Learning about superconductivity

Checking out a display

View inside Hall A

# Important Information

- Touring the entire site will take four hours.
- Children under 16 must be accompanied by an adult.
- Restrooms at Hall A, the Physics displays and S.C.O.T. Lot are outdoor portable restrooms, the rest are indoors.
- The Accelerator Tunnel is not handicap accessible. All other tour stops are handicap accessible.

# Getting Around

Shuttle buses continuously loop the Jefferson Lab campus and parking lots. Estimated wait times are 5–10 minutes.

You can walk the entire tour route; it is approximately a two-mile loop.

Report lost children or medical problems to the nearest event worker.

**Learn more about Jefferson Lab:**
visit www.jlab.org
or email jlabinfo@jlab.org
or call (757) 269-7100.

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U.S. DEPARTMENT OF ENERGY | JSA | Jefferson Lab

# JEFFERSON LAB OPEN HOUSE

# MAP & INFORMATION

**May 17, 2014**
Event ends at 3 p.m.

# WHAT IS JEFFERSON LAB?

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.

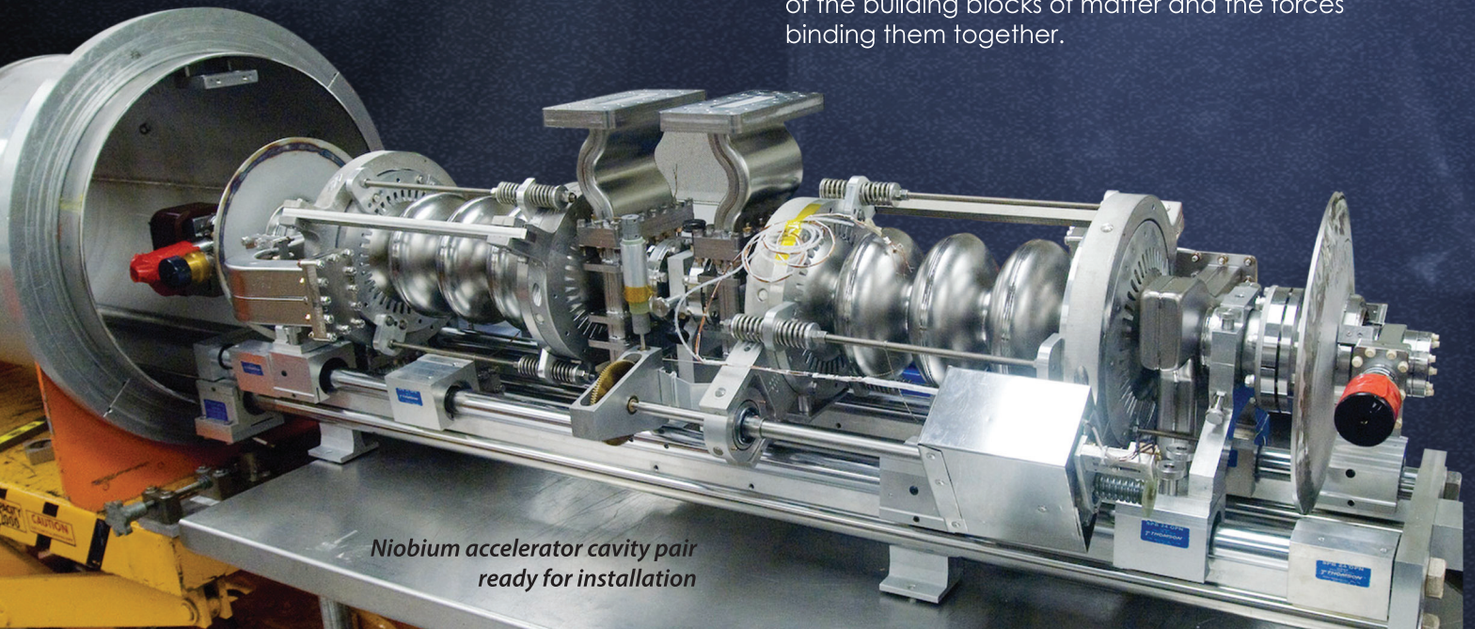
Jefferson Lab's unique and exciting mission is to expand our knowledge of the universe by studying sub-atomic particles known as quarks and gluons. Scientists know that these building blocks of matter combine to form the protons and neutrons found in the nucleus of the atom. But they don't fully understand 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 the lab's four experimental halls. When the beam strikes a target, the interactions are recorded and studied.

*Aerial view of Jefferson Lab*

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 helps scientists gain a better understanding of the building blocks of matter and the forces binding them together.

*Magnets in a CEBAF beam recirculating arc*



*Niobium accelerator cavity pair ready for installation*

## JEFFERSON LAB FACTS

- Jefferson Lab is managed and operated for the U.S. Department of Energy by Jefferson Science Associates, LLC, a joint venture between Southeastern Universities Research Association, Inc., and PAE Applied Technologies.

- To build Jefferson Lab required a $600 million investment by the federal government, the Commonwealth of Virginia, the City of Newport News, foreign contributors and the U.S. nuclear physics research community. The annual budget is approximately $200 millon.

- More than 700 people are employed at Jefferson Lab, with a daily site population (staff, contractors, visiting researchers, students) of about 1,000.

- Approximately 1,250 scientists from around the world conduct experiments at Jefferson Lab.

- A $338 million upgrade to Jefferson Lab's Continuous Electron Beam Accelerator Facility to be completed in 2017 doubles the beam energy of CEBAF and adds new research capabilities.


# TOUR STOPS

## CEBAF Center

This is the place for hands-on science activities.

Watch liquid nitrogen demonstrations in the auditorium every hour on the hour from 10 a.m.–2 p.m. Designed for children ages 6–12, but appropriate for kids of all ages.

Also, see supercomputers in our Data Center and visit with Jefferson Lab staff representing Technology Transfer, Medical Imaging, and Human Resources.

Interact with scientists and the equipment from university laboratories from the Applied Research Center.

## TED Building & Test Lab

Learn about the Department of Energy and its other national labs, and see examples of the lab's sustainability efforts as you stroll through the LEED-certified Technology and Engineering Development Building, or TED.

The Test Lab is where Jefferson Lab conducts world-leading research and development for accelerator components. Fire an accelerator, build your own cavity, witness superconductivity at work or catch a science lecture.

## Machine Control Center

Visit the nerve center for the lab's Continuous Electron Beam Accelerator Facility (CEBAF), where operators run the machine. Learn how we generate electrons, accelerate them to almost the speed of light, and deliver them to the experimental halls for experiments.

## Experimental Hall A, B & C

Descend underground through the truck ramps to view the enormous detector systems in Halls A and C. Catch a shuttle to visit Hall B, where you can watch our detectors collect particles in real time.

## Accelerator Tunnel

Venture 25 feet underground to see the six-ton, 27-foot long cryomodules used to speed the electron beam and two-ton electric magnets used to steer the electron beam. There are two identical tour routes.

## Central Helium Liquefier (CHL)

Take a peek inside our accelerator's refrigeration plant, and see the lab's unique nitrogen & helium refrigerators at work.

## Free-Electron Laser Building

The FEL is the most powerful tunable laser on Earth, operating in the infrared and near ultraviolet (UV). Learn how the FEL works and see the radiofrequency klystrons used to power accelerators. See the Laser Micro-Engineering Station, which uses UV light to pattern materials in 3D, learn about experiments looking for mysterious Dark Matter, and see yourself in infrared.

## Experimental Hall D

Walk through Hall D's Counting House and into the hall itself to see the newly installed equipment. Learn how research here may help answer the question: Why is one quark never seen alone?

*Detector installation in Hall D*

# Suggested Tour Itineraries

**SEE IT ALL:**
Spend 20-30 minutes at each tour stop to learn a little about everything we do.
**Suggested tour time: 4 hours**

**SCIENCE FOR KIDS:**
Watch a liquid nitrogen show and join in the fun with hands-on demos from the lab and other local organizations at **CEBAF Center**, **TED Building** and the **Test Lab**.
**Suggested tour time: 2 hours**

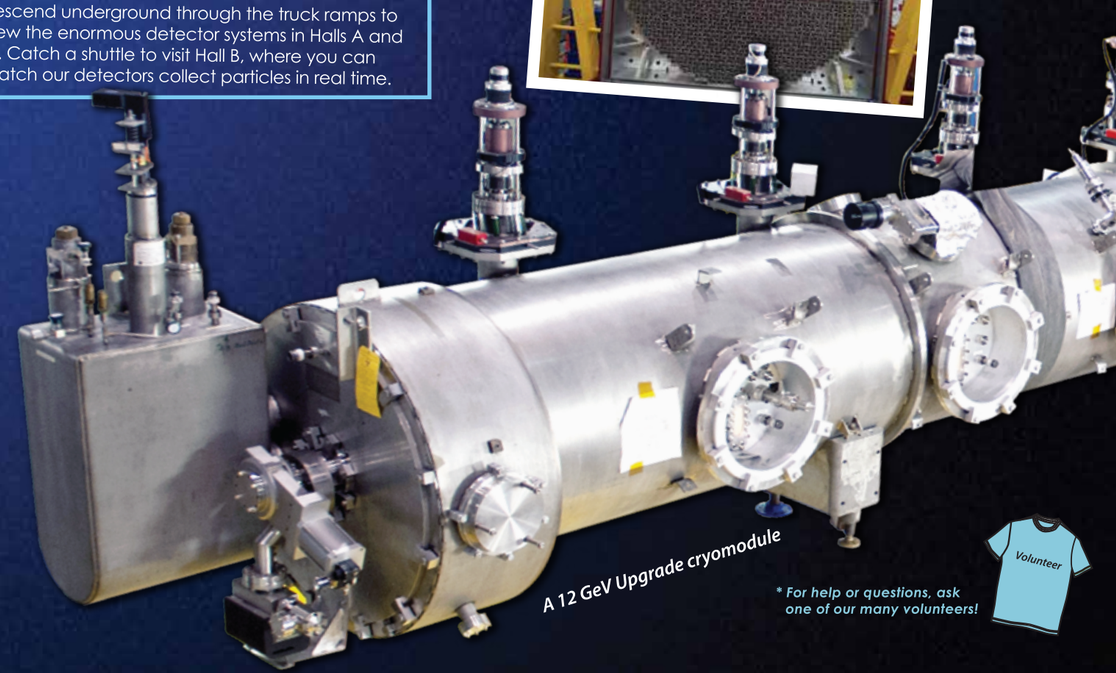
**SCIENCE IN DEPTH:**
Learn about lasers, the physics you already know, experiments and radiation at Jefferson Lab by attending talks by some of the lab's dynamic speakers in the **Test Lab**. (Seating is limited. For safety, attendance is limited to seat availability)
**Talks offered on the hour**

**ACCELERATOR TECH:**
Learn about the accelerator technology developed at Jefferson Lab. Take an in-depth tour of the **Test Lab**, **Machine Control Center** and **Tunnel**.
**Suggested tour time: 2 hours**

**NUCLEAR PHYSICS:**
Learn about the research conducted with Jefferson Lab's accelerators by visiting **Halls A, B, C, and D** and speak to experimenters from local university physics departments in the Physics display tent.
**Suggested tour time: 2.5 hours**

*Aerial view of CEBAF Center*

*The Technology & Engineering Development building*



*A 12 GeV Upgrade cryomodule*




** For help or questions, ask one of our many volunteers!*