**Los Alamos National Laboratory**

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| Los Alamos National Laboratory | |
| * LANL * LANS | |
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| Aerial view | |
| **Established** | 1943 |
| **Budget** | $2.2 billion |
| **Field of research** | * National security * Fundamental science |
| **Director** | Charles F. McMillan |
| **Staff** | 9,000 |
| **Students** | 700 |
| **Location** | Los Alamos, New Mexico, United States 35°52′32″N 106°19′27″WCoordinates: 35°52′32″N 106°19′27″W |
| **Affiliations** | * University of California * Bechtel * Babcock & Wilcox * URS |
| **Operating agency** | Los Alamos National Security LLC |
| **Website** | lanl.gov |
|  | |
| **Los Alamos Scientific Laboratory** | |
| U.S. National Register of Historic Places | |
| U.S. National Historic Landmark District | |
|  | |
| **Location** | Central Ave., Los Alamos, New Mexico |
| **Coordinates** | 35°52′54″N 106°17′54″W |
| **Built** | 1943 |
| **Architectural style** | Bungalow/Craftsman, Modern Movement, Other |
| **Governing body** | Department of Energy |
| **NRHP Reference #** | 66000893 |
| **Added to NRHP** | 15 October 1966 |

Los Alamos National Laboratory (or LANL; previously known at various times as Project Y, Los Alamos Laboratory, and Los Alamos Scientific Laboratory) is one of two laboratories in the United States where classified work towards the design of nuclear weapons is undertaken. The other, since 1952, is Lawrence Livermore National Laboratory. LANL is a United States Department of Energy (DOE) national laboratory, managed and operated by Los Alamos National Security (LANS), located in Los Alamos, New Mexico. The laboratory is one of the largest science and technology institutions in the world. It conducts multidisciplinary research in fields such as national security, space exploration, renewable energy, medicine, nanotechnology, and supercomputing.

LANL is the largest institution and the largest employer in northern New Mexico, with approximately 9,000 direct employees and around 650 contractor personnel. Additionally, there are roughly 120 DOE employees stationed at the laboratory to provide federal oversight of LANL's work and operations. Approximately one-third of the laboratory's technical staff members are physicists, one quarter are engineers, one-sixth are chemists and materials scientists, and the remainder work in mathematics and computational science, biology, geoscience, and other disciplines. Professional scientists and students also come to Los Alamos as visitors to participate in scientific projects. The staff collaborates with universities and industry in both basic and applied research to develop resources for the future. The annual budget is approximately US$2.2 billion.

**History**

**The Manhattan Project**

Main article: Manhattan Project

The laboratory was founded during World War II as a secret, centralized facility to coordinate the scientific research of the Manhattan Project, the Allied project to develop the first nuclear weapons. In September 1942, the difficulties encountered in conducting preliminary studies on nuclear weapons at universities scattered across the country indicated the need for a laboratory dedicated solely to that purpose.

General Leslie Groves wanted a central laboratory at an isolated location for safety, and to keep the scientists away from the populace. It should be at least 200 miles from international boundaries and west of the Mississippi. Major John Dudley suggested Oak City, Utah or Jemez Springs, New Mexico but both were rejected. Manhattan Project scientific director J. Robert Oppenheimer had spent much time in his youth in the New Mexico area, and suggested the Los Alamos Ranch School on the mesa. Dudley had rejected the school as not meeting Groves’ criteria, but as soon as Groves saw it he said in effect *This is the place*. Oppenheimer became the laboratory's first director.

During the Manhattan Project, Los Alamos hosted thousands of employees, including many Nobel Prize-winning scientists. The location was a total secret. Its only mailing address was a post office box, number 1663, in Santa Fe, New Mexico. Eventually two other post office boxes were used, 180 and 1539, also in Santa Fe. Though its contract with the University of California was initially intended to be temporary, the relationship was maintained long after the war. Until the atomic bombings of Hiroshima and Nagasaki, Japan, University of California president Robert Sproul did not know what the purpose of the laboratory was and thought it might be producing a "death ray". The only member of the UC administration who knew its true purpose—indeed, the only one who knew its exact physical location—was the Secretary-Treasurer Robert Underhill, who was in charge of wartime contracts and liabilities.



The first stages of the explosion of the Trinity nuclear test.

The work of the laboratory culminated in the creation of several atomic devices, one of which was used in the first nuclear test near Alamogordo, New Mexico, codenamed "Trinity", on July 16, 1945. The other two were weapons, "Little Boy" and "Fat Man", which were used in the attacks on Hiroshima and Nagasaki. The Laboratory received the Army-Navy ‘E’ Award for Excellence in production on October 16, 1945.

After the war, Oppenheimer retired from the directorship, and it was taken over by Norris Bradbury, whose initial mission was to make the previously hand-assembled atomic bombs "G.I. proof" so that they could be mass-produced and used without the assistance of highly trained scientists. Many of the original Los Alamos "luminaries" chose to leave the laboratory, and some even became outspoken opponents to the further development of nuclear weapons.

In the years since the 1940s, Los Alamos was responsible for the development of the hydrogen bomb, and many other variants of nuclear weapons. Several female scientists also made contributions to work at the lab at this time. In 1952, Lawrence Livermore National Laboratory was founded to act as Los Alamos' "competitor", with the hope that two laboratories for the design of nuclear weapons would spur innovation. Los Alamos and Livermore served as the primary classified laboratories in the U.S. national laboratory system, designing all of the country's nuclear arsenal. Additional work included basic scientific research, particle accelerator development, health physics, and fusion power research as part of Project Sherwood. Many nuclear tests were undertaken in the Marshall Islands and at the Nevada Test Site. During the late-1950s, a number of scientists including Dr. J. Robert "Bob" Beyster left Los Alamos to work for General Atomics (GA) in San Diego.

Three major nuclear-related accidents have occurred at LANL. Criticality accidents occurred in August 1945 and May 1946, and a third accident occurred during an annual physical inventory in December 1958.

LANL was declared a National Historic Landmark in 1965.

**Post-Cold War**

At the end of the Cold War, both labs went through a process of intense scientific diversification in their research programs to adapt to the changing political conditions that no longer required as much research towards developing new nuclear weapons and has led the lab to increase research for “non-war” science and technology. Los Alamos' nuclear work is currently thought to relate primarily to computer simulations and stockpile stewardship. The development of the Dual-Axis Radiographic Hydrodynamic Test Facility will allow complex simulations of nuclear tests to take place without full explosive yields.

The lab has made intense efforts for humanitarian causes through its scientific research in medicine. Three vaccines for the AIDS virus are being tested by lab scientist Bette Korber and her team. "These vaccines might finally deal a lethal blow to the AIDS virus", says Chang-Shung Tung, leader of the Lab's Theoretical Biology and Biophysics group.

There is also development for a safer, more comfortable and accurate test for breast cancer by Lab scientists Lianjie Huang and Kenneth M. Hanson and collaborators. The new technique, called ultrasound-computed tomography (ultrasound CT), uses sound waves to accurately detect small tumors that traditional mammography cannot.

The laboratory contributed to the early development of the flow cytometry technology. In the 1950s, researcher Mack Fulwyler developed a technique for sorting erythrocytes that combined the Coulter Principle of Coulter counter technologies, which measures the presence of cells and their size, with ink jet technology, which produces a laminar flow of liquid that breaks up into separate, fine drops. In 1969, Los Alamos reported the first fluorescence detector apparatus, which accurately measured the number and size of ovarian cells and blood cells.

Other research performed at the lab includes developing cheaper, cleaner bio-fuels and advancing scientific understanding around renewable energy.

Non-nuclear national security and defense development is also a priority at the lab. This includes preventing outbreaks of deadly diseases by improving detection tools and the monitoring the effectiveness of the United States’ vaccine distribution infrastructure. Additional advancements include the ASPECT airplane that can detect bio threats from the sky.

The laboratory has attracted negative publicity from a number of events. In 1999, Los Alamos scientist Wen Ho Lee was accused of 59 counts of mishandling classified information by downloading nuclear secrets—"weapons codes" used for computer simulations of nuclear weapons tests—to data tapes and removing them from the lab. After ten months in jail, Lee pleaded guilty to a single count and the other 58 were dismissed with an apology from U.S. District Judge James Parker for his incarceration. Lee had been suspected for having shared U.S. nuclear secrets with China, but investigators were never able to establish what Lee did with the downloaded data. In 2000, two computer hard drives containing classified data were announced to have gone missing from a secure area within the laboratory, but were later found behind a photocopier; in 2003, the laboratory's director John Browne, and deputy director, resigned following accusations that they had improperly dismissed two whistleblowers who had alleged widespread theft at the lab. The year 2000 brought additional hardship for the laboratory in the form of the Cerro Grande Fire, a severe forest fire that destroyed several buildings (and employees' homes) and forced the laboratory to close for two weeks.

In July 2004, an inventory of classified weapons data revealed that four hard disk drives were missing: two of the drives were subsequently found to have been improperly moved to a different building, but another two remained unaccounted for. In response, director Peter Nanos shut down large parts of the laboratory and publicly rebuked scientists working there for a lax attitude to security procedures. In the laboratory's August 2004 newsletter he wrote, "This willful flouting of the rules must stop, and I don't care how many people I have to fire to make it stop". Nanos is also quoted as saying, "If I have to restart the laboratory with 10 people, I will". However, a report released in January 2005 found that the drives were in fact an artifact of an inconsistent inventory system: the report concludes that 12 barcodes were issued to a group of disk drives that needed only 10, but the two surplus barcodes nevertheless appeared on a master list. Thus, auditors wrongly concluded that two disks were missing. The report states, "The allegedly missing disks never existed and no compromise of classified material has occurred". This incident is widely reported as contributing to continuing distrust of management at the lab. In May 2005, Nanos stepped down as director.

**Contract changes**

Continuing efforts to make the laboratory more efficient led the Department of Energy to open its contract with the University of California to bids from other vendors in 2003. Though the university and the laboratory had difficult relations many times since their first World War II contract, this was the first time that the university ever had to compete for management of the laboratory. The University of California decided to create a private company with the Bechtel Corporation, Washington Group International, and the BWX Technologies to bid on the contract to operate the laboratory. The UC/Bechtel led corporation—Los Alamos National Security, LLC (LANS)—was pitted against a team formed by the University of Texas System partnered with Lockheed-Martin. In December 2005, the Department of Energy announced that LANS had won the next seven-year contract to manage and operate the laboratory.

On June 1, 2006, the University of California ended its sixty years of direct involvement in operating Los Alamos National Laboratory, and management control of the laboratory was taken over by Los Alamos National Security, LLC. Approximately 95% of the former 10,000 plus UC employees at LANL were rehired by LANS to continue working at LANL. Other than UC appointing three members to the eleven member board of directors that oversees LANS, UC now has virtually no responsibility or direct involvement in LANL. UC policies and regulations that apply to UC campuses and its two national laboratories in California (Lawrence Berkeley and Lawrence Livermore) no longer apply to LANL, and the LANL director no longer reports to the UC Regents or UC Office of the President. Also, LANL employees were removed from the UC's 403(b) retirement savings and defined benefits pension program and placed in a LANS run program. While the LANS retirement program provides rehired UC employees with pensions similar to those UC would have given them, LANS no longer guarantees full pensions to newly hired LANL employees, it now provides basic 401(k) retirement saving options.

Concern has been voiced about the new contractor's effectiveness in correcting the perceived problems in safety, security and financial management that were cited as the reasons for bidding the contract, and Bechtel's lack of transparency (as a private corporation) and increasing control of national nuclear facilities.

Award of the Lawrence Livermore National Laboratory contract to LLNS LLC took effect October 1, 2007. LLNS is a joint venture of the University of California, Bechtel, Babcock & Wilcox, URS and Batelle.

**Extended operations**

With support of the National Science Foundation, LANL operates one of the three National High Magnetic Field Laboratories in conjunction with and located at two other sites Florida State University in Tallahassee, Florida and University of Florida in Gainesville, Florida.

Los Alamos National Laboratory is a partner in the Joint Genome Institute (JGI) located in Walnut Creek, California. JGI was founded in 1997 to unite the expertise and resources in genome mapping, DNA sequencing, technology development, and information sciences pioneered at the three genome centers at University of California's Lawrence Berkeley National Laboratory (LBNL), Lawrence Livermore National Laboratory (LLNL), and LANL.

The **Integrated Computing Network** (ICN), in 2008 the fastest supercomputer, is a multi-security level network at the LANL integrating large host supercomputers, a file server, a batch server, a printer and graphics output server and numerous other general purpose and specialized systems.

The Los Alamos National Laboratory also used to host the arXiv e-print archive. The arXiv is currently operated and funded by Cornell University.

In the recent years, the Laboratory has developed a major research program in systems biology modeling, known at LANL under the name q-bio.

**Controversy and criticism**

In 2009, 69 computers which did not contain classified information were lost. 2009 also saw a scare in which 2.2 pounds of missing plutonium prompted a Department of Energy investigation into the laboratory. The investigation found that the "missing plutonium" was a result of miscalculation by LANL's statisticians and did not actually exist; but, the investigation did lead to heavy criticism of the laboratory by the DOE for security flaws and weaknesses that the DOE claimed to have found.

The Soviets had direct access to Los Alamos research through Klaus Fuchs who had an important role in the Theoretical Division. In his position Fuchs attended weekly colloquiums and important planning discussions. He was editor of the secret Los Alamos Encyclopedia. Fuchs in 1950 confessed, was convicted (serving 9 years) and upon release lived in East Germany.

**Directors**

* [J. Robert Oppenheimer](http://en.wikipedia.org/wiki/J._Robert_Oppenheimer) (1943–1945)
* [Norris Bradbury](http://en.wikipedia.org/wiki/Norris_Bradbury) (1945–1970)
* [Harold Agnew](http://en.wikipedia.org/wiki/Harold_Agnew) (1970–1979)
* [Donald Kerr](http://en.wikipedia.org/wiki/Donald_Kerr) (1979–1986)
* [Siegfried S. Hecker](http://en.wikipedia.org/wiki/Siegfried_S._Hecker) (1986–1997)
* [John C. Browne](http://en.wikipedia.org/wiki/John_C._Browne_%28physicist%29) (1997–2003)
* [George Peter Nanos](http://en.wikipedia.org/wiki/George_Peter_Nanos) (2003–2005)
* [Robert W. Kuckuck](http://en.wikipedia.org/w/index.php?title=Robert_W._Kuckuck&action=edit&redlink=1) (2005–2006)
* [Michael R. Anastasio](http://en.wikipedia.org/wiki/Michael_R._Anastasio) (2006–2011)
* [Charles F. McMillan](http://en.wikipedia.org/wiki/Charles_F._McMillan) (2011–current)

**See also**

* [Anti-nuclear movement in the United States](http://en.wikipedia.org/wiki/Anti-nuclear_movement_in_the_United_States)
* [Association of Los Alamos Scientists](http://en.wikipedia.org/wiki/Association_of_Los_Alamos_Scientists)
* [Bradbury Science Museum](http://en.wikipedia.org/wiki/Bradbury_Science_Museum)
* [Federation of American Scientists](http://en.wikipedia.org/wiki/Federation_of_American_Scientists)
* [Clarence Max Fowler](http://en.wikipedia.org/wiki/Clarence_Max_Fowler)
* [David Greenglass](http://en.wikipedia.org/wiki/David_Greenglass)
* [Ed Grothus](http://en.wikipedia.org/wiki/Ed_Grothus)
* [History of nuclear weapons](http://en.wikipedia.org/wiki/History_of_nuclear_weapons)
* [Hydrogen Moderated Self-regulating Nuclear Power Module](http://en.wikipedia.org/wiki/Hydrogen_Moderated_Self-regulating_Nuclear_Power_Module)
* [Julius and Ethel Rosenberg](http://en.wikipedia.org/wiki/Julius_and_Ethel_Rosenberg)
* [Timeline of Cox Report controversy](http://en.wikipedia.org/wiki/Timeline_of_Cox_Report_controversy)
* [Venona Project](http://en.wikipedia.org/wiki/Venona_project)

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