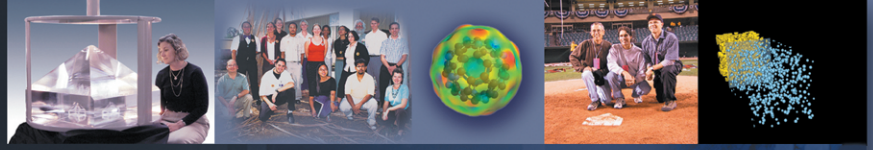


Chemistry and Materials Science
Lawrence Livermore National Laboratory

cms careers

http://www-cms.llnl.gov/

chemistry & materials science
CMS

University of California

science in the national interest

emerging national needs

cutting-edge facilities

join our team

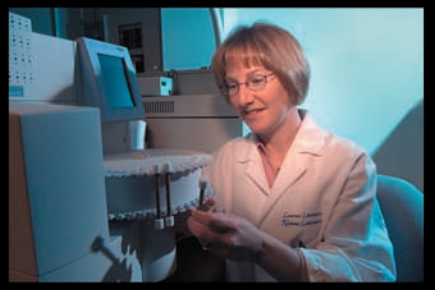
Founded in 1952 as a nuclear weapons research facility, Lawrence Livermore National Laboratory has become one of the world's premier scientific centers, where cutting-edge science and engineering in the interest of national security are used to break new ground in other areas of national importance, including energy, biomedicine, and environmental science. The Chemistry and Materials Science (CMS) Directorate supports Livermore's core missions by providing expertise in chemistry, chemical engineering, chemical biology, and materials science. Our world-class staff enjoys an atmosphere of intellectual freedom and innovation in our unrelenting efforts to meet pressing and enduring national needs.

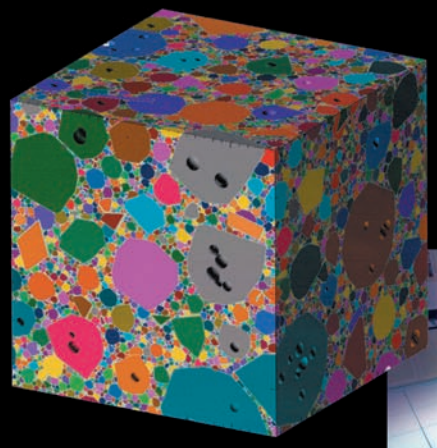
Stockpile Stewardship

The Laboratory's primary mission is one of nuclear deterrence: preventing the spread and use of nuclear weapons worldwide and ensuring that the nation's nuclear weapons stockpile remains safe, secure, and reliable without underground nuclear tests. To help meet this unprecedented challenge, CMS scientists and engineers are combining laboratory experiments with advanced computational capabilities to predict how nuclear weapons components will change as they age. As the Laboratory acquires increasingly more powerful experimental and computational tools, CMS researchers will continue to play a major role in advancing the science and technology needed to ensure the safety and reliability of our nation's nuclear stockpile.

Homeland Security

A grave threat to our nation's homeland security is the acquisition and potential use of weapons of mass destruction (WMD)—whether nuclear, chemical, radiological, or biological. CMS supports national and international agencies in their efforts to reduce the danger from WMD. Our scientists and engineers are developing techniques to detect and analyze the chemical, biological, and nuclear species present in WMD. Together with other Laboratory personnel and their multidisciplinary expertise, CMS researchers continue to leverage Livermore's extensive resources in nuclear weapons research and in the life and physical sciences to strengthen our nation's technological base and to provide a multilayered defense against catastrophic terrorism.





Employee Profile...

Computational chemist Larry Fried has a Ph.D. in chemistry from Cornell University and works in the area of chemistry under extreme conditions. Larry and his colleagues are developing multiscale, science-based models that can be run on the Laboratory's ultrafast computing platforms and experimentally validated. Larry also uses the Laboratory's collection of powerful machines to explore atomistic simulations of chemical events, such as polymer crystallization and high-explosives detonation.

Larry considers having ready access to the world's best computational facilities to be a huge research advantage. He also sees the Laboratory's multidisciplinary environment as a tremendous resource, enabling collaborative, high-quality, cross-discipline research that is productive, intellectually stimulating, and fun. He believes that the Laboratory offers a perfect blend of basic and applied research, great employee benefits, and a fantastic work environment for people with families.

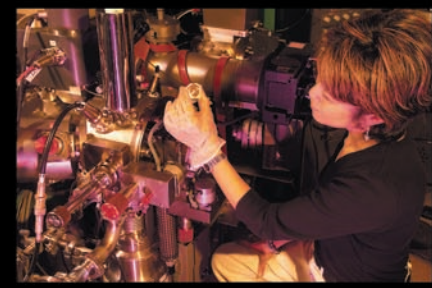
Optics and Laser Science

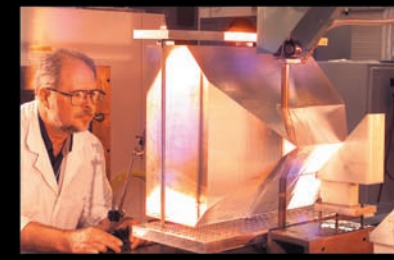
Over the last 30 years, the Laboratory has built a series of increasingly larger lasers, culminating in the 192-beam National Ignition Facility (NIF). When completed in 2008, NIF will be the world's most energetic laser and will deliver—for the first time in a laboratory setting—energy densities approaching those at the core of the sun or in an exploding nuclear weapon. NIF is a key component of the nation's stockpile stewardship efforts because it will generate the temperatures and pressures needed to conduct experiments to validate weapons-physics codes and to assess integrated weapons performance. These experiments will enable Livermore scientists to assess the aging nuclear weapons stockpile with supercomputer modeling tools instead of underground nuclear tests.

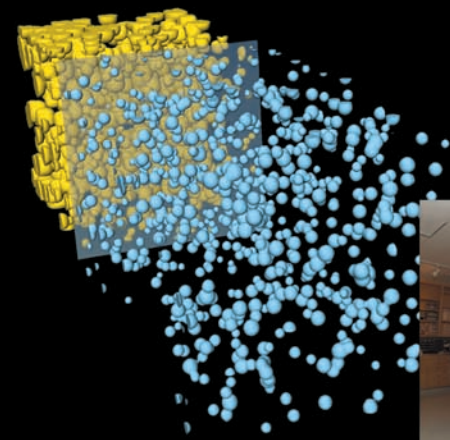
NIF will serve as a national and international center for the study of materials under extreme conditions, providing valuable data for national-security, energy-security, basic-science, and nuclear-weapons research. CMS scientists and engineers are leading the development of new materials—such as crystals, glasses, aerogels, and metallic foams—for use in NIF optics and as NIF experimental targets. Our employees also play crucial roles in the design and operation of NIF experiments investigating complex chemistry and physics problems in fusion, high-temperature plasma physics, and high-energy-density regimes.

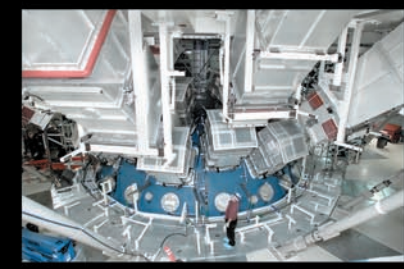
Exploratory Science

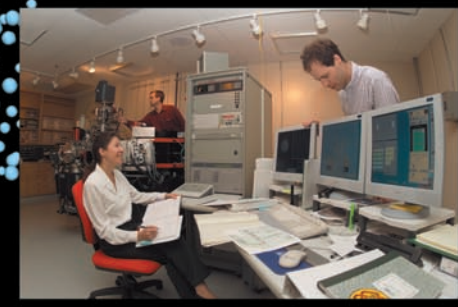
The CMS Directorate supports Livermore's national-security mission by providing scientific excellence and leadership that meets and anticipates the needs of Laboratory programs. CMS scientists and engineers are encouraged to expand their technical expertise by pursuing research and development in key science areas of relevance to the Laboratory's mission. These exploratory-science efforts are conducted by multidisciplinary teams on state-of-the-art equipment in a broad range of scientific disciplines, including materials science, biochemistry, nuclear chemistry, and energetic materials, to name a few. Capabilities developed in basic research—from nanolithography to sol-gel chemistry techniques—are then transferred to support the Laboratory's mission-critical needs.











Employee Profile . . .

Metallurgist Tai-Gang Nieh is an acknowledged expert in superplasticity, the high-temperature deformation of metals and ceramics. T.G., who holds a Ph.D. in materials science from Stanford University, has coauthored a textbook on superplasticity and more than 300 scientific papers. T.G. has also been honored as a fellow of The Minerals, Metals & Materials Society and of the American Society for Metals.

T.G. joined CMS after 12 years in the aerospace industry. He appreciates Livermore's technical diversity and the many opportunities to collaborate with researchers both inside and outside the Laboratory. The university collaborations, in particular, have helped T.G. expand his core competencies over the years. T.G. also enjoys working with CMS postdocs and has been impressed by the high quality of their research abilities and technical results.

The CMS Directorate continually explores new scientific frontiers to meet emerging national needs, such as the dangers of biological- and chemical-warfare agents. Three premier, CMS-led organizations are responding to these new national-security threats from several scientific perspectives. CMS researchers are also developing new multiscale-modeling techniques so that they can gain and apply an in-depth understanding of material properties to areas of national importance—from stockpile stewardship to biodefense.

Nanoscience

The BioSecurity and Nanosciences Laboratory (BSNL) conducts scientific research to protect the nation against biological threats and natural-disease outbreaks. By pushing technologies beyond their current limits, BSNL scientists are developing sensitive and precise sensors that can detect, identify, and characterize harmful molecules such as viruses, spores, bacteria, and toxins associated with WMD. BSNL researchers are also using sophisticated computer modeling to design experiments in key thrust areas, including molecular recognition chemistry, biological signatures, nanofabrication of ultrasensitive detectors, bioaerosol science, pathomics, and molecular-scale measurements.

Forensic Science

The Forensic Science Center (FSC), the second U.S. laboratory to be internationally certified for successfully identifying chemical-warfare agents, provides exceptional chemical-and forensic-analysis capabilities to support national-security needs in counterterrorism. FSC researchers collaborate with federal agencies such as the FBI to develop techniques and tools to detect and analyze chemical, biological, and nuclear species. FSC scientists are also applying forensic technology to help defeat terrorists and interdict dangerous materials.

Employee Profile . . .

The combined opportunity to conduct great science, undertake new challenges at the interface of chemistry and biology, and pursue his own program of research within a community of technical experts convinced Julio Camarero that the offer to work at Livermore was one he could not refuse.

Julio has a Ph.D. in organic chemistry from the University of Barcelona and extensive training in bio-organic chemistry, molecular biology, and biochemistry. Julio's background made him a perfect fit for CMS's BioSecurity and Nanosciences Laboratory, where he uses chemical and biological tools to solve key questions in biology and biosecurity.

Because Julio's research requires interdisciplinary work between biology, chemistry, lasers, and materials science, he is especially thankful for the many Laboratory scientists who provide him with technical guidance and assistance. Their willingness to share knowledge and collaborate has enabled Julio to learn, grow, and advance his research.

Bionuclear Science

The nuclear and bionuclear research conducted at the Glenn T. Seaborg Institute both supports the nation's stockpile stewardship and nuclear nonproliferation efforts and addresses national problems such as homeland security, health, and the environment. For example, Seaborg Institute researchers are investigating the use of isotopic signatures to identify manufacturers of biological and nuclear weapons. They are also applying radiation science to minimize the effects of nuclear and radiological weapons, improve human health, and tackle environmental issues such as drinking-water safety and nuclear-waste cleanup.

Multiscale Modeling

With the advent of supercomputers, Livermore scientists can now accurately model material behavior on the atomistic, grain, and continuum scales, providing insight into material properties—such as material synthesis and dynamic behavior—of relevance to national problems such as stockpile stewardship and biodefense. The resulting multiscale simulations can then be tightly coupled to experiments, leading to more robust and reliable scientific discoveries and correspondingly more valuable insights on how to address national needs.

Advancing the leading edge of science and technology requires access to state-of-the-art tools and equipment. At Lawrence Livermore, our world-class staff can take advantage of many unique, cutting-edge experimental and computational research facilities as they undertake wide-ranging challenges of national importance.

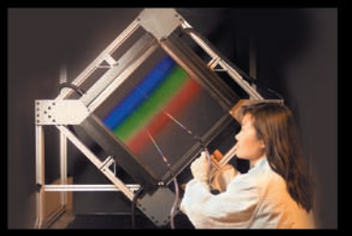
High-Performance Computing

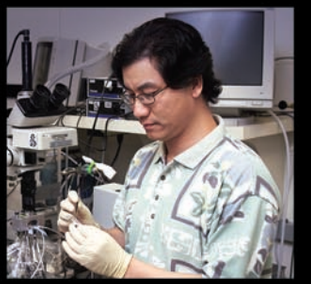
At the forefront of computational science since the invention of the computer, the Laboratory houses some of the most powerful supercomputers in the world, with speeds of hundreds of teraops (trillion operations per second). These extraordinary resources are moving our scientists closer to the goal of replicating the extreme conditions in a nuclear explosion and are enabling discovery-class breakthroughs in basic science.

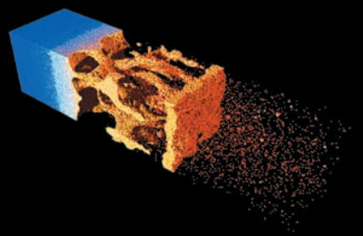
A sophisticated infrastructure is supporting the Laboratory's increasing computing capabilities. For example, when combined with Livermore's ultrahigh-speed networks, new visualization software can transform the vast data sets generated by supercomputers into never-seen-before details at unprecedented resolutions. As CMS researchers take advantage of these outstanding computing resources, they are becoming world leaders in many areas of computational chemistry and materials science.

Energetic Materials

Livermore is a national resource for high-explosives and explosives-driven experiments. Our facilities—from the High Explosives Application Facility (HEAF) to the experimental test site known as Site 300—are designed to accommodate the multiscale nature of explosives testing and are equipped with state-of-the-art diagnostic devices.







Employee Profile . . .

Christine Hartmann-Siantar considers herself fortunate to be doing what she loves—applying science and technology (S&T) to help people live happier, longer lives. Losing several family members to cancer prompted Christine to pursue her Ph.D. in medical physics at the University of Wisconsin, Madison, and work with cancer patients. She then joined the Laboratory, attracted by the possibility of developing methods for improving cancer treatment. As the director of CMS's Glenn T. Seaborg Institute, Christine has begun a bionuclear initiative that combines nuclear S&T with bioscience to serve societal needs.

Christine enjoys CMS's open and teamwork-oriented atmosphere. She believes that CMS employees are committed to doing their best for the country and to promoting outstanding science and technological innovation. Christine also appreciates Livermore's flexible work environment, which fosters a family-friendly workplace. Finally, she praises the Laboratory's commitment to helping young researchers reach their full potential.herself—reach their full potential.

The CMS Directorate is responsible for the synthesis and testing of high-explosives materials for the Laboratory's weapons program and other Department of Defense projects. This work is carried out at HEAF and at Site 300 to assure that the nation's stockpile weapons are safe and reliable. Specific activities at both facilities include explosives synthesis, formulation, characterization, and processing. In addition, CMS researchers are applying high-fidelity, high-speed diagnostics to dynamic experiments, which are then coupled with computational and theoretical studies.

High-Power Lasers

The Laboratory's National Ignition Facility (NIF) is only the latest in a 30-year history of laser design, construction, and operation. When completed in 2008, NIF will be able to focus the energy of 192 laser beams on a BB-sized capsule for a few billionths of a second, enabling researchers to meet stockpile stewardship goals and evaluate the feasibility of inertial fusion energy. The first four laser beams in NIF were activated in 2002, and CMS researchers are participating in a broad spectrum of experimental studies that will take advantage of NIF's immense energy capability.

Other laser facilities are also available at Livermore for national-security and basic-materials research. For example, the Laboratory's Janus ultrashort-pulse (JanUSP) laser is one of the brightest lasers in the world, producing a beam with an average intensity of 5×10^{20} watts per square centimeter that lasts about 100 femtoseconds. CMS materials scientists use high-power, short-pulse lasers like the JanUSP to investigate laser–material interactions. In addition, the Laboratory is investing in a high-energy petawatt laser, which will open new experimental regimes in astrophysics, high-energy-density science, and relativistic plasma physics.

Bay Area Living

Lawrence Livermore National Laboratory is located in the Livermore Valley, one hour east of San Francisco. The valley features award-winning wineries, golf courses, and community performing arts groups in a rural–suburban environment. Outdoor fans will delight in exploring the lakes, trails, campsites, and bike paths at nearby regional parks and in the surrounding hills.

Major cities in the San Francisco Bay Area are close enough for an evening jaunt to the theater, ballet, or symphony. In addition, public transportation is available via BART (Bay Area Rapid Transit) to San Francisco, Berkeley, and Oakland, providing ready access to airports, fine dining, museums, nightclubs, upscale shopping, and cultural and sporting events. Further west is the scenic Pacific Coast, from Monterey and Big Sur in the south to Mendocino in the north, while the Sierra Nevada beckons in the east—offering unparalleled skiing, camping, hiking, and climbing in Lake Tahoe and Yosemite.

First-Class Benefits

As part of the University of California system, the laboratory offers it's employee a first-class benefits package:

- Medical, dental, vision, disability, life, accident, and legal insurance
- A defined-benefits pension plan and a tax-deferred 403b savings plan
- Employee/family sick leave and 12 holidays per year
- Generous, paid vacation, starting at an accrual rate of three weeks per year
- Catastrophic leave-sharing program
- Professional development training and education
- Membership in the employee association, which operates a child care center, fitness center, and Olympic-sized swimming pool; offers on-site massage, discount tickets, and timesaving services (e.g., dry cleaning, package shipping and receiving); and sponsors special activity groups for employees and their families

Employee Profile . . .

After finishing her Ph.D. in physics at Princeton University, Olgica Bakajin was awarded the Laboratory's highly selective Lawrence Fellowship. The fellowship's promise of tremendous research flexibility and freedom drew Olgica to Lawrence Livermore National Laboratory. She was also impressed by the Laboratory's dynamic community of interdisciplinary scientists and their enthusiastic dedication to conducting cutting-edge scientific research in the national interest.

As a key contributor in CMS's BioSecurity and Nanosciences Laboratory, Olgica values her partnerships with other bright, motivated scientists and their common desire to achieve scientific excellence more than individual recognition. She also appreciates the mix of basic and applied science, which is made possible by Livermore's unique position midway between academia and industry. Olgica's many research interests include pathogen detection, microtechnology, microfluidics, carbon nanotubes, and protein-folding kinetics.

Work–Life Balance

The Laboratory places a high importance on programs that help employees balance the competing demands of work, family, and personal responsibilities. Our benefits and services have been designed to promote and enhance this work–life balance. We are also committed to providing options, tools, and resources (e.g., information about child and elder care and support groups) so that our employees can successfully manage issues affecting their work and personal lives.

Multidisciplinary Teams

The Laboratory's strength lies in a multidisciplinary research culture that values innovation, pushes the boundaries of fundamental science, and encourages experts from different fields to work together to solve complex problems of national interest. CMS scientists are key contributors on these multidisciplinary teams and are universally respected for their excellence in science and technology and for their commitment to the Laboratory's mission.

Job Opportunities

We in CMS invite you to join our team. We highly value our employees and look forward to helping you achieve your career goals as you pursue science in the national interest. Current openings can be found at http://jobs.llnl.gov/. Below are a few of the many career opportunities available in our directorate:

- Chemists, biochemists, and computational chemists
- Materials scientists
- Chemical engineers and process engineers
- Physicists
- Nuclear chemists and engineers
- Metallurgists
- Postdoctoral research staff
- Program and division leaders
- Faculty scholars and summer students
- Technicians and scientific associates
- Administrative and operations staff

join our team

Postdoctoral Program

The Chemistry and Materials Science (CMS) Directorate proudly supports a thriving, productive community of postdoctoral fellows. Postdoctoral appointments, which last for up to three years, represent an important pathway toward career positions at the Lawrence Livermore National Laboratory. Each postdoc makes significant contributions to basic- and applied-research projects of national interest and brings a unique technical background that adds to the directorate's breadth and depth of scientific capability.

The Laboratory is committed to helping employees reach their full potential. CMS encourages postdocs to pursue research opportunities where they can apply and develop their skills. Postdocs also have complete access to Livermore's abundant resources—from cutting-edge facilities with sophisticated, state-of-the-art equipment to a multitude of experts in diverse scientific and technical fields who can serve as research mentors and advisors.

For more information about the CMS Postdoctoral Program, including the backgrounds and research interests of current postdocs, visit http://www-cms.llnl.gov/PostDocs/.

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