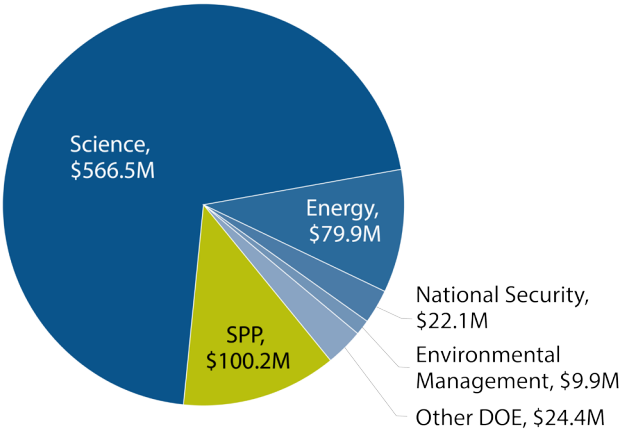
Lawrence Berkeley National Laboratory
At a Glance

U.S. DEPARTMENT OF ENERGY

Berkeley Lab performs research at the forefront of science. We search for cleaner and novel sources of energy. We study the planet to understand how our climate is changing and what we can do about it. We explore the universe to understand how it began and where it's going. We are leaders in energy conservation, designing better materials and greener buildings.

We design and build the most powerful microscopes, brightest x-ray light sources and fastest computers. Our research aims to coax more power from solar cells, build better batteries and develop clean biofuels for the future. We are the home of five state-of-the-art DOE user facilities, where more than 11,000 scientists from across the nation perform advanced research.

FY 2016 Funding by Source



Lab operating costs: **$802.9M**
DOE/NNSA costs: **$697.3M**
SPP costs (non-DOE/non-DHS): **$100.2M**
SPP as % total Lab operating costs: **12.5%**
DHS costs: **$5.4M**

Facts

Location: Berkeley, California
Type: Multiprogram Laboratory
Year Founded: 1931
Director: Michael Witherell
Contractor: University of California
Responsible Site Office: Berkeley Site Office

Physical Assets

202 acres and **94** buildings and **26** trailers
1.68 million GSF in DOE-owned buildings
Replacement plant value: **$1.335B**
338,778 GSF in leased facilities
326,086 GSF in contractor-leased buildings

Human Capital

3,302 full-time equivalent employees (FTEs)
232 joint faculty
486 postdoctoral researchers
263 graduate students
148 undergraduate students
11,403 facility users
2,241 visiting scientists and engineers

Core Capabilities

- Accelerator Science and Technology
- Advanced Computer Science, Visualization, and Data
- Applied Materials Science and Engineering
- Applied Mathematics
- Biological and Bioprocess Engineering
- Biological Systems Science
- Chemical Engineering
- Chemical and Molecular Science
- Climate Change Science and Atmospheric Science
- Computational Science
- Condensed Matter Physics and Materials Science
- Condensed Matter Physics and Materials Science
- Cyber and Information Sciences
- Decision Science and Analysis
- Earth Systems Science and Engineering
- Environmental Subsurface Science
- Large Scale User Facilities/Advanced Instrumentation
- Mechanical Design and Engineering
- Nuclear Physics
- Nuclear and Radio Chemistry
- Particle Physics
- Power Systems and Electrical Engineering
- Systems Engineering and Integration

Mission Unique Facilities

- Advanced Light Source
- The Molecular Foundry
- National Energy Research Scientific Computing Center (NERSC)
- Energy Sciences Network (ESnet)
- Joint BioEnergy Institute
- Joint Genome Institute
- Advanced Biofuels Process Demonstration Unit
- FLEXLAB

BERKELEY LAB

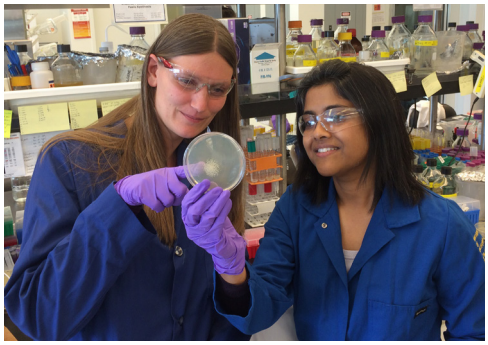
Lawrence Berkeley National Laboratory
Accomplishments

U.S. DEPARTMENT OF ENERGY

Unique Facility
Advanced Light Source

The Advanced Light Source (ALS) is one of the most sophisticated scientific instruments ever built. It produces hair-thin beams of x-rays and ultraviolet light, precisely focused and a billion times brighter than the sun. The ALS hosts more than 2,000 visiting scientists annually. Experiments range from environmental, materials, and energy sciences to physics and biology. ALS beams have revealed the structures of nearly 3,300 proteins and analyzed bacteria found in the Gulf of Mexico oil spill. Its beamlines are vital analytical tools leading to better medicines, stronger materials, and more efficient solar cells and batteries.

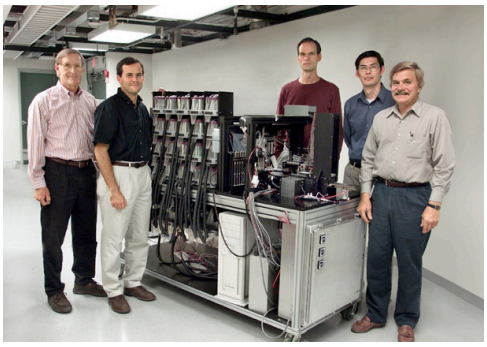
Research Highlight
Berkeley Lab Scientists Brew Jet Fuel in One-Pot Recipe



Researchers at Berkeley Lab have engineered a strain of bacteria that enables a "one-pot" method for producing advanced biofuels. The *Escherichia coli* (*E. coli*) is able to tolerate the liquid salt used to break apart plant biomass into sugary polymers. Because the salt solvent, known as ionic liquids, interferes with later stages in biofuels production, it needs to be removed before proceeding, a process that takes time and money. Developing ionic-liquid-tolerant bacteria eliminates the need to wash away the residual ionic liquid.

The achievement is critical to making biofuels a viable competitor to fossil fuels because it helps streamline the production process.

Technology to Market Highlight
Automating Drug Discovery with Robots



Most available pharmaceuticals target proteins. Crystalizing a protein to map out its atomic structure and determine whether a potential drug might bind with it is now a common path to drug discovery. In the late 1990s, crystalizing a protein could take months and even years. Berkeley Lab's bioinstrumentation group helped create a solution by designing a nanodroplet protein crystallization robot, which sped up the crystallization process by a factor of 10. Syrrx licensed the Lab's technology in 2000 and designed a series of robots to create an automated drug discovery system. One drug Syrrx developed using the system received FDA approval in 2013 to treat type 2 diabetes.