LAB AT A GLANCE
LAWRENCE LIVERMORE NATIONAL LABORATORY

Science and technology on a mission is the hallmark of Lawrence Livermore National Laboratory (LLNL). In service to the Department of Energy/National Nuclear Security Administration and other federal agencies, LLNL develops and applies world-class science and technology (S&T) to ensure the safety, security, and reliability of the nation's nuclear deterrent. LLNL also applies S&T to confront dangers ranging from nuclear proliferation and terrorism to energy shortages and climate change that threaten national security and global stability.

As a national security laboratory, LLNL harnesses operational excellence and strategic partnerships to meet our mission and applies the talents of our multidisciplinary staff, premier facilities, and core competencies to the nation's pressing issues. Through strategic support of S&T, we translate innovations into national security and global stability.

FACTS

- **Location:** Livermore, California
- **Type:** Multidisciplinary national security laboratory
- **Year Founded:** 1952
- **Director:** Kimberly S. Budil
- **Contractor:** Lawrence Livermore National Security, LLC (LLNS)
- **Responsible Site Office:** Livermore Field Office
- **Website:** www.llnl.gov

CORE COMPETENCIES

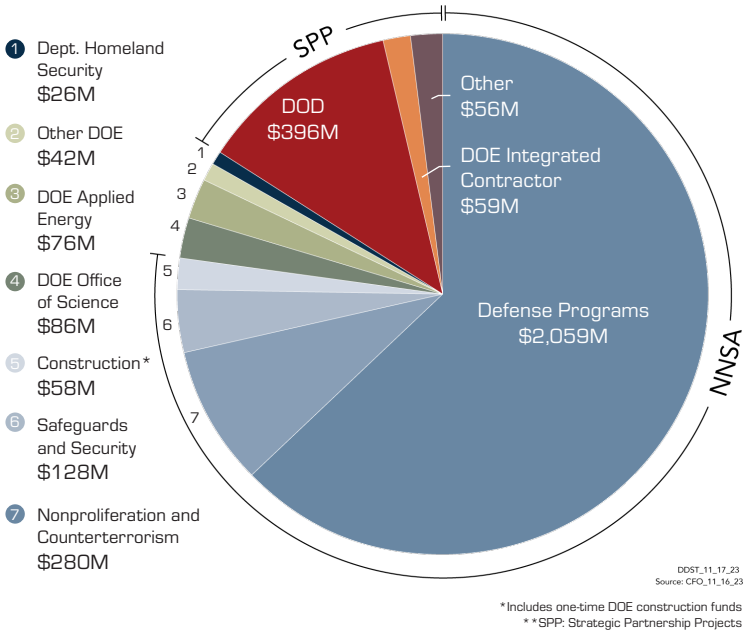
- Advanced Materials and Manufacturing
- Bioscience and Bioengineering
- Earth and Atmospheric Sciences
- High-Energy-Density Science
- High-Performance Computing, Simulation, and Data Science
- Lasers and Optical Science and Technology
- Nuclear, Chemical, and Isotopic Science and Technology

MISSION-SPECIFIC FACILITIES

- Advanced Manufacturing Laboratory
- Center for Micro-and Nanotechnology
- Center for Accelerator Mass Spectrometry
- Contained Firing Facility
- Electron Beam Ion Trap
- Forensic Science Center
- High Explosives Applications Facility
- Livermore Computing
- Polymer Production Enclave
- National Atmospheric Release Advisory Center
- National Ignition Facility
- Select Agent Center

FY2023 FUNDING BY SOURCE

(Total: $3,266,349,342)



*Includes one-time DOE construction funds
**SPP: Strategic Partnership Projects

FY2023 COSTS

- FY23 LLNL operating costs: $3.24 billion
- FY23 DOE/NNSA costs (include DOE/IC): $2.8 billion
- FY23 SPP costs (exclude DHS and DOE/IC): $410 million
- FY23 SPP as a % of operating costs: 12.6%
- FY23 DHS costs: $22 million

PHYSICAL ASSETS (FY23)

- 7,617 acres (owned) and 506 buildings/trailers
- 6.5 million gross square footage (GSF) in active buildings
- 58 non-operational buildings/trailers with 0.61 GSF
- 43,897 GSF leased
- Replacement plant value: $30 billion

HUMAN CAPITAL (FY23)

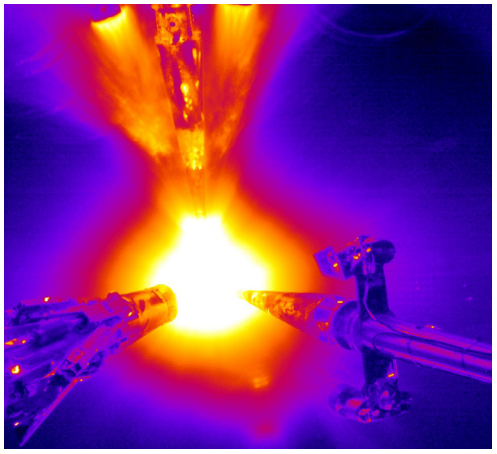
- 9,291 LLNS employees, including:
  - 12 joint faculty
  - 321 postdoctoral researchers
  - 144 undergraduate interns
  - 162 graduate students
- 480 contractors (non-LLNS employees)

LABORATORY HIGHLIGHTS

UNIQUE FACILITIES

One of the World's Premier High-Performance Computing Facilities

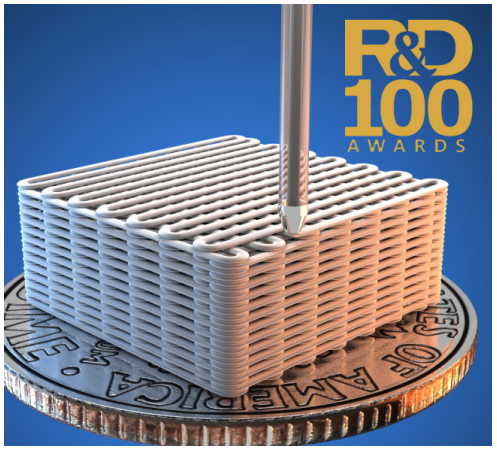
Lawrence Livermore is home to Livermore Computing (LC), a premier high-performance computing facility. LC boasts more than 200 petaflops of computing power and numerous TOP500 systems, including the 125-petaflop Sierra system. Continuing the lineage of world-class LLNL supercomputers, Sierra represents the penultimate step on the road to exascale computing, which is expected to be achieved by 2023 with an LLNL system called El Capitan. These flagship systems are GPU-enabled and produce multi-physics simulations in 3D at never-before-seen resolutions for a variety of mission-critical needs. In 2020, LLNL and Cerebras Systems integrated the world's largest computer chip into the Lassen system, upgrading the top-tier supercomputer with cutting-edge AI technology. This combination creates a radically new type of computing solution, enabling researchers to investigate novel approaches to predictive modeling. The platforms are supported by our LEED-certified, innovative facilities for infrastructure, power, and cooling; a storage infrastructure including three varieties of file systems and the world's largest TFinity tape archive; and top-tier customer service. Our industry-leading software ecosystem showcases our leadership of many large open source efforts, from TOSS with Lustre and ZFS to the R&D 100 Award-winning Flux, SCR, and Spack.



CUTTING-EDGE RESEARCH

Achieving Fusion Ignition

LLNL is home to the National Ignition Facility (NIF), the world's largest and highest-energy laser system. NIF's 192 lasers can fire more than 1.9 megajoules (MJ) of ultraviolet energy into a hohlraum—a cylinder the size of a pencil eraser—compressing and heating a tiny hydrogen-filled capsule suspended in the hohlraum until the hydrogen atoms fuse and release copious amounts of energy. As the premier facility creating conditions relevant to understanding the operation of modern nuclear weapons, NIF is a crucial element of stockpile stewardship, producing experimental data that validates 3D weapon simulation codes, improves understanding of important weapon physics, and investigates questions remaining from underground nuclear tests. On Dec. 5, 2022, NIF made scientific history with a shot that achieved fusion ignition in a laboratory for the first time. The shot generated 3.15 MJ of fusion energy from an input of 2.05 MJ of laser energy. This provides new opportunities for stockpile stewardship applications and enhances the prospects for an inertial fusion energy future. LLNL scientists and engineers are pushing on all fronts to increase NIF's capabilities to address challenges, including higher energy and power limits, next-generation optics, improved targets with tighter specifications, and better diagnostics.



TECHNOLOGY TO MARKET

ENERGY INKS: A versatile 3D printing technology

Imagine being able to select a printer feedstock to print a functioning battery. The capability to 3D print functioning devices has been made possible with Energy Inks, 3D-printing feedstock inks developed by LLNL and introduced to the marketplace by partner MilliporeSigma. This partnership and resulting technology maturation collaboration makes Energy Inks available to companies and universities worldwide, bolstering the success of institutions in the energy device market.

In recent years, polymers used in 3D printing have enabled a more efficient method of prototyping. Energy Inks further advance 3D printing to create next-generation, high-performance, printed devices for energy storage, catalysis, filtration, sensors, and more. With growing demand for electronics, energy storage devices, and clean energy technologies, Energy Inks helps meet a critical need. Devices once thought too complex and costly for commercial distribution can now be printed faster and more efficiently. The technology enables tailored energy storage and device conversions by increasing strength-to-weight ratios for improved electric vehicle performance, augmenting performance in harsh environments, and optimizing energy applications.

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