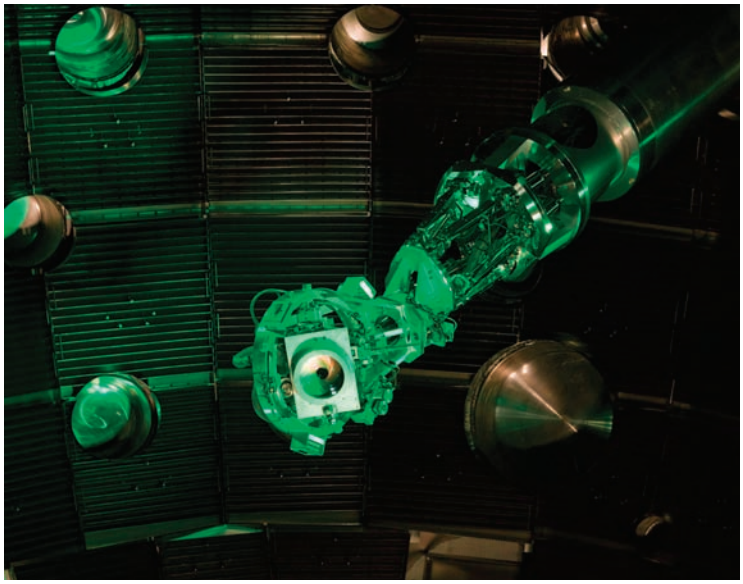
Positioning the Laboratory for the Future

Fiscal year 2008 was a period of significant transition and transformation for Lawrence Livermore National Laboratory (LLNL). On October 1, 2007, a new contractor—Lawrence Livermore National Security, LLC (LLNS)—assumed management of the Laboratory. LLNS is committed to carrying on the Laboratory's tradition of scientific and technical excellence in service to the nation while finding new ways to achieve operational and cost efficiencies.

There is growing recognition in Congress, among our sponsors, and across the nation of the imperative to sustain America's preeminence in science and technology innovation. At the same time, there is renewed recognition that LLNL and the other national laboratories have a vital and unique role in developing technical solutions to the nation's most pressing challenges.

As we look ahead to next year and beyond, we know that change is the only constant. Advances in science and technology are opening up exciting new possibilities for confronting emerging threats and long-standing challenges. The ongoing transformation of our Laboratory will take us to a vibrant future with many opportunities to contribute to national security and global stability.

2008 Highlights



Stockpile Stewardship and Complex Transformation

LLNL achieved scientific breakthroughs that explain some of the key "unknowns" in nuclear weapons performance and are critical to developing the predictive science needed to ensure the safety, reliability, and security of the U.S. nuclear deterrent without nuclear testing. In addition, the National Ignition Facility (NIF) passed 99 percent completion, an LLNL supercomputer simulation won the 2007 Gordon Bell Prize, and a significant fraction of our inventory of special nuclear material was shipped to other sites in support of complex transformation.

National and Global Security

Laboratory researchers delivered insights, technologies, and operational capabilities that are helping to ensure national security and global stability. Of particular note, they developed advanced detection instruments that provide increased speed, accuracy, specificity, and resolution for identifying and characterizing biological, chemical, nuclear, and high-explosive threats.

Exceptional Science and Technology

The Laboratory continued its tradition of scientific excellence and technical innovation. LLNL scientists made significant contributions to Nobel Prize–winning work on climate change. LLNL also received three R&D 100 awards and six Nanotech 50 awards, and dozens of Laboratory scientists and engineers were recognized with professional awards. These honors provide valuable confirmation that peers and outside experts recognize the quality of our staff and our work.

Enhanced Business and Operations

A major thrust under LLNS is to make the Laboratory more efficient and cost competitive. We achieved roughly $75 million in cost savings for support activities through organizational changes, consolidation of services, improved governance structures and work processes, technology upgrades, and systems shared with Los Alamos National Laboratory. We realized nonlabor cost savings of $23 million. Severe fiscal constraints necessitated a major workforce restructuring and reduction.

Nuclear Deterrence

Ensuring the safety, security, and reliability of the enduring stockpile and supporting the transformation of the nuclear weapons complex

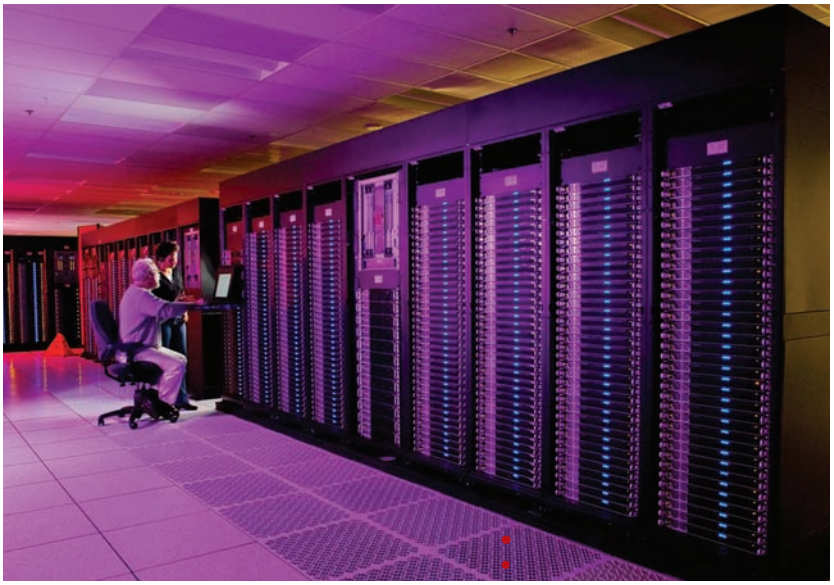
LLNL's foremost responsibility is to ensure the safety, security, and reliability of the U.S. nuclear deterrent. Researchers use experiments, theory, and simulations to delve into science at its most basic to understand nuclear weapon performance and the effects of aging on weapon materials, to assess the condition of stockpile weapons and develop modifications as needed, and to certify weapon performance without nuclear tests. As a center of excellence for nuclear design and engineering, we are pursuing innovations in design, materials, and manufacturing to help transform the nuclear weapons complex.

2008 Highlights

Annual Stockpile Assessment

The Laboratory completed Cycle 13 of the Annual Stockpile Assessment Process, adding depth and rigor to the Quantification of Margins and Uncertainties (QMU) methodology. QMU, which is used to quantify uncertainties in weapon performance, was also applied in the assessment of two additional weapon systems.

2008 Highlights



Supercomputing Resources

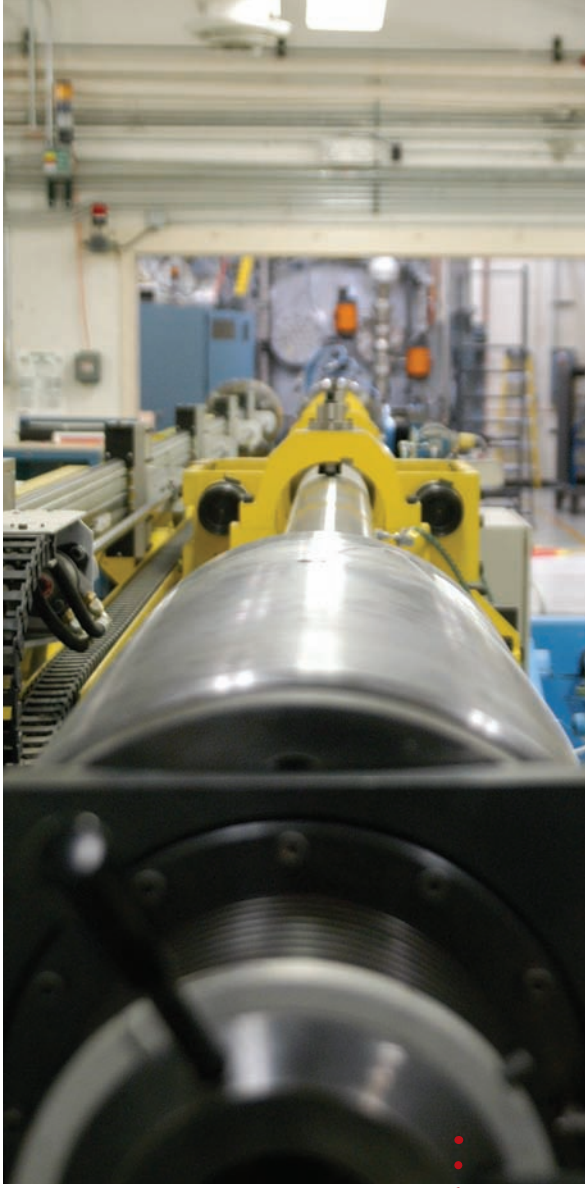
Following the March signing of Sequoia Critical Decision 1 by the National Nuclear Security Administration (NNSA), we solicited and received bids for this next Advanced Simulation and Computing (ASC) supercomputer, which is slated to run at 14–20 petaflops. Throughout the year, our Purple and BlueGene/L machines efficiently met the high-priority computing needs of all three NNSA laboratories. In addition, we led the development of the Tri-Lab Linux Capacity Cluster "Tri-Pod" strategy for procuring smaller-job ASC computers to provide a consistent user environment and common operating system.

3D Energy Balance Model

Livermore scientists developed a first-generation, three-dimensional energy balance model, meeting an NNSA "Getting the Job Done" Top 10 deliverable for FY2008. With a quantitative model for this key weapons physics issue, we are moving closer to a predictive assessment capability that will eliminate the need for adjustable parameters set by design-specific nuclear test data.

Gordon Bell Prize

Using a revolutionary computational technique that could change the way high-performance scientific computing is conducted, a team of scientists from LLNL and IBM earned the 2007 Gordon Bell Prize for a simulation of Kelvin–Helmholtz instability on BlueGene/L, at the time the world's fastest supercomputer. This molecular dynamics simulation of 62.5 billion atoms revealed how the instability develops from atomic-scale fluctuations into micrometer-scale vortices.



Stockpile Stewardship Experiments

The Laboratory completed a series of experiments at the Joint Actinide Shock Physics Experimental Research (JASPER) Facility that accurately determined the low-pressure equation of state for plutonium. Only with JASPER's unique capabilities has it become possible to obtain this critical data, required for the National Boost Initiative to address a key weapon performance issue. Also this year, we hosted two hydrodynamic experiments at our Contained Firing Facility for Los Alamos National Laboratory's work on the W76 warhead.

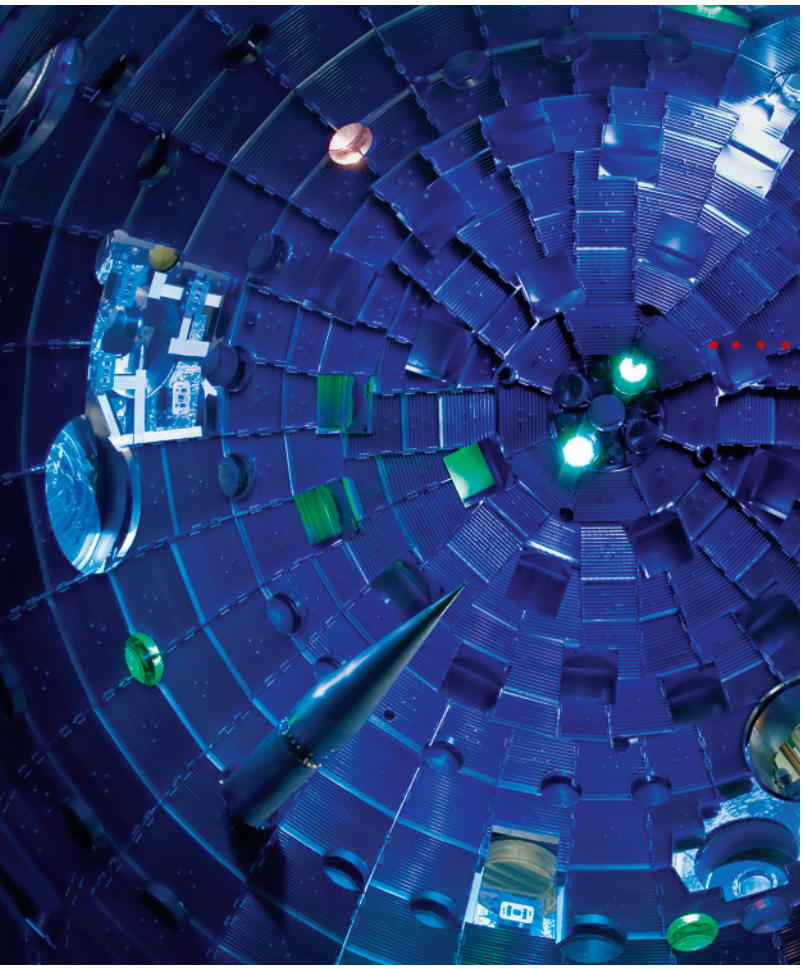
Removal of Special Nuclear Material

We reduced our inventory of special nuclear material by about 25 percent as part of the NNSA Complex Transformation Initiative to remove such material from LLNL by 2012. The three shipments were completed in full compliance with all safety and environmental procedures, laws, and regulations.

National Ignition Facility

Delivering on-time, on-budget progress toward NIF project completion, meeting the milestones required to launch the ignition campaign, and establishing the basis for a national NIF user facility

NIF is the most powerful laser system in the world. By providing the capabilities to achieve fusion ignition and burn—the power of the Sun—in a laboratory setting, NIF is a critical experimental facility for stockpile stewardship and an important international scientific resource. NIF will be used to resolve key issues about the "nuclear" performance of nuclear weapons, investigate the properties of matter at extreme conditions, and explore possibilities for a clean energy future.



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NIF Construction

The NIF project is more than 99 percent complete, with all 192 beamlines tested. Operational qualification shots have demonstrated a combined infrared energy of more than 4 megajoules. Final optics have been installed in 10 quads (40 beamlines), and two quads have been shot to the target chamber at a total ultraviolet energy of 43 kilojoules, or about half of full-NIF energy.

National Ignition Strategy

The National Ignition Campaign (NIC) completed the first simulated ignition campaign. This red team/blue team activity exercised all facets of the NIC experimental program and key aspects of the strategy for achieving fusion ignition. Over the course of several months, the team conducted 25 simulated shots to examine the 100-shot ignition campaign plan.

Ignition Targets

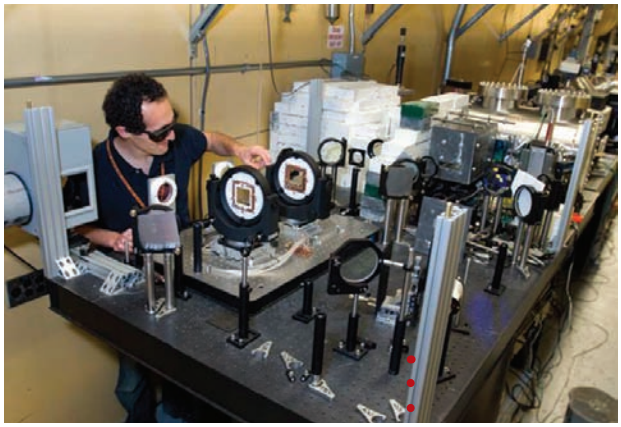
Laboratory scientists met key NIC milestones to carry out fusion ignition and burn experiments. The campaign shot plan for FY2010 and the ignition point target design were updated, reviewed by NIC participating sites, and placed under configuration control. Researchers fabricated and characterized an engineering prototype ignition target that successfully met specifications for point design.

NIF Systems

In preparation for fusion ignition experiments, our scientists and engineers significantly enhanced the Integrated Computer Control System software to permit fully automated control of shot sequences. In addition, a new automated Final Optics Damage Inspection system was installed that reduces the time required to inspect the condition of the final optics for 48 beamlines from two days to one hour. Progress was also made in installing the cryogenic target system, diagnostic systems, and an integrated data analysis and visualization tool.

OMEGA Experiments

LLNL scientists used the OMEGA laser at the University of Rochester's Laboratory for Laser Energetics to demonstrate several important diagnostic techniques for NIF, including a method for imaging the evolving implosion of the ignition capsule and for timing shocks in the capsule. Experiments with OMEGA also verified theoretical predictions that a hohlraum with low-density "foam" walls would produce x rays more efficiently, making it possible to ignite a fusion target at lower laser power.



T-REX First Light

The Thomson-Radiated Extreme X-Ray (T-REX) source achieved "first light" of 0.776 megaelectronvolts. By generating high-energy gamma radiation, T-REX's peak brightness will be up to 10 orders of magnitude greater than current synchrotron light sources. Potential applications for T-REX technology include the detection and imaging of concealed fissile material.

LIFE for Energy

Initial studies were conducted of the Laser Inertial Confinement Fusion–Fission Energy (LIFE) concept. LIFE combines the underlying fusion principles of NIF with elements of conventional fission nuclear power plants in a way that minimizes long-lived radioactive waste and nuclear proliferation concerns. This exciting hybrid concept is the next step in the development of almost unlimited, safe, sustainable, carbon-free energy.

Global Security

Providing system solutions to counter proliferation, catastrophic terrorism, and asymmetric warfare, and applying LLNL resources to ensure energy security and confront climate change

Global security is an enduring mission for the Laboratory. Our insights, technologies, and operational capabilities are helping to reduce the threat posed by the proliferation or terrorist acquisition of nuclear weapons or other weapons of mass destruction (WMD). Because energy and water resources are often at the heart of regional conflict, we are devising new technologies and approaches to improve the nation's energy security and confront climate change.

2008 Highlights

Nuclear Safeguards

A team of LLNL researchers demonstrated the feasibility of using antineutrinos for detecting the diversion of fuel in a nuclear reactor. They showed that a cubic-meter-sized antineutrino detector can precisely monitor a reactor's operational status and thermal power over hour- to month-long timescales. The National Academy of Engineering highlighted antineutrino detection as a promising technology for addressing the challenge of preventing nuclear terrorism. We are engaged in discussions with the International Atomic Energy Agency on the use of this technology for the international safeguards regime.

APDS Deployment

Livermore's Autonomous Pathogen Detection System (APDS) was selected for deployment within the national BioWatch biosecurity assurance network. A cooperative research and development agreement was signed with an industry partner for further development of the system and for the manufacture of deployable units.

PCR on a Chip

Researchers from LLNL and the University of California (UC) at Davis developed a microfluidic system that performs nucleic acid analysis via polymerase chain reaction inside tiny, 10-picoliter droplets. This "PCR on a chip" system can detect viruses and other pathogens using sample amounts that are a million times smaller than current commercial instruments with about half the analysis steps, which greatly shortens detection time.

Rapid All-Threat Detection

The Laboratory's Single Particle Aerosol Mass Spectrometry (SPAMS) system demonstrated the ability to detect almost simultaneously and in near-real time four potential threat materials—biological, chemical, explosive, and radiological—as well as illicit drugs. The research team also demonstrated the instrument's potential for rapidly detecting tuberculosis and differentiating it from other bacteria.

BSL-3 Facility

LLNL began operations in its new biosafety level-3 (BSL-3) facility, the first such facility in the Department of Energy (DOE) complex. Research conducted in this facility is aimed at protecting the nation against bioterrorism and infectious diseases that pose public health threats.

Intelligence Assessments

LLNL analysts made important contributions to U.S. intelligence assessments on various proliferation, counterterrorism, and technical topics, including a National Intelligence Estimate. Livermore researchers also developed a software tool called FactWeave that has been used successfully to analyze proliferation procurement networks and key individuals involved in the trafficking of WMD-related materials and equipment.

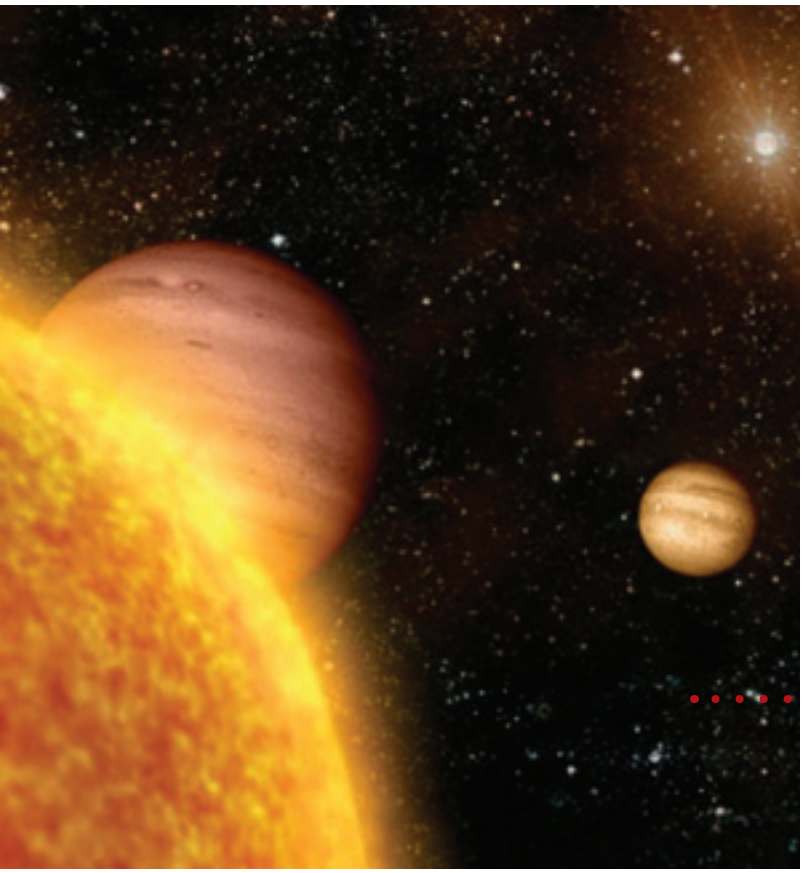
Hydrogen-Fueled Vehicles

LLNL developed a prototype cryogenic hydrogen storage tank that can hold liquid hydrogen for six days without venting any of the fuel (current tanks can hold hydrogen for only two to four days). Our pressure vessel is much stronger than previous tanks and can operate at pressures up to 350 atmospheres, enabling it to contain the hydrogen fuel even as pressures increase because of heat transfer from the environment. With this fuel tank, hydrogen-powered transportation is one step closer to reality.

Science and Technology

Advancing the frontiers of science and technology and developing the capabilities needed to solve problems of national and global importance

Lawrence Livermore is a premier applied science laboratory with state-of-the-art capabilities in dozens of disciplines. Our unique experimental facilities, powerful supercomputers, and multidisciplinary expertise allow us to investigate phenomena that are beyond the reach of other institutions. This year, LLNL researchers made numerous scientific discoveries and engineering breakthroughs and garnered an impressive array of awards and honors.



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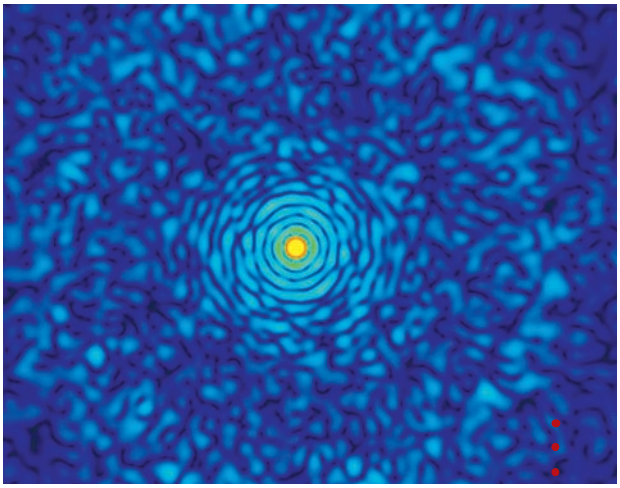
Nobel Peace Prize

More than 40 LLNL researchers were scientific contributors to the reports of the Intergovernmental Panel on Climate Change (IPCC), which, together with former Vice President Al Gore, won the 2007 Nobel Peace Prize. The Laboratory's Program for Climate Model Diagnosis and Intercomparison has been actively involved in the preparation of all four IPCC reports, from the first one in 1990 to the fourth assessment issued in 2007.

New Solar System Discovered

Laboratory scientists were part of a large international team that discovered a new solar system, located some 5,000 light-years from ours, with scaled-down versions of Jupiter and Saturn. The discovery harnessed Livermore's pioneering work in gravitational microlensing, adaptive optics, and computational modeling.



Visualization of Protein Structure

The structure of nanolipoprotein particles was modeled using the Thunder and Zeus supercomputers, as part of LLNL's Computing Grand Challenge Program. Visualizing the structure of these protein particles is an essential step toward understanding the function of membrane proteins, which are involved in an array of cellular processes such as enzyme production and drug interactions.

Fast Flow through Carbon Nanotubes

LLNL researchers discovered the mechanism that allows carbon nanotube membranes to permit the ultrafast flow of water molecules while rejecting ions that make up common salts. Their work revealed that water molecules line up like freight trains to pass through the carbon nanopores (which are 100,000 times smaller than the diameter of a human hair), while the electrical charge at the nanotube ends rejects the salt ions.

Wild 2 Comet Surprises

New research by Livermore scientists and collaborators revealed that the Wild 2 comet samples, returned to Earth in 2006 by NASA's Stardust mission, have a composition that more closely resembles an asteroid than a comet. This finding contradicted researchers' expectations for a comet that has spent most of its life orbiting in the Kuiper Belt, beyond Neptune.

Nanotech 50 Awards

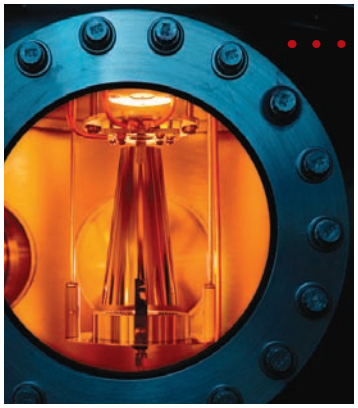
Lawrence Livermore received six Nanotech 50 awards for work in energetic nanocomposites, dynamic transmission electron microscopy, functional nanopores, transparent ceramics from nanoparticles, nanolipoprotein particle formation, and mechanical behavior of nanomaterials. The awards recognize the year's top 50 technologies, products, and innovators that have affected or are expected to advance the state of the art in nanotechnology.

R&D 100 Awards

The Laboratory garnered three R&D 100 award. These "Oscars of Invention" were for a low-cost, reliable, reusable, shipping-container security system; an automated system for rapidly directing and aligning multiple high-energy laser beams; and a dynamic transmission electron microscope that provides the highest resolution ever for digital imaging of ultrafast material processes (above).

Growth in Industrial Partnerships

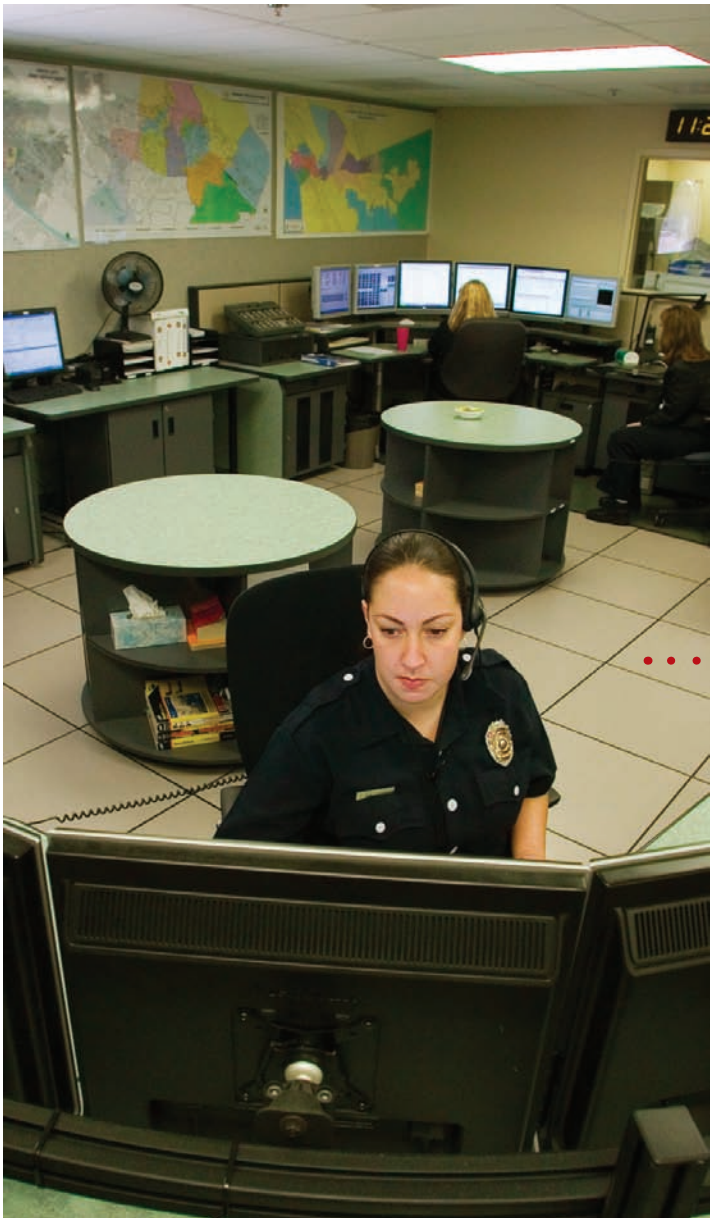
For FY2008, the Laboratory was awarded 58 U.S. patents, filed 111 invention disclosures and 60 patent applications, executed two cooperative research and development agreements (CRADAs) with industrial partners, and issued 73 commercial licenses for LLNL-developed technologies and software. Licensing income increased by nearly 50 percent over last year to a record $9.4 million, representing annual sales of some $250 million in products based on Laboratory technologies. LLNL received two awards from the Federal Laboratory Consortium (FLC) for excellence in technology transfer, one for a compact proton therapy system licensed to TomoTherapy, Inc., of Madison, Wisconsin (below), and the other for a portable neutron detector licensed to ORTEC of Oak Ridge, Tennessee.



Safety, Security, and the Environment

Demonstrating safety and security excellence and responsible environmental stewardship in all our activities

LLNS assumed management of the Laboratory with the aim of strengthening the collective commitment to safety, security, and the environment. Best practices are being standardized and propagated throughout the institution. We are building on successful work practices in individual projects and programs by expanding their use across the Laboratory. We are also drawing on the expertise of the LLNS partners to identify opportunities for increased effectiveness while reducing the cost of our safety, security, and environmental stewardship efforts.



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Fire and Emergency Response

An Emergency Management Department was established to centralize and improve the efficiency and effectiveness of the Laboratory's emergency response capabilities. LLNS contracted with the Alameda County Fire Department (ACFD) to provide emergency services, and ACFD hired all LLNL fire department personnel, who remain assigned to the Laboratory. The Laboratory's fire department continues to manage the Alameda County Regional Communication Center and provide mutual aid to surrounding communities.

Enhanced Security

Upgrades to LLNL's physical and cyber security were part of a continuing effort to anticipate and protect against changing threats. An inspection in spring

2008 Highlights

2008 by the DOE Office of Health, Safety, and Security found both notable practices and areas needing improvement. We took aggressive steps to make necessary changes. For example, a fully integrated force-on-force exercise in August demonstrated an improved protective force response that "resulted in a robust protection strategy," according to NNSA.

Improved Safety Performance

Two groups that routinely work with a wide range of hazards—the Technology Resources Engineering Division (right) and the NIF project—received national safety awards for completing 12 months of work without a single lost day due to injury or illness. These activities together involved more than 650 employees and 1.6 million hours of work. Overall, the Laboratory improved its safety performance, decreasing the total recordable case rate from 2.37 to 2.24 and the days-away case rate from 0.41 to 0.15. More important than these rates is the fact that fewer employees were injured at work.

Energy Conservation

LLNL launched a "Every Watt Counts" energy conservation campaign and achieved a significant reduction in energy use. Energy-saving measures ranged from turning out lights to raising the temperature of computer machine rooms by a few degrees. Taken together, they resulted in an overall energy reduction of 9.94 percent compared with the FY2003 baseline, exceeding the DOE-specified goal of 9 percent (3 percent per year starting in FY2006).

Environmental Protection

As documented in our annual *Environmental Impact Report*, environmental monitoring of operations at the Laboratory indicated no adverse impact to public health or the environment. This assessment provides tangible evidence of LLNL's continuing commitment to responsible stewardship of the environmental resources in its care.

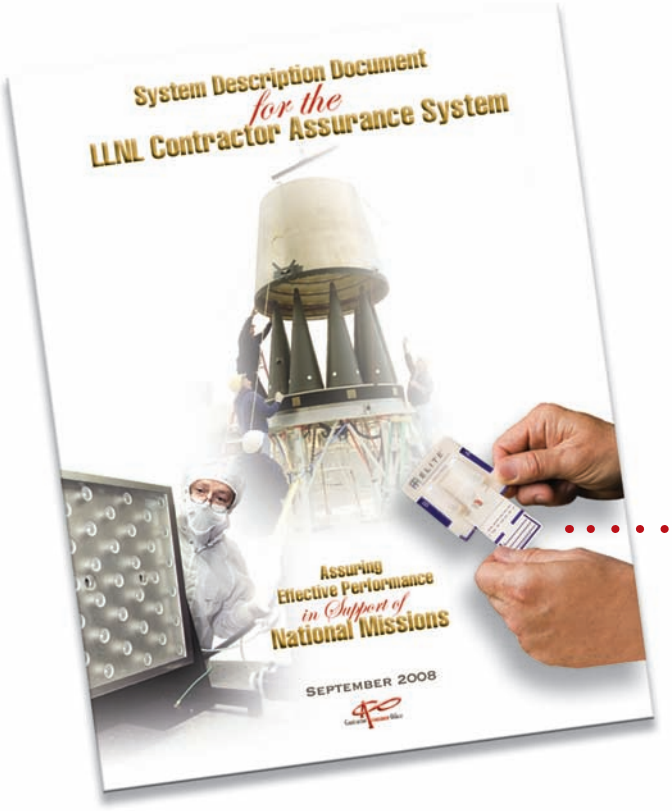
Pollution Prevention

The Laboratory received two DOE Pollution Prevention Awards, one for the E85 fueling station and large fleet of E85-compatible vehicles and the other for efficiency in reusing and recycling materials from demolished structures. In addition, the California Water Environment Association's Pretreatment, Pollution Prevention, and Stormwater Committee presented its Facility of the Year award to LLNL's Sewer Monitoring Team, which operates the sewer monitoring complex for LLNL and Sandia National Laboratories-California.

Management and Operations

Improving work processes, streamlining and standardizing business practices, and achieving cost efficiencies in operations

The Laboratory is committed to excellence in management, business, and operations. A number of initiatives have been launched to standardize work processes, eliminate duplications, and apply value-adding tools for managing work. We also tap the expertise of the LLNS parent organizations to identify opportunities for implementing best practices, integrating services, and managing interfaces so that we can carry out our national security mission as efficiently and cost effectively as possible.



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Workforce Restructuring

A workforce restructuring program was implemented that involved the release of 550 supplemental labor and flexible-term employees, the voluntary separation of 215 career employees, and the involuntary separation of 440 career employees. Together with normal attrition and retirements, Laboratory staffing decreased by more than 1,600 people over the course of the year; LLNL ended FY2008 with approximately 6,900 employees.

Contractor Assurance System

A Contractor Assurance System (CAS) was initiated to provide Laboratory managers, the LLNS Board of Governors, and NNSA with assurance that performance objectives are being met. The system enables the efficient and transparent management of requirements and standards, tracking of issues and their resolution, collection of performance data, and continuous improvement of the assessment process. The Contractor Assurance Office helped define the

governance structure used to oversee the Laboratory's performance.

Cost Savings

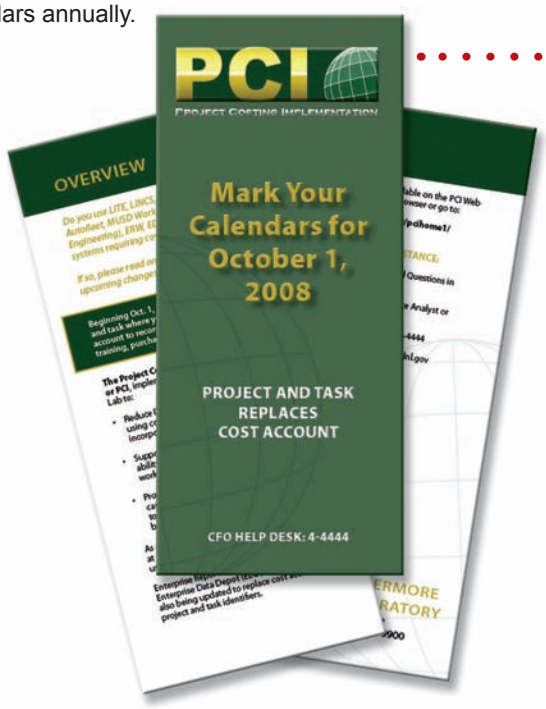
LLNL achieved $75 million in cost savings for support activities in FY2008 through organizational changes, consolidation of services, improved governance structures and work processes, technology upgrades, and shared systems with Los Alamos. Approximately $23 million in nonlabor cost savings came from the use of online travel booking and reduced travel, electronic pay stubs, reduced equipment purchases, renegotiated service contracts, and similar measures.

Performance Evaluation and Improvement

The Laboratory implemented a suite of performance evaluation and improvement tools. For example, we track the execution of the Performance Evaluation Plan (PEP) with PEPstat to ensure compliance with the terms of the prime contract. The PEPstat database provides the monthly status of PEP objectives, identifies issues and concerns, and facilitates communication between LLNL and NNSA's Livermore Site Office. We also developed a Multi-Year Performance Improvement Strategy, which identifies planned efforts and expected accomplishments for FY2009–2013.

Financial and Project Management

The Project Costing Implementation (PCI) initiative was completed on schedule and under budget, transitioning the Laboratory's financial systems to project- and task-based accounting. In addition to providing more timely data and improved tracking of project costs, PCI paves the way for more effective use of best-practice project management tools. PCI also enables the retirement of several legacy financial systems, saving millions of dollars annually.



Reduction in Site Footprint

LLNL made excellent progress toward its goal of reducing the site footprint by 2 million square feet by FY2011. More than 500,000 square feet of space were shut down this year, including 150,000 square feet transitioned to "cold and dark" status. This effort eliminated roughly $9.1 million in annual operating and maintenance costs as well as $29 million in one-time deferred maintenance and seismic upgrade costs.

Property Inventory

The Laboratory received a "far exceeds expectations" rating from NNSA for this year's property inventory. The FY2008 inventory was a statistical sample, and we accounted for 99.99 percent of the items in our inventory base.

Parent Organization Reachback

LLNL drew on expertise in LLNS parent organizations in the form of Functional Management Assessments (FMAs) and Assess, Improve, and Modernize (AIM) teams. Twenty-six FMAs were conducted, eight for mission-related work and 18 for operations and business. Eight AIM teams provided assessments and recommendations in such areas as emergency management, training, nuclear operations, and radiation safety.

Workforce

Recognizing outstanding performance and accomplishments

LLNL requires an exceptional workforce to execute its national security mission and sustain its vitality. The numerous honors and awards received by our employees attest to their exceptional capabilities, talents, and performance. However, FY2008 was an extremely difficult year for our employees. Severe fiscal constraints and the expectation of future lean budgets necessitated a significant workforce reduction, including the involuntary release of career employees for the first time in nearly 35 years.

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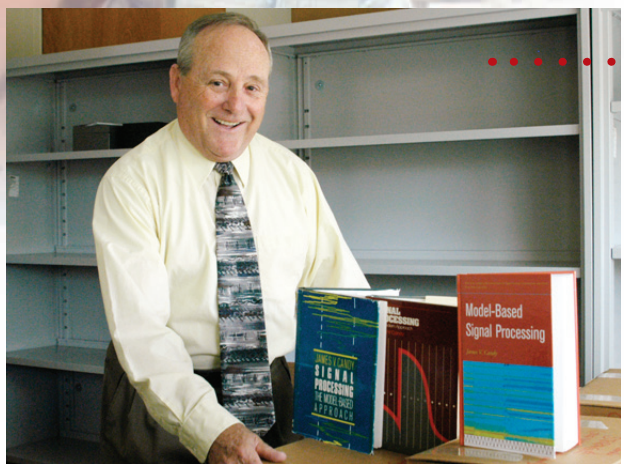


Silver Medal

Engineer Jim Candy received the prestigious Helmholtz–Rayleigh Interdisciplinary Silver Medal from the Acoustical Society of America, a society of the American Institute of Physics, for his contributions to signal processing and underwater acoustics.

Outstanding Journal Referees

Five Laboratory scientists—Peter Beiersdorfer, Mau Hsiung Chen, Ian Thompson, Charles Cerjan, and William Hoover (retired)—received lifetime awards from American Physical Society (APS) editors as outstanding referees of APS journals.

NAS Board Member
Tom Isaacs, head of the Laboratory's Office of Planning and Special Studies, was named to the Nuclear and Radiation Studies Board of the National Academy of Sciences.

Award of Excellence
Laboratory engineer Keith Carlisle received an NNSA Defense Programs Award of Excellence.

Fusion Pioneers
Two pioneers in the field of fusion—Dick Post and John Nuckolls—were honored for their lifetime accomplishments by Fusion Power Associates.

Fulbright Grant
Computer scientist Steve Suppe received a Fulbright Student Grant to study advanced techniques in information retrieval and data mining at the University of Haifa in Israel.

Gold Medal
Chemist Charlie Westbrook was awarded the Bernard Lewis Gold Medal, an award given every two years at the international meeting of the Combustion Institute.

Fellows
Tomas Diaz de la Rubia was elected a fellow of the American Association for the Advancement of Science. Ed Moses, John Taylor, and Alan Frank (retired) were elected fellows of SPIE. Denise Hinkel, Peter Celliers, and Jim De Yoreo were elected fellows of the American Physical Society. Kathy Shingleton was elected a fellow of the Health Physics Society.

Outstanding Mentors
Eleven LLNL scientists received Outstanding Mentor Awards from DOE: Eivind Almaas, Patrick Brantley, Wren Carr, Dustin Froula, Ming Jiang, Richard Johnson, Pam Hullinger, Malvin Kalos, Ted Laurence, Michael Thelen, and Dan White.

Nonproliferation Award
Computer scientist Rusty Babcock was honored by NNSA for her work in developing the Federal Information System, a national accounting system for nuclear materials, for Russia's Federal Atomic Energy Agency.

Hall of Fame
LLNL's chief veterinary officer Pam Hullinger was inducted into the Alameda County Women's Hall of Fame. She is the sixth Laboratory scientist to receive this honor.

Farrant Award
Judy Kim, a graduate student at UC Davis and a fellow in the Laboratory's Lawrence Scholar Program, received the John Farrant Memorial Student Award from the Australian Microscopy and Microanalysis Society for her abstract and research entitled "Nanosecond Imaging in the Dynamic TEM Reveals Unquenchable Transient Microstructure."

Best Dissertation
Lisa Poyneer won two prizes at UC Davis for her doctoral dissertation. They were the College of Engineering's Zuhair A. Manir Award and the Jain Prize from the Electrical and Computer Engineering Department.

Undergraduate Research Excellence
Ronald Page received a Sigma Xi Student Research Award for excellence in undergraduate research based on his work in mathematics and computer science at LLNL

Connections to the Community

Contributing to our local communities through science and math outreach and charitable giving

For more than half a century, LLNL has been a valued and contributing member of the community, with a particular emphasis on outreach in science and math education. The Laboratory also supports local communities through charitable giving, including a new LLNS corporate giving program.

2008 Highlights

Record HOME Contributions

Laboratory employees gave more than $1.4 million to community and nonprofit organizations in the Tri-Valley, San Joaquin Valley, and greater Bay Area through the annual Helping Others More Effectively (HOME) campaign. LLNS donated $1 million in matching funds, bringing the total contribution to more than $2.4 million, the largest amount ever raised in HOME's 33-year history.

Community Gift Program

LLNS awarded $100,000 through its Community Gift Program as well as $90,000 in one-time gifts. Most of these awards serve children in the Tri-Valley and San Joaquin County, with a focus on science and math education and cultural arts.

Science on Saturdays

Some 6,000 people attended our Science on Saturdays lecture series, held in Livermore, Tracy, Hayward, and Modesto. In these presentations, Laboratory researchers and local science teachers team up to highlight cutting-edge LLNL science and demonstrate its real-world applications. This year's topics featured geothermal energy, astrophysics, fusion energy, climate change, and agro-security.

Teller Scholarships

Edward Teller Science Scholarships were awarded to four high-school students, two each from the Livermore and Tracy public school districts. Established in honor of the late Dr. Teller, the awards are given to graduating seniors who excel in science studies.

Science and Engineering Fair

Nearly 250 local students in grades 7–12 presented more than 190 projects in the 11th annual Tri-Valley Science and Engineering Fair, hosted by LLNL. The two senior winners went on to earn awards at the Intel International Science and Engineering Fair. The two top junior winners competed at the California State Science Fair, and six of the junior winners were among 300 students selected nationwide as semifinalists in the Society for Science and the Public U.S. Middle School Competition.

Science Teacher Education

More than 200 science teachers participated in programs at LLNL aimed at enhancing science education. Of particular note:

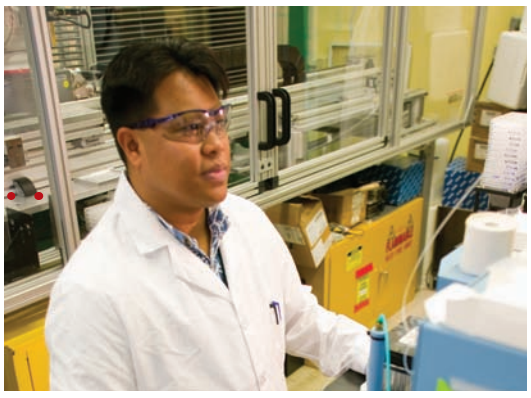
- Four teachers completed the second year of a three-year internship at the Laboratory under the DOE Academies Creating Teacher Scientists (ACTS) program.
- More than 100 middle- and high-school teachers participated in this summer's Teacher Research Academy, a collaboration with UC Davis in which teachers learn new ways to bring science research into the classroom.
- Nine California State University (CSU) students participated in the Science and Teacher Research (STAR) program, a partnership of CSU, the DOE laboratories in California, and the NASA Ames Research Center. STAR gives college science majors who plan on teaching middle- or high-school science the opportunity to engage in a research internship at a national laboratory. Four of this year's participants were recently hired as credentialed science teachers in California schools, including one in Livermore.

Community Leader Day

The Laboratory hosted a Community Leader Day in early October for more than 450 officials and representatives from the Tri-Valley and San Joaquin Valley. Held at the Bankhead Theater in downtown Livermore, the event was an opportunity for members of neighboring government, education, and business groups to meet the new Laboratory senior management and learn about LLNL's plans for the future.

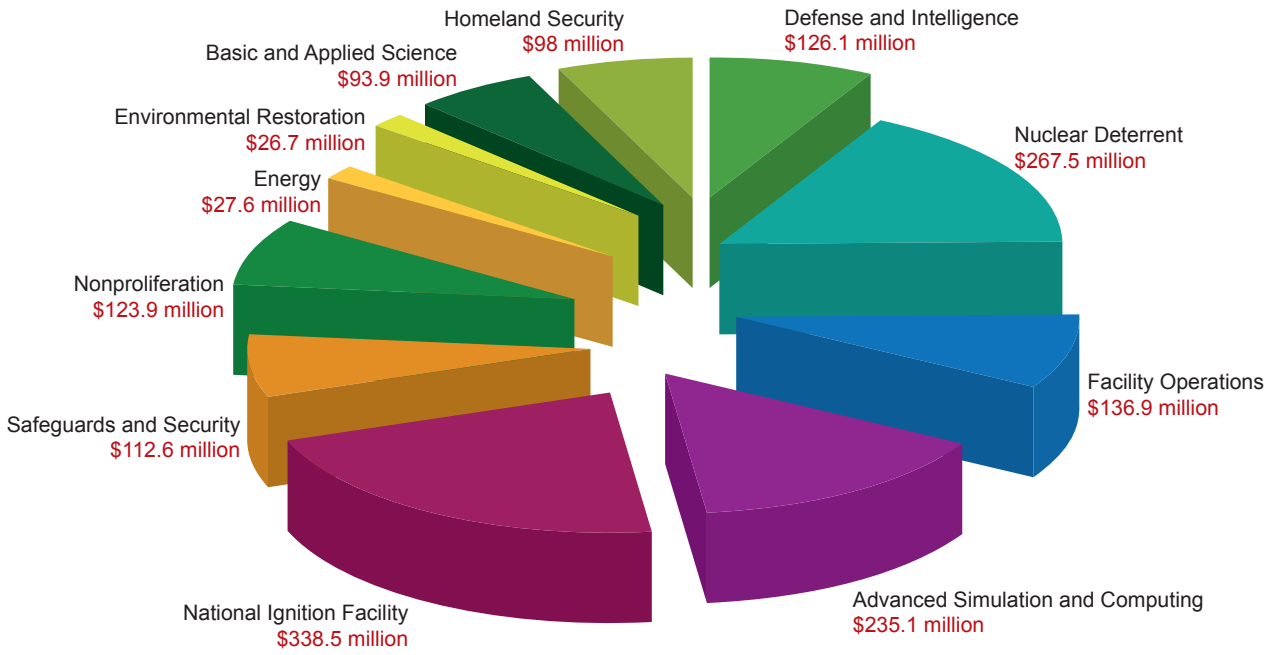
Blood Drives and Daffodil Days

LLNL employees donated more than 800 pints of blood for the American Red Cross and raised nearly $32,000 for the American Cancer Society's Daffodil Days, making the Laboratory once again one of the largest workplace donors in northern California for these important efforts.



Facts and Figures

LLNL FY2008 Funding: $1.587 billion



FY2008 Accomplishments "By the Numbers"

Completed Cycle 13 of the Annual Stockpile Assessment Process.

Reduced our inventory of special nuclear material by nearly 25 percent.

Achieved 99 percent completion of the NIF project, with operational testing of all 192 laser beamlines.

Increased work-for-others funding by more than $50 million to nearly $350 million.

Began operations in the first BSL-3 facility in the DOE complex.

Received one Gordon Bell Prize, three R&D 100 awards, six Nanotech 50 awards, and two FLC awards.

Received 58 U.S. patents, filed 111 invention disclosures and 60 patent applications, executed two CRADAs, and issued 73 commercial licenses.

Generated $9.4 million in licensing income, representing annual sales of $250 million in products based on Laboratory technologies.

Achieved $75 million in cost savings through organizational and process improvements, including $23 million in nonlabor cost savings.

Significantly improved safety performance, decreasing the incidence of severe injuries by 63 percent.

Reduced overall energy usage by 9.94 percent compared with the FY2003 baseline, surpassing the DOE-specified goal of 9 percent.

Closed 500,000 square feet of space, eliminating more than $5 million in annual costs and $30 million in one-time costs.

Accounted for 99.99 percent of the items in this year's property inventory base, for a "far exceeds expectations" rating.

Reduced the workforce by more than 1,600 employees, ending FY2008 with a staff of approximately 6,900.

Donated more than 800 pints of blood for the American Red Cross and raised nearly $32,000 for the American Cancer Society's Daffodil Days.

Donated more than $2.4 million through our annual HOME campaign, including $1 million in matching funds from LLNS.

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