

# 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](http://www.ornl.gov). For examples of student research at the Laboratory, go to [www.orss.denison.edu/studentresearch.html](http://www.orss.denison.edu/studentresearch.html).

Some high-lights 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 are particularly strong in nuclear, solid state, and plasma physics. Accelerators are used to probe the properties of nuclei and in a variety of other nuclear physics experiments. Investigations are carried out in fission and reactor physics, high energy physics, solid state physics, engineering physics, and plasmas.

**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.

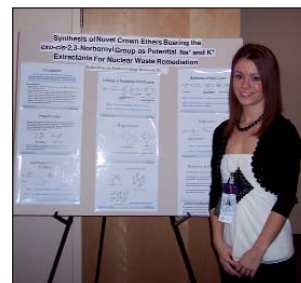


## Oak Ridge Science Semester

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.orss.denison.edu](http://www.orss.denison.edu)



Top: Program participants on a rafting excursion.

Above: An Oak Ridge Science Semester participant at the program's poster session.

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

### Staff

**N. Daniel Gibson**, Director, Professor of Physics, Denison University.

**Christie Kasson**, Administrative Secretary.

**Cheryl Terry**, University Programs Administrator, Oak Ridge Institute for Science Education.

**Resident Faculty** One or two faculty from GLCA and ACM member colleges will serve as Resident Faculty for the program.

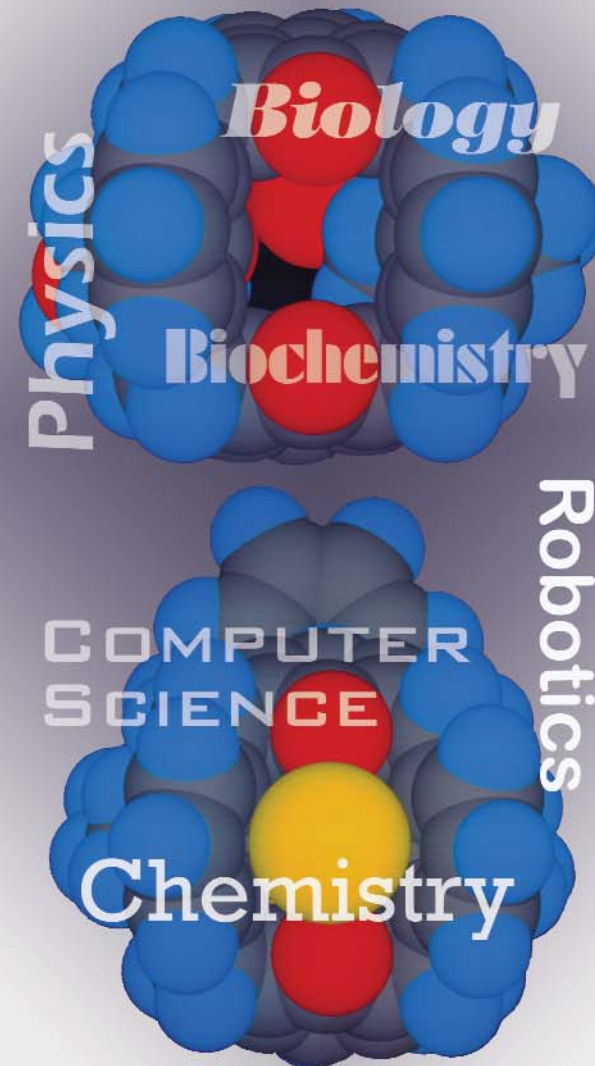
## ACM Associated Colleges of the Midwest

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# Oak Ridge Science Semester

Cutting-Edge Research



[www.acm.edu/oakridge](http://www.acm.edu/oakridge)



Oak Ridge Science Semester participants and resident faculty.

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](http://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.

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

**Credit and grades** Recommended credit is 16 semester hours 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 credits)

**Advanced course** Students choose among courses taught by the resident GLCA/ACM faculty or by ORNL staff scientists. Students may also arrange with their home campus faculty for an independent study. (recommended, 4 credits)

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

**Eligibility** Upperclass majors in biology, chemistry, computer science, physics, or the social sciences 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 \$6,400** (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.orss.denison.edu](http://www.orss.denison.edu).

**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](http://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