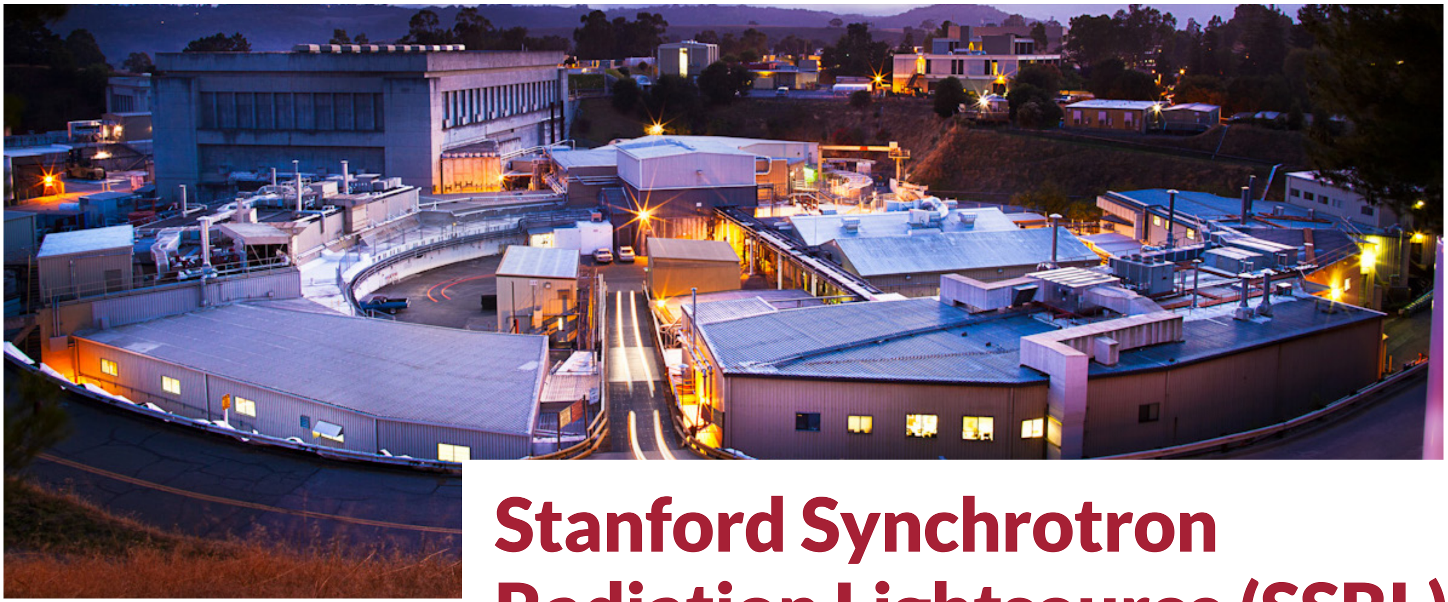

Stanford Synchrotron Radiation Lightsource (SSRL)

SSRL | Stanford Synchrotron Radiation Lightsource

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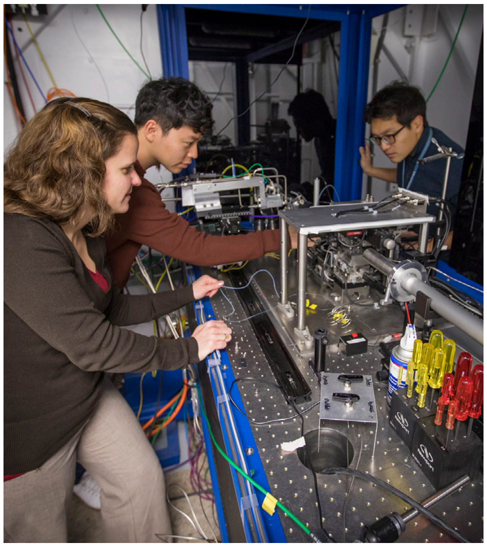
SSRL produces extremely bright X-ray light for probing our world at the atomic and molecular level. Scientists from all over the world use it each year for research that benefits many sectors of the American economy. Their work spurs advances in medicine, energy production, environmental cleanup, nanotechnology and new materials.

Facts

- ~140 staff run the facility
- 18,000 publications since 1974
- 29 experimental stations

Tools for discovery

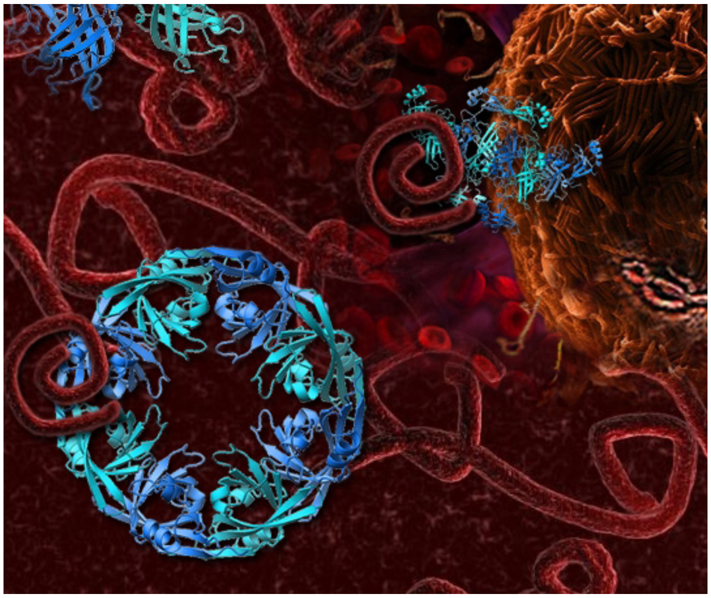
Research at SSRL aids in the design of new drugs and next-generation batteries. It helps make catalysts more efficient and reveals how to optimize the atom-by-atom structure of photovoltaic thin films that generate energy from sunlight. The goals are to make more effective medicines with fewer side effects, improve the performance of energy devices and develop more efficient processes for industry. In addition, fundamental studies of exotic materials at SSRL can pave the way for technologies of the future.



Right: Researchers at SSRL Beamline 6-2, where SLAC carries out research on batteries and energy storage materials. (Dawn Harmer/SLAC National Accelerator Laboratory) Top: The SSRL facility, which provides synchrotron radiation, a name given to X-rays or light produced by electrons circulating in a storage ring at nearly the speed of light. (Brad Plummer/SLAC National Accelerator Laboratory)

A destination for research and training

As one of the world's pioneering centers of X-ray science, SSRL is known for its outstanding support and training for scientists and engineers. Since SSRL's opening in 1974, researchers from a wide variety of fields have published more than 18,000 scientific papers based on work at the facility.



An SSRL study revealed how an Ebola virus protein can arrange into three very different shapes, yielding new clues for how to fight the virus. (Nikola Stojanovic/SLAC National Accelerator Laboratory and Zachary Bornholdt/The Scripps Research Institute)

An X-ray technique explores the active chemistry of a tiny fuel cell, at center, in a pressurized experimental chamber. (Andy Freeberg/SLAC National Accelerator Laboratory)

Saving lives

Pharmaceutical companies use SSRL to study promising new drugs. Research here contributed to the development of Vemurafenib, a treatment for late-stage or inoperable melanoma; Oseltamivir, a widely used antiviral drug marketed as Tamiflu; and a life-saving drug for tuberculosis. SSRL beamlines also identified shape changes in an Ebola virus protein and in the structure of the SARS-CoV-2 spike protein that could help combat those diseases.

Building better batteries

Scientists around the world are racing to develop cheaper, sturdier and more efficient rechargeable batteries for computers, electric vehicles and other devices. With the SSRL X-ray beam, they can test new battery materials and components in realistic operating conditions, watching split-second chemical changes occur as the battery charges and discharges. These studies are overturning old notions of how batteries work and pointing out new ways to improve them.

Improving solar cells

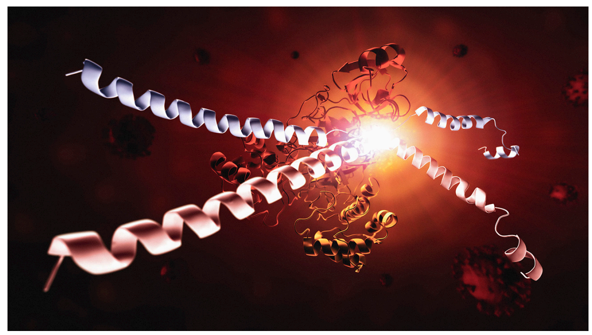
By packing molecules closer together, scientists have developed a semiconductor material that is among the speediest ever designed. This material – and the innovative process used to manufacture it – may significantly improve the efficiency and cost of organic solar cells used to turn the sun's rays into usable energy.

Spurring new technology

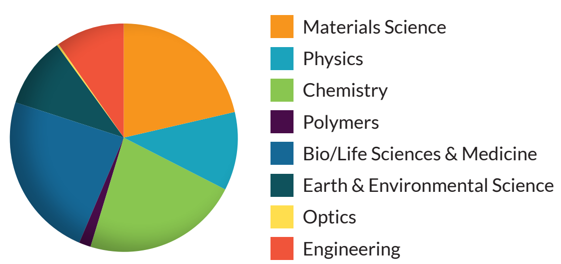
By partnering with industry, SSRL has enabled technical advancements that would otherwise not have been possible. This leads to job creation and gives advanced technologies a foothold in the commercial market.

Increasing efficiency in how we work

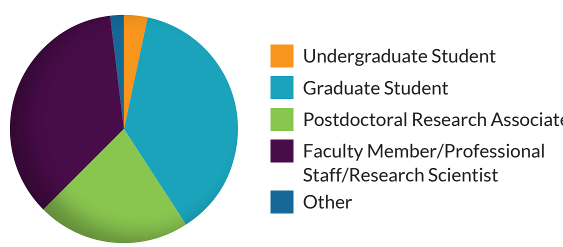
Thanks to upgrades in automated instruments and improved data collection, scientists from across the U.S. and around the world can now perform research at SSRL from their home institutions with on-site support from SSRL staff scientists. These remote capabilities save on travel-related resources, increasing the efficiency of science at SLAC.



An SSRL study determined how a SARS-CoV-2 virus protein cuts a vital immunity pathway in an infected host. (Greg Stewart/SLAC National Accelerator Laboratory)



Users by Science



Users by Career Status

SLAC's Stanford Synchrotron Radiation Lightsource is an Office of Science user facility operated for the Department of Energy by Stanford University. It is primarily supported by the DOE Offices of Basic Energy Sciences and Biological and Environmental Research, with additional support from the National Institutes of Health, National Institute of General Medical Sciences.

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