

# GEOLOGY

If geology makes you think of dusty collections of rocks, minerals, and old bones, visit the geology department at Lawrence. You will discover a thriving group of faculty and students who consider geology to be a way of seeing the Earth, a lens through which the planet's past and present come simultaneously into focus.

In many ways, geology is the ideal liberal arts major. It is a discipline that draws not only upon one's observational and analytical abilities, but also upon one's aesthetic and creative instincts.

At Lawrence, you will have an exceptional range of research experiences, comparable to what students from larger universities would first encounter in graduate school. In a single academic term, you could find yourself sampling ice-age lake sediments with the department's drilling rig; mapping the roots of an ancient mountain belt in Michigan's upper peninsula; studying the effects of agriculture on rivers in Puerto Rico, examining microscopic rock structures with state-of-the-art image analysis software; and conducting geochemical and crystallographic studies with research equipment shared with the chemistry and physics departments.

All geology majors complete some type of senior research project, and many of our students present results of their research at professional meetings.

## CURRICULUM – *The Geology Major*

As a geology major, you will complete two foundation courses, *Introductory Geology*, *History of Earth and Life*, followed by a four-course sequence on the physics and chemistry of the

Earth. You will then take a suite of three advanced-level geology courses of your choice. In your junior and senior years, you will participate in a two-term integrative capstone course, in which you will design and carry out an original research project. You will also take at least three courses in related areas of mathematics, chemistry, and physics.

You will have the opportunity to participate in departmental colloquia and field trips, thereby making connections with geologists across the country and around the world. The requirements for the geology major have been designed to encourage you to explore other disciplines and to have time for independent study and research. The faculty will also encourage you to participate in a summer geology field camp or summer research opportunities at Lawrence.

In recent years, senior research topics included:

“Hydrochemical characteristics of a Reclaimed Suburban Wetland”

“Using image analysis to document the evolution of a crustal-scale fault closed the Mid-Continent Rift”

“A 10,000 Year History of the Bjorklund Property, Bailey's Harbor, WI”

“The Effects of Storm Water Detention Ponds on Stream Morphology and the Role of Channel Materials”

## *The Geology Minor*

A minor in geology can complement any major, but especially chemistry, biology, economics or environmental studies. For a minor in geology, you can select courses from the major curriculum that best match your interests, and you are welcome to in all departmental seminars and field trips, as well as the annual geology picnic, renowned for its highly competitive croquet tournament!

## INTERDISCIPLINARY STUDIES

Some of the most significant recent advances in the sciences have been made in the largely uncharted territory that lies between the traditional scientific disciplines. You can design your own interdisciplinary major in the natural sciences, with a primary concentration in geology and a secondary emphasis in biology, chemistry, or physics.

As in the pure geology major, you will begin with the two foundation courses in geology. You will also take the two-course introductory sequence in physics, *Principles of Classical Physics* and *Principles of Modern Physics*. You

will then choose additional courses in biology or chemistry. In all, you will take ten upper-level courses in the natural sciences, of which at least five are in the geology department and three are in the secondary area of your choosing.

The interdisciplinary program in environmental studies is another way for students in any major to explore connections between the social and natural sciences. You can take courses such as *Population and Culture*, *Ecological Anthropology*, *Biodiversity*, or *Aquatic Ecology* to complement your major in geology.

### FIELD STUDY

Field-based studies are at the heart of the Lawrence geology program. Every year before the start of Fall Term, the geology department takes a field trip to a geologically interesting destination. Recent trips have taken students and faculty to the Adirondack Mountains, Scotland, western Ontario, northern Minnesota, Hawaii, Wyoming and Puerto Rico.

Shorter trips are integrated into academic-year courses. Lawrence is within a few hours' drive of classic geological localities, including iron ore deposits and ancient volcanoes in northern Wisconsin and Michigan; a fossil forest preserved in glacial sediments on the shores of Lake Michigan; and the world-renowned glacial landscape of the Kettle Moraine. Local environmental issues related to groundwater resource protection also provide the basis for student field projects.

During the summer, many students enroll in summer field courses or secure internships. Paul Schonfeld, '05, had a summer research internship at the Geophysical Institute, University of Alaska-Fairbanks. Jenny Murphy '06 was part of a team excavating a 10-million year old fossil forest in arctic Canada, a National Science Foundation sponsored

program. Noah Planavsky, '06 spent 3 months at the Geological Survey of Western Australia analyzing stromatolites, the oldest visible records of life. Emily Thiem, '08, studied glacier dynamics on the Juneau Icefield in Alaska. Jordan Theissen, '09, conducted research at the National Center for Earth Surface Dynamics at the University of Minnesota.

### FACILITIES

At Lawrence, you will have direct access to many types of research equipment, including a geochemistry laboratory, petrographic microscopes, an X-ray diffractometer, a scanning electron microscope, GIS computer laboratory, and a thin section preparation system.

A current meter, water-quality logger, portable geochemistry bench, ground water monitoring equipment, and a variety of surveying instruments including GPS are used regularly in course work for data collection in the field.

### AFTER LAWRENCE

Demands on the planet's energy, mineral, and water resources will continue to grow with world population. Increasing numbers of earth scientists are needed to facilitate sustainable use of the resources.

Lawrence geology students are accepted into some of the top graduate programs in the country.

Jorene Hamilton, '05, is completing an MS in fluvial geomorphology at SUNY Binghamton.

Martha Nelson Growdon, '03

Completed an MS in structural geology at the University of Connecticut and is starting a PhD at Indiana Univ.

Rebecca Buttram, '03, just finished graduate work on metamorphic core complexes in the Basin and Range province at Arizona State.

Brooke Miller, '02, completed an M.S. in geochemistry at Oregon State University and works for a Nevada-based mining company.

Katherine Young, '00, completed a PhD hydrology at Notre Dame and is now pursuing JD with focus on environmental law.

Ayako Kameda, '97, completed her Ph.D. in geophysics at Stanford University and works as a research scientist for Chevron.

Charles DeMets, '82 is professor of geophysics at the University of Wisconsin-Madison. He is an internationally renowned tectonicist who discovered a previously unknown plate boundary in the Indian Ocean.

David Gust, '75 did research in experimental petrology at the NASA-Johnson Space Center before becoming head of the school of geology at the Queensland University of Technology in Brisbane, Australia.

### FACULTY

**Marcia Bjornerud**, professor University of Minnesota, B.S.; University of Wisconsin, M.S., Ph.D. Interests: structural geology, tectonophysics, history of geology

**Jeffrey J. Clark**, associate professor Middlebury College, B.A.; Johns Hopkins University Ph.D. Interests: geomorphology, earth surfaces processes, human influence on the environment

**Andrew Knudsen**, assistant professor Hamilton College, B.A.; University of Idaho, Ph.D. Interests: geochemistry, mineralogy, and environmental geology.