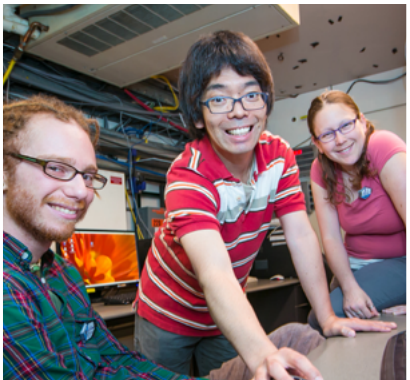
CLASSE

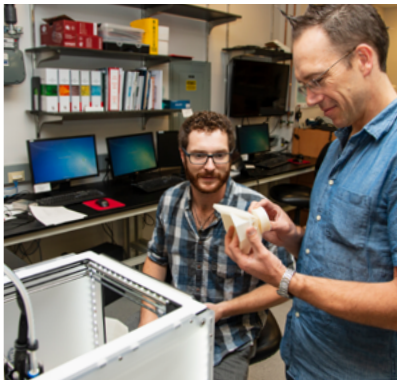
Cornell Laboratory for Accelerator-based Sciences & Education

WORKING at CLASSE

We are a team of scientists, students, researchers, engineers, technicians and personnel that studies our world and universe using x-rays and high energy electrons and proton beams.

- Accelerator Technology
- X-Ray Science
- Elementary Particle Physics
- Astrophysics





CLASSE at Cornell

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In a *CLASSE* of its own

Buried 40 feet beneath Alumni Field on the Cornell University campus is the 768 meter Cornell Electron Storage Ring (CESR). CESR was constructed as an electron-positron collider operating at a center-of-mass energy in the range of 3.5-12 GeV. CESR is now used as an X-ray source for CHESS, and is also used as a test-bed accelerator for exploring the latest accelerator physics technologies and concerns.

The Cornell Laboratory for Accelerator-based Sciences and Education (CLASSE) is part of a long history at Cornell that has helped advance the frontiers of beam science.

While other synchrotron laboratories are traditionally located at national labs, **Cornell is the only U.S. university still operating a large accelerator complex**. The university graduates roughly 20 percent of the nation's Ph.D.s trained in accelerator science and advanced X-ray technology, and approximately 60 undergraduates participate in CHESS laboratory research every year.

CORNELL CONNECTION

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Life at Cornell comes with **rich benefits**

Cornell takes pride in offering generous benefits to support and enhance your health, wealth and wellness. Here's a quick overview of the kind of total rewards that have made us an award-winning employer of choice.

Visit the Benefits & Pay section to learn more.

Health Care

Cornell offers a variety of high-quality health insurance plans to suit individual needs and preferences. Choose among options that feature comprehensive preventive and specialist care and flexibility to support the health of yourself and your family.

Lifelong Learning & Career Growth

Earn a Cornell degree while you work, or take classes that enrich your career skills. We proudly offer generous education benefits for lifelong learning, as well as opportunities that support the education of future generations.

Securing Your Future

The best way to predict your future is to create it. Cornell benefits offer retirement plans, so you'll have the resources you need to plan and achieve your financial goals.

Check out more of the great benefits Cornell has to offer:

Discover. Connect. Thrive

CLASSE - More than a sum of its parts

CLASSE

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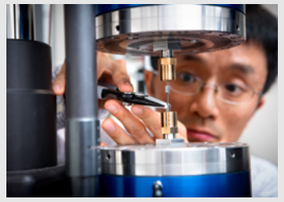
CLASSE is a team of scientists, students, researchers, engineers, technicians and personnel that studies our world and universe using x-rays and high energy electrons and proton beams. Our research aims to increase the scientific reach of future accelerators and open new doors for industry.

At CLASSE, we study the Higgs boson with the Large Hadron Collider, glimpse the early universe with the Atacama Cosmology Telescope, and develop organic solar cells and study the folding of long DNA strands at the CHESS national x-ray user facility. CLASSE also advances the frontiers of beam science, and develops the technology needed to produce and accelerate ultra-bright, high power beams for research, medicine and industry. We study the behavior of very compact beams using the Cornell Electron Storage Ring (CESR), develop high power electron sources, and advance the superconducting technology that efficiently accelerates particles to near light speed.



Sample at CHESS, being prepared for x-rays

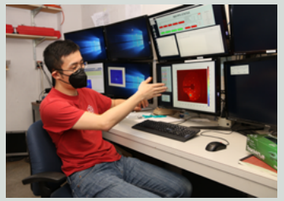
CORNELL HIGH ENERGY SYNCHROTRON SOURCE (CHESS)

CHESS is a national user facility that provides synchrotron x-ray capabilities for investigators in all fields of science and engineering. It uses synchrotron light given off by charged particles as they circulate in a ring at nearly the speed of light. The x-ray beams generated at CHESS help scientists and researchers understand materials from airplane wings to cell membranes, from pollutants in plants to matter under earth-core pressures.

CMS Detector at CERN

PARTICLE PHYSICS AND ASTROPHYSICS

Cornell scientists develop and explore the theories that might have been operative in the early universe using the Large Hadron Collider (LHC) in Geneva Switzerland, where the conditions of the early universe are created briefly in collisions, and a high precision experiment at Fermilab. They also apply general relativity to the dynamics of stars.



Ultra fast electron diffraction development at Newman Lab

BRIGHT SOURCES OF ELECTRONS

The photoinjector at CLASSE holds records for both beam current and brightness and meets the needs of future accelerators, including an Energy Recovery Linac. Further advances on photocathode technology and beam halo will enable even better performance, and new applications such as ultrafast electron diffraction.

CESR at Wilson Lab

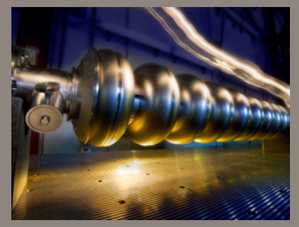
STORAGE RING DYNAMICS

Using CESR, lab scientists study ultra-compact electron and positron beams, advancing accelerator performance for future light sources and particle physics colliders. This work takes advantage of superb beam instrumentation, feedback and control systems as well as sophisticated accelerator models. CESR is recognized internationally as an outstanding training ground for graduate students and post-docs who become leaders at accelerator laboratories around the world.

Testing SRF Cavities

SUPERCONDUCTING PARTICLE ACCELERATION

Cornell is a leader in particle beam acceleration based on superconducting radio frequency (SRF) cavities, a technology of choice in modern accelerators. CLASSE scientists work to improve cavity energy efficiency, reliability and performance. Cornell has developed and industrialized the cavities chosen to power seven facilities around the world, and is currently working on a prototype Energy Recovery Linac (ERL) named CBETA with Brookhaven National Lab.



Building SRF Cavities

PRODUCTION, ACCELERATION AND TRANSPORT OF ELECTRON BEAMS

The Center for Bright Beams is one of 12 NSF Science and Technology Centers. It joins scientists from multiple Cornell departments, other universities and national labs to address major challenges in the production, acceleration and transport of electron beams. CBB aims to revolutionize the brightness of electron beams, extending the reach of science, medicine and industry.

BEYOND the LAB - CLASSE Staff in the community

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Katie Moring: CHESS Operations Manager

Featured in:
Living in Ithaca

As the Operations Manager at CHESS, Katie Moring has a lot of responsibilities at the lab, but is still able to find the time to help organize and enjoy what the Ithaca area has to offer, while also encouraging others to do the same.

The hills of Ithaca are a haven for road bike enthusiasts. The rural roads offer the rider a backdrop of farm life, glimpses of Cayuga Lake, and enough climbs to keep you healthy and invigorated.

If you travel these scenic paths, you may come across a group of riders known as the Gorges Gals, journeying the same climbs, and geared up for the 20-30 mile ride. Usually, at the front of the pack is Katie Moring. Katie helps organize the weekly ride - with sometimes up to 40 attendees - and urges others to get involved.

READ MORE

Elisabeth Bodnaruk: Research Support Specialist

Elisabeth says she feels like she belongs at CHESS, doing whatever it takes to make things work - from building experimental hutches to working with sensitive vacuum equipment.

When she is not at CHESS though, she is working with her other construction crew: Habitat for Humanity. It is apparent that the skills needed at the lab easily translate to her volunteer responsibilities. But out here on the construction site it is 22 degrees, and she hopes that moving some 24-foot trusses will help keep her warm.

"I enjoy working with tools, working as part of a team, and trying to solve problems," she says, as she stands atop feel like I'm contrib-
uting to something
greater."

READ MORE

READ MORE

Bill Miller: Research Support Specialist

For the past 30 years, Bill has gone from helping users capture data on Polaroids, to assembling hutches for the recent CHESS-U upgrade.

Throughout these thirty years, one thing has always been constant; Bill is there when you need him, whether you are a user or a staff scientist, Bill is known to lend a helping hand. However, If you ask him, he would add a bit of humor, the kind that seems to follow Bill around the lab; "Nothing is constant here, that's why I love it!"

As a volunteer critical care technician, Bill says that his skills complement the demands of emergency situations.

"We are always ready to go at a moment's notice," he says. "And it's a lot alike. You are solving problems, troubleshooting… it's just a little bit more intense. People entrust you with the lives of their loved ones," he says. "Sometimes it is life and death, and my job is to get them to the ER Doctor, hopefully in better shape than when I picked them up."

LIVING in ITHACA - Ithaca truly is gorgeous

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Ithaca is a large town surrounded by rolling rural hills and home to some of the northeast's most attractive gorges and waterfalls with amazing places to go swimming. The centerpiece of the landscape is Cayuga Lake — 40 miles of (mostly) clear, pristine water, and a boon for sailing enthusiasts, with a number of parks along its shoreline.

To find out more about living in Ithaca, please check out:
https://www.liveinithaca.org/

Taughannock Falls carves a 400ft deep gorge through layers of sandstone, shale and limestone that were once the bed of an ancient sea. With a 215 foot plunge, this waterfall stands three stories taller than Niagara Falls.

No matter the season, no matter the time of day, there is always something exciting going on in the thaca Commons. This four-block, pedestrian-only section of Downtown is home to many unique stores and Ithaca restaurants.

With an eclectic variety of restaurants, the Ithaca Farmers Market steals the show, as it is one of the local highlights, bringing in fresh food from the local area.