

EDUCATING THE NEXT GENERATION

As part of its mission, Jefferson Lab offers dynamic science education programs for students of all ages.

Jefferson Lab Science Activities for Teachers is an initiative funded by Jefferson Science Associates for 5th, 6th and 8th grade teachers. It is designed to build content knowledge in the physical sciences and introduce engaging and advanced teaching methods that help students develop critical-thinking skills. Teachers attend 16 after-school sessions throughout the school year. Each session includes a Jefferson Lab-related activity, project, and/or lecture. Topical material is relevant so that participants can immediately apply new teaching strategies to their lesson plans. In addition, teachers are given the educational materials necessary to implement new teaching strategies.

High school and college students also benefit from the lab's expertise and unique facilities. Each year, hundreds of students work and conduct research at the lab. About one-third of all nuclear physics Ph.D.s awarded in the United States and roughly 15 percent of those awarded worldwide are based on research done at Jefferson Lab.

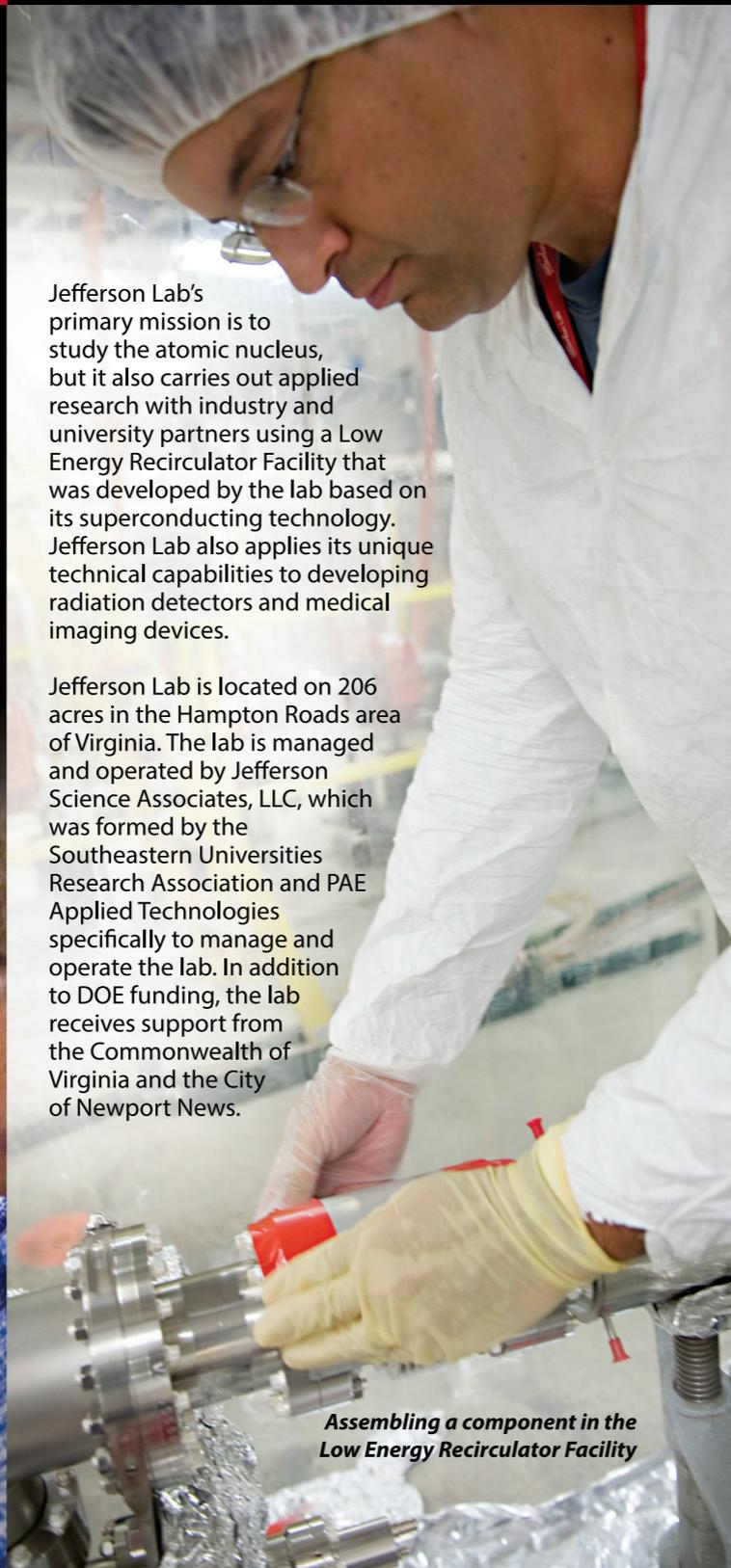


Student researchers with a mentor

ABOUT JEFFERSON LAB

Jefferson Lab's primary mission is to study the atomic nucleus, but it also carries out applied research with industry and university partners using a Low Energy Recirculator Facility that was developed by the lab based on its superconducting technology. Jefferson Lab also applies its unique technical capabilities to developing radiation detectors and medical imaging devices.

Jefferson Lab is located on 206 acres in the Hampton Roads area of Virginia. The lab is managed and operated by Jefferson Science Associates, LLC, which was formed by the Southeastern Universities Research Association and PAE Applied Technologies specifically to manage and operate the lab. In addition to DOE funding, the lab receives support from the Commonwealth of Virginia and the City of Newport News.



Assembling a component in the Low Energy Recirculator Facility

WANT TO KNOW MORE?

Learn more about Jefferson Lab by visiting www.jlab.org, by sending an email to jlabinfo@jlab.org or by calling (757) 269-7100.

Inside one of the experimental halls



Jefferson Lab

Thomas Jefferson National Accelerator Facility is managed by Jefferson Science Associates, LLC for the U.S. Department of Energy's Office of Science



THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY

**E X P L O R I N G
THE NATURE OF MATTER**



Accelerator components

GROUNDBREAKING RESEARCH

The Thomas Jefferson National Accelerator Facility is a world-leading nuclear physics research facility funded by the U.S. Department of Energy's Office of Science.

Jefferson Lab's unique and exciting mission is to expand our knowledge of the universe by studying sub-atomic particles known as quarks and gluons. Scientists know that these building blocks of matter combine to form the protons and neutrons found in the nucleus of the atom. But they don't fully understand how these particles build our world and universe.

To learn more, scientists conduct experiments using Jefferson Lab's Continuous Electron Beam Accelerator Facility. CEBAF acts like a giant microscope, providing an unprecedented view that enables scientists to "see" things a million times smaller than an atom. CEBAF does this by propelling an electron beam at nearly the speed of light into targets located in three of the lab's experimental halls. Beam to the fourth hall is manipulated to generate photons that are directed to a target. When the beam strikes a target, the interactions are recorded and studied.

To understand the information collected in these experiments, Jefferson Lab theorists develop theoretical models and carry out sophisticated computerized simulations of the interactions. Integrating experimental results and cutting-edge theories help scientists gain a better understanding of the building blocks of matter and the forces binding them together.



Light guides for a new detector system



Jefferson Lab Accelerator Site

A UNIQUE RESEARCH FACILITY



Building a new detector system

Jefferson Lab's CEBAF is shaped like a racetrack and is located in a tunnel 25 feet below ground. Magnets focus and steer the electron beam, while superconducting technology allows the beam to be accelerated through specially designed components that are cooled to about -456°F , or 2 Kelvin (K).

The electron beam, focused to about the width of a human hair, can travel around the 7/8-mile tunnel five times in about 22 millionths of a second. The beam gains energy with each lap it completes around the accelerator. When the desired energy is reached, electron beam is delivered to one or more of the lab's four experimental halls.



An experimental detector

MAKING AN IMPACT

More than 1,500 scientists from the U.S. and abroad use Jefferson Lab's world-class facilities to conduct basic and applied research. The lab also provides many high-tech employment opportunities and ranks among the top 30 employers in the Hampton Roads region. The lab employs more than 700 people, most with advanced college degrees and specialized skills.

The lab's annual budget of about \$150 million provides substantial economic benefits regionally and across the nation.



Advanced computing at JLab