AT A GLANCE: SLAC

SLAC NATIONAL ACCELERATOR LABORATORY

Managed by Stanford University and located in Silicon Valley, SLAC is a vibrant multiprogram laboratory whose mission is to explore how the universe works at the biggest, smallest, and fastest scales and invent powerful tools that scientists around the globe use. Since its founding in 1962, SLAC has made revolutionary discoveries that have established the laboratory's leadership in high energy physics. Today, SLAC is the world's leading laboratory in X-ray and ultrafast science due in large part to its X-ray user facilities, the Stanford Synchrotron Radiation Lightsource (SSRL), and the Linac Coherent Light Source (LCLS). Through diverse research programs in materials, chemical, biological and energy sciences, high-energy density science, cosmology, particle physics, bioimaging and technology development, SLAC helps solve real-world problems and advances the interests of the Nation.

FUNDING BY SOURCE

FY 2019 (Costs in $M)
Total Laboratory
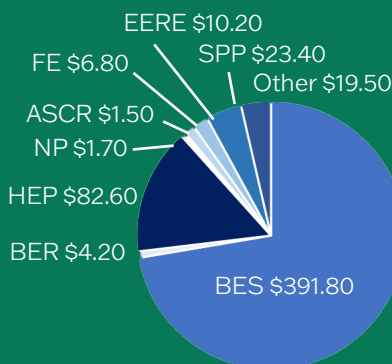Operating Costs: $541.5
DOE/NNSA Costs: $518.1
SPP (Non-DOE/Non-DHS) Costs: $23
SPP as % of Total Laboratory Operating Costs: 4%
DHS costs: $0.4

Pie chart:
- EERE $10.20
- SPP $23.40
- Other $19.50
- FE $6.80
- ASCR $1.50
- NP $1.70
- HEP $82.60
- BER $4.20
- BES $391.80

FACTS

Location: Menlo Park, California
Type: Multiprogram Laboratory
Contractor: Stanford University
Site Office: Bay Area
Website: slac.stanford.edu
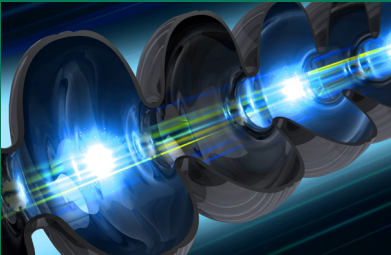
PHYSICAL ASSETS

426.3 acres
150 buildings
$3.1 billion replacement plant value
1.8 million GSF in buildings
0 GSF in leased facilities
1,170 GSF in 1 excess facility

HUMAN CAPITAL

1,620 FTE employees
22 joint faculty
227 postdoctoral researchers
121 undergraduate students
241 graduate students
2,608 facility users*
22 visiting scientists
*Facility users as reported to DOE by the user facilities LCLS, SSRL, and FACET, and test facilities ASTA, LSST, ESTB, and NLCTA.

CORE CAPABILITIES

Accelerator S&T
Advanced Computer Science, Visualization, and Data*
Chemical and Molecular Science
Condensed Matter Physics and Materials Science
Large-Scale User Facilities/Advanced Instrumentation
Particle Physics
Plasma and Fusion Energy Science
*Emerging core capability

MISSION UNIQUE FACILITIES

Facility for Advanced Accelerator Experimental Tests (FACET)
Linac Coherent Light Source (LCLS)
NIH Common Fund Stanford-SLAC Cryo-EM Center (S2C2)
NIH Common Fund Stanford-SLAC CryoET Specimen Preparation Service Center (SCSC)
Stanford-SLAC cryogenic electron microscopy (cryo-EM) facilities
Stanford Synchrotron Radiation Lightsource (SSRL)
Ultrafast Electron Diffraction facility (MeV-UED)
*Also leading DOE contributions to the construction and operation of the Vera C. Rubin Observatory, as well as the joint DOE-National Science Foundation (NSF) construction of the next-generation dark matter experiment SuperCDMS-SNOLAB.

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ACCOMPLISHMENTS

Unique Facility: X-ray and Electron Beams Draw Thousands - Thousands of scientists come to SLAC each year to explore the natural world at the largest, smallest, and fastest scales with powerful X-ray and electron beams. It's a combination found nowhere else: the pioneering Linac Coherent Light Source (LCLS) X-ray free-electron laser, being upgraded to increase its firing rate to a million pulses per second; Stanford Synchrotron Radiation Lightsource (SSRL), a forefront light source providing bright X-rays and outstanding user support; and the MeV-UED "electron camera," which tracks atomic motions in a broad range of materials in real time. Our advanced instrumentation and facilities for cryogenic electron microscopy make us one of the world's leading centers for cryo-EM research, training, technology development and service to the scientific community.
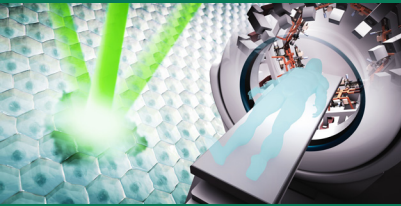
Tech-to-Market Highlight: Inventions Enhance and Save Lives - Working with industry, universities, and federal partners, SLAC scientists are developing valuable and sometimes life-saving technologies—for instance, a new type of pocket-sized antenna that enables mobile communication where conventional radios don't work, a low-cost emergency ventilator that could save the lives of COVID-19 patients, and, in collaboration with Stanford University, accelerator-based cancer treatments that zap tumors with X-rays or electrons, decreasing treatment times from minutes to seconds. This would make radiation therapy more precise with fewer side effects.
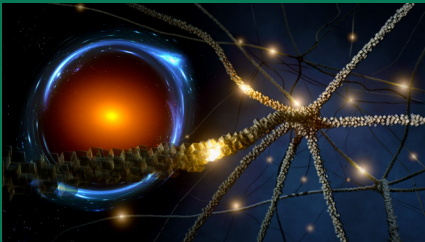
Research Highlight: Machine Learning Boosts Research Across the Laboratory - SLAC's big scientific facilities produce enormous amounts of data, and when our LCLS-II X-ray laser upgrade and Vera C. Rubin Observatory come online the data torrents will become tsunamis. One of the ways SLAC is meeting this challenge is machine learning, where computer programs carry out tasks by looking for patterns in examples. Machine learning is enhancing research and operations across the laboratory, allowing SLAC to operate accelerators more efficiently, speed the discovery of new materials, and uncover distortions in space-time 10 million times faster than before. At SLAC's X-ray facilities, scientists can use machine learning to analyze data in real time so they can adjust their experiments on the fly for maximum efficiency.

U.S. DEPARTMENT OF **ENERGY**