

Cutting-edge research at a world-class facility

The Oak Ridge National Laboratory has been at the forefront of scientific research for decades, especially in energy-related areas.

A list of research areas at ORNL is at www.ornl.gov. For examples of student research at the Laboratory, go to www.denison.edu/collaborations/oakridge/.

Some highlights of the research areas at ORNL are listed below.



At right: ORNL's Holifield Radioactive Ion Beam Facility.

Biology The emphasis is on the genetic, cytological, biochemical, biophysical, pathological, and physiological effects of radiation.

Chemistry In nuclear chemistry, most work is aimed at understanding nuclear properties in terms of current theoretical models. The emphasis in inorganic chemistry is on the actinides. Organic chemistry studies are devoted to reaction mechanisms and isotope effects.

Physics ORNL's basic research programs in physics include fission and reactor physics, high energy physics, nuclear physics, solid state physics, engineering physics, and plasmas. Two of the most advanced neutron scattering scientific research facilities in the world are at ORNL: the High Flux Isotope Reactor (HFIR) and the Spallation Neutron Source (SNS), which draw scientists from around the globe to conduct basic research.

Interdisciplinary studies Current research programs include studies in geology, materials science, health physics, biochemical and biophysics activities, energy use and development studies, and the environmental sciences.

Social sciences Such diverse activities as electrical generator sitings, environmental impact statements, urban development programs, attitudinal surveys, and energy resource supply-and-demand analyses take place in the Energy Division.



Program participants on a rafting excursion.

Oak Ridge Science Semester

The **Oak Ridge Science Semester** is managed by Denison University and recognized by the member colleges of the Great Lakes Colleges Association (GLCA) and the Associated Colleges of the Midwest (ACM).

For more information contact:

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www.denison.edu/collaborations/oakridge

Students from ACM colleges may also contact the ACM office at the address below.

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Resident Faculty Each year one or two faculty members from GLCA and/or ACM colleges are selected to serve as Resident Faculty for the program.

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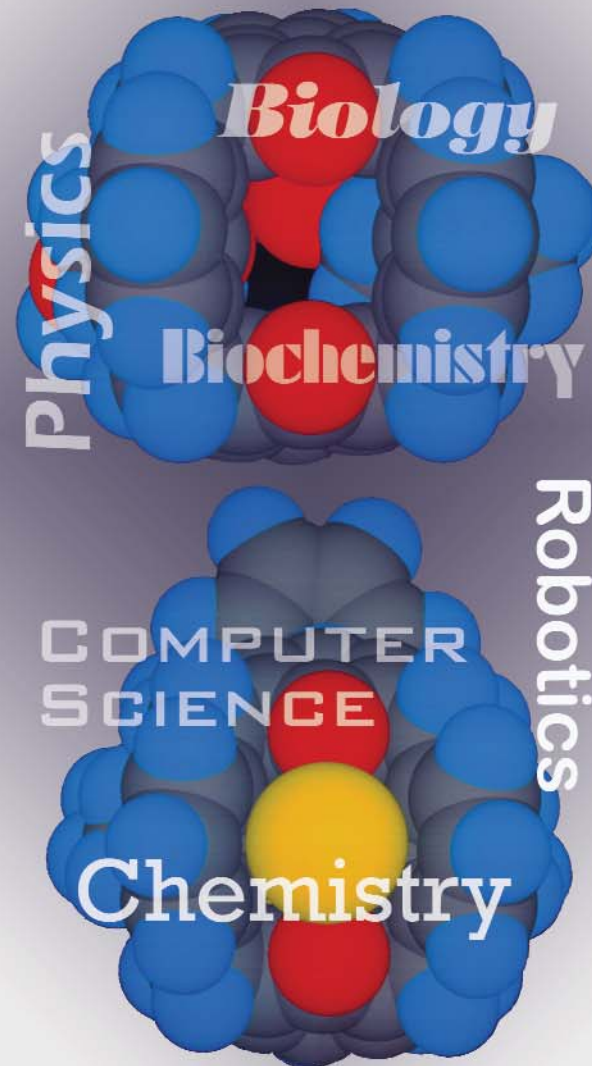
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Oak Ridge Science Semester

Cutting-Edge Research



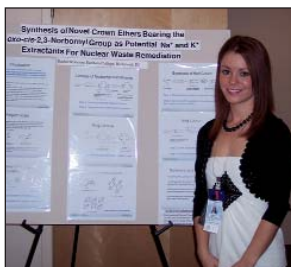
www.acm.edu/oakridge



Oak Ridge Science Semester participants and resident faculty.
Below: At the program's poster session.

The Oak Ridge Science Semester is an exceptional opportunity for undergraduates to conduct research and work alongside career scientists at a premier facility, the Oak Ridge National Laboratory (ORNL). Students often find that this is the most demanding and rewarding experience of their college careers.

- Each student joins an **ongoing research project** at ORNL in an area related to the student's interests.
- A scientist from the ORNL staff serves as the student's **mentor** and provides guidance throughout the semester.
- **Research is the core of the program**, as students are expected to devote at least 35 hours per week to the project.
- Participants are members of the research team and are expected to **contribute significantly** to the design and methodological approach of their research activity.
- Students use the **sophisticated resources** available at the Laboratory, including supercomputers and state-of-the-art electron microscopes, lasers, and analytical instruments such as a Fourier Transform Mass Spectrometer and a scanning tunneling microscope.
- The academic program is enriched in informal ways by guest speakers, department colloquia, and the special interests and expertise of the ORNL staff.



Cover: A crown ether molecule captures a radioactive cesium ion (yellow ball) from liquid waste because its cavity was sculpted to the right size and shape to trap this particular ion. (Courtesy of the Oak Ridge National Laboratory Review; images by Jeff C. Bryan.)

For more details, go to www.acm.edu/oakridge

Host institution Oak Ridge National Laboratory (ORNL)

ORNL is a U.S. Department of Energy (DOE) multiprogram laboratory focusing on national and global energy and environmental issues. ORNL is located in Oak Ridge, Tennessee, near Knoxville, and is managed for DOE by UT-Battelle, LLC.

The Laboratory's mission is to conduct basic and applied research and development in order to advance the nation's energy resources, environmental quality, and scientific knowledge, and to contribute to the educational foundation and national economic competitiveness.

Credit and grades Recommended credit is 12-16 semester credits or the equivalent. Students should consult the campus program advisor or off-campus studies officer for their college's credit and grading policies for this program. The amount and distribution of credit should be determined in advance.

Courses

Interdisciplinary seminar An introduction to ORNL and its research programs. The seminar also serves as a forum for students to present their own research data for discussion and comment. (required, 4 semester credits)

Advanced course Students choose among a few select courses taught by the resident GLCA/ACM faculty or by ORNL staff scientists. Students may opt to take a class at a local college or university. Students may also arrange with their home campus faculty for an independent study. (optional, 4 semester credits)

Research Research on a specific project under the guidance of an ORNL staff scientist. (required, 8 semester credits)

Dates Fall semester only (late August - mid-December)

Eligibility Upperclass majors in astronomy, astrophysics, biology, chemistry, computer science, engineering, environmental science, geology, mathematics, and physics are eligible. The program is primarily designed for seniors, but juniors who give evidence of the capacities demanded at Oak Ridge are encouraged to apply. Applicants should have grade-point averages of at least 3.0 on a 4.0 scale, both overall and in their majors.

Costs Unlike many off-campus programs, most students keep their current tuition arrangement with their home institution. In addition, **students receive a separate stipend of \$6,800** (contingent on funding from the U.S. Department of Energy and/or ORNL) **AND are provided with an apartment which is paid for by the ORSS Program**. For complete cost information, go to www.denison.edu/collaborations/oakridge/costs.html.

Housing and transportation Housing is provided in an apartment complex in Oak Ridge or nearby.

Students are responsible for travel to and from Oak Ridge and local travel to and from ORNL. Carpools are common since there is no local bus service.

How to apply

- For more information about applying, go to www.acm.edu/apply.
- The Oak Ridge Science Semester office at Denison University must receive completed applications (having gone through all on-campus procedures) by **March 1**.

What past participants say ...

"It was amazing to be doing what I was doing. It was really cool to have that experience. I really feel like I learned something!"

— Earlham College student

"First and foremost, I learned a lot — I wasn't just applying knowledge from years of classes, I was gaining exposure to new techniques and cutting edge technologies. Second, I established relationships and contacts with many incredible people."

— St. Olaf College student

"It was a very valuable experience to slowly feel out the full extent to which I could contribute. I really enjoyed working with the people."

— Albion College student

"My mentors were of immense help during this program. They both were always available to explain essential concepts to me or help me with things not only pertaining to my specific project but also helping me out with graduate school searches and whatnot. I felt that I could always count on their assistance and that was very reassuring during this semester."

— Earlham College student