

# GEOLOGY AND ASTRONOMY

The Department of Geology and Astronomy prepares you for careers in geoscience and geoscience education, and provides professional development opportunities for practicing geoscientists and geoscience educators. The U.S. Bureau of Labor Statistics states that employment of geoscientists is projected to grow by 21% from 2010 to 2020, faster than the average for all occupations. The WCU geoscience degree prepares you for entry-level positions in such occupations and also is a strong foundation for an advanced degree. Geoscience is an integrated study of the Earth and its geologic history, composition and structure, resources, natural hazards, atmosphere and oceans, and environment in space. Geoscientists are involved in forecasting and helping people to cope with natural hazards such as earthquakes, landslides, floods, volcanoes, and coastal erosion. Geoscientists are responsible for developing mineral and energy resources as well as protecting water and soil resources and the environment. Since people and human societies depend on Earth, geoscience plays a unique and essential role in today's rapidly changing world.

## Career Opportunities

Geoscience is a strong and growing field with openings for graduates with B.S. and master's degrees. Salaries are competitive with or higher than the other sciences and social sciences. A degree from the Department of Geology and Astronomy can lead to a career in the following areas:

- Environmental geology, hydrogeology, water or soil resources, environmental remediation
- Geologic hazards, land-use planning
- Teaching at the middle-school or high-school levels
- Mineral or energy resource exploration or management
- Interdisciplinary applied science such as geophysics, geochemistry, or biogeochemistry

Southeastern Pennsylvania and the surrounding area have one of the highest concentrations of environmental consulting firms in the nation, and WCU graduates are working in most of these companies, including R.F. Weston, ERM, and numerous other firms in our region and nationwide.

Other employers of our graduates include the following:

Pennsylvania and U.S. Geological Surveys

National Air and Space Museum and Naval Research Laboratories

Energy companies (e.g., Schlumberger, Exxon-Mobil) and water companies (e.g., Aqua PA)

About 10-20% of WCU graduates pursue advanced degrees in master's or doctoral programs at institutions including the following:

Bryn Mawr College  
Colorado School of Mines  
Lehigh University  
New Mexico Tech

Penn State, Temple University  
Stanford University  
University of Alberta (Canada)  
University of Arizona  
University of Missouri (Columbia)  
University of Montana  
University of Pennsylvania  
University of West Virginia

## Undergraduate Degrees

**Bachelor of Science in Geoscience.** This program offers two areas of concentration that share a common core of geology courses. Students completing either concentration are prepared for careers as professional geoscientists and possess the educational requirements to seek licensure as certified professional geologists. The **geology concentration** leads to occupations in managing and exploring for water, energy, and mineral resources; environmental protection, remediation, and management; mitigation of natural hazards; design of land development and management plans; geotechnical consulting; and research. Its curriculum emphasizes depth in the traditional disciplines of geology such as mineral and rock formation, paleontology, structural geology, geomorphology, and hydrogeology. The **earth systems concentration** is intended for students who want a broader understanding of geoscience, astronomy, and human interactions with the environment. In addition to the geology core, students in this concentration take required courses in oceanography, meteorology, and astronomy. This concentration is excellent preparation for students pursuing careers in geoscience, the environmental industry, resource management, environmental law, or environmental policy.

**Bachelor of Science in Education – Earth and Space Science.** This is a professional degree program leading to certification in secondary earth and space science. The curriculum combines a broad science background with course work in geology, oceanography, meteorology, and space science. The certification program meets all guidelines established by the National Council for Accreditation of Teacher Education (NCATE) and the Pennsylvania Department of Education (PDE). Many recipients obtain a second certification in general science or environmental education.

## Minors

The department offers minors in astronomy, earth science, geology, and science education.

## Facilities

The department has the following excellent facilities designed to train you in the use of the latest technology:

- The Center for Microanalysis and Imaging Research and Training (CMIRT) which has an environmental scanning electron microscope with energy-dispersive x-ray spectrometer (ESEM-EDX), an X-ray diffractometer, a state-of-the-art transmission electron microscope, a confocal microscope, and equipment to prepare biological samples

*Learn More*

# UNDERGRADUATE FACT SHEET

- A hand-held x-ray fluorescence spectrometer (XRF) for rapid chemical analysis
- The field hydrogeology analysis lab equipped to collect and analyze a complete set of physical and chemical data on surface waters
- A weather station tied to the EarthWatch weather network that collects real-time meteorological data
- The petrography lab with optical polarizing microscopes, an extensive collection of rocks and minerals, and an image analysis system
- An astronomical observatory on the roof of the Schmucker Science Center which has a 10-inch Meade reflecting telescope with two SBIG CCD cameras and an SBIG stellar spectrograph as well as portable telescopes including seven 8" Dobsonians, three 8" Schmidt-Cassegrains, and a 14" Schmidt-Cassegrain
- A dedicated student computer lab with 15 desktop computers that includes courseware, a printer, and a flatbed scanner, as well as about 80 laptop computers that students use in classes
- The recently renovated University Planetarium with a new digital projector, used for astronomy classes, K-12 school groups, and monthly public programs
- The WCU Geology Museum with student-created exhibits that highlight interesting topics about minerals, rocks, fossils, and meteorites using specimens from historic collections

In 2013 the department joined the regional earthquake-monitoring network administered at the Lamont-Doherty Earth Observatory (Columbia University), giving it access to international seismic data. As part of this new initiative, a state-of-the-art Trillium broadband seismometer is being installed in the Gordon Natural Area.

## Special Study Opportunities

Students in the Department of Geology and Astronomy have numerous learning opportunities in addition to regular course work:

- Field experiences: The department typically offers two field courses each year that can be taken to fulfill upper-level elective requirements, including a unique summer opportunity in the Russian Arctic in partnership with Moscow State University, and a summer exploration of geology in U.S. National Parks or southeast Pennsylvania. A field course in Peru, organized through the Amazon Center for Environmental Education and Research (ACEER), typically runs during spring break.
- Research experiences: Student research is incorporated into many courses. Department majors are strongly encouraged to conduct research projects with faculty outside course work during the academic year or in summer. Many faculty have grants that pay student researchers a stipend. The department supports students who present research at professional conferences, and majors have won national awards for best student posters.

- On-the-job training and travel opportunities: Students can earn academic credit for paid or volunteer internships with companies, nonprofits, or government agencies. Students also can opt to spend a semester or year at another university, in the U.S. (through the National Student Exchange program) or abroad. More information is available on the Center for International Programs website.

## Typical Elective Courses

Environmental Geology  
Intermediate Astronomy (Observational)  
Fundamentals of Soils  
Advanced Meteorology or Oceanography  
Geology of the Solar System

## Related Student Activities

Sigma Gamma Epsilon (honor society) and Earth-Space Science Club, jointly operated  
WCU Astronomy Club  
Women in Science Club

## Advanced Degree

Master of Arts in Geoscience

## Faculty

You can obtain a complete listing of faculty and their academic qualifications for this program from the contact person listed below.

## For More Information

Dr. LeeAnn Srogi, Chairperson  
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610-436-2727  
Department website: [http://www.wcupa.edu/\\_academics/sch\\_cas.esc/](http://www.wcupa.edu/_academics/sch_cas.esc/)

## Information on Admission

### Office of Admissions

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