

DEPARTMENT OF EARTH AND SPATIAL SCIENCES

Alistair Smith, Chair 201/203 McClure Hall, 83844-3021; phone 208-885-6216; earth-sciencerocks@uidaho.edu; <https://www.uidaho.edu/sci/ess> (<https://www.uidaho.edu/sci/ess/>).

The Department of Earth and Spatial Sciences provides programs in both geology and geography to satisfy the needs of a wide variety of students seeking professional careers in the geosciences.

Geology is the study of the origin and evolution of the earth, emphasizing the concepts of geologic time and plate tectonics. The applied aspects of geology include the search for hydrocarbons, ores, and water; the assessment of geologic hazards associated with earthquakes, volcanoes, and landslides; and the study of the global environment. Also included in these studies are geologic aspects of waste disposal and pollution abatement.

Geography is the science of place and space. Geographers ask where things are located on the Earth, why they are located where they are, how places differ from one another and change over time, and how people interact with the environment. Geography is organized into four primary branches: human geography, physical geography, human-environment interaction, and geospatial methods. Human geography is concerned with the spatial aspects of politics, economics, culture, and sustainability. Physical geographers study patterns of climates, landforms, vegetation, soils, and water. Human-environment geographers investigate the connections between the two and the impacts of natural hazards on society. Geospatial methods are useful tools for understanding our complex world, which include spatial analysis, geographic information systems (GIS), remote sensing, and mapping platforms.

Undergraduate Programs

To prepare students for many rewarding and important career opportunities, the Department of Earth and Spatial Sciences in the College of Science offers Bachelor of Science (B.S.) degrees in climate change and solutions, earth and spatial sciences, geographical information systems, and geology; minors in geology, geography, and groundwater hydrology; and undergraduate certificates in climate change, environmental hydrogeology, and geographic information systems.

Students benefit from close contact with their instructors and hands-on experience within their coursework and through internships with industries and agencies involved in geologic, geographic, GIS, and cartographic applications.

The bachelor's degree in geology emphasizes practical and field science along with theory. It is the goal of the department that our graduates not only be ready for immediate employment, but also that they have the broad education that will help them to grow professionally, be successful in graduate school, and advance through positions of greater responsibility during their careers. Degree options are available in physical geology, environmental hydrogeology, and geologic education.

Minors in geology and geography are offered for students in allied fields who have an interest in geology or geography or both. The minor curriculum for either program can be tailored to meet the needs of individual students.

Graduate Programs

Master of Science (M.S.) degrees in geographic information systems, geography, geology, and groundwater hydrology and Ph.D. degrees in geography and geology are available. Graduate certificates in climate change and geographic information systems are also offered.

The undergraduate preparation expected of the entering graduate candidates depends upon the degree sought. Some of our most promising graduate students have come to us with bachelor's degrees in other subjects. Deficiencies for master's candidates are determined by the major professor. Students may be required to complete some undergraduate courses in the department to provide adequate background.

Geography graduate programs provide training in research methods and applications of theory and spatial modeling to problems in regional development, cartography, and the physical environment. Students learn problem definition, research design, and data analysis using a variety of techniques including GIS, remote sensing, spatial analysis, and computer assisted cartography.

The geology program provides the student with the necessary background courses in cognate sciences and mathematics plus a spectrum of courses in the sub-disciplines of geology. Specialized elective courses can be chosen to prepare for various careers such as exploration for minerals or petroleum, the search for and management of ground water, environmental geology, and earth science education.

Research laboratories are equipped for work in applied dendrochronology, economic geology, geochemistry, geochronology, geographical and spatial analysis, geomechanics, geophysics, GIS, hydrogeology, mineralogy, paleontology, petrology, structural analysis, tectonics, and volcanology. Laboratories are maintained for work in all of the basic courses, with large study collections of fossils, rocks, minerals, crystal models, maps, ore suites, thin sections, polished sections, and topographic and geologic maps. Equipment used in advanced courses includes several sets of microscopes, photomicrographic apparatus, x-ray diffraction equipment, and a variety of instruments for geochemical analysis. Also available are computers, resistivity survey equipment, gravity meters, GPS receivers, seismographs, a magnetometer, soil drilling and sampling kits, and water-level recorders.

Undergraduate Geographic Information Systems Certificate

The GIS certificate is designed to serve students to enhance their educational foundation in geographical information systems (GIS) or to strengthen their GIS credentials. GIS is the computer technology that uses digital information about earth surface features and location patterns to produce useful maps and analytical solutions to complex problems in physical, environmental, social, and economic sciences. Applications of GIS have expanded continuously during the past decade, and GIS software has become very powerful, enabling complex problem solving in a wide variety of public and private sector settings worldwide.

Requirements for this program are listed on the website: www.uidaho.edu/sci/geography (<http://www.uidaho.edu/sci/geography/>).

Undergraduate Climate Change Certificate

There is a need for personnel who have a working knowledge of the science of climate change, its potential impacts, and adaptation and mitigation strategies to build climate resilient societies and landscapes.

Careers include scientists quantifying impacts, mitigation, and adaptation and practitioners and managers minimizing effects in natural and human systems.

Requirements for this program are listed on the website: www.uidaho.edu/sci/geography (<http://www.uidaho.edu/sci/geography/>).

Career Opportunities

Geology, geography, and GIS applications continue to be among the fastest-growing job markets worldwide. Most industry jobs today involve the use and adaptation of GIS in both the public and private sectors. Geologists and geographers work in industry using their skills in research, location analysis, site selection, mapping, and management of geographical information with the aid of computers. Industrial jobs for geographers range from research, planning, and data management in primary resources to deciding where to locate a new supermarket or shopping mall. Many jobs for geographers involve computer mapping or GIS. Cartographers from our program are employed in a variety of positions working with map design, graphics, and production cartography. There are increasing opportunities for geographers with the area studies and global systems options in international employment with government agencies and NGOs. Geographers are also employed in the public and private sector monitoring air and water quality, managing natural resources, and addressing other environmental and land management issues. The department arranges student internships with industries and agencies to provide on-the-job training as well as maintains a close relationship with the U of I Career Services Center to aid students in their search for employment.

Faculty members in the Earth and Spatial Sciences department emphasize quantitative methods and rigorous problem formulation. In addition, critical approaches and qualitative methods are employed. Faculty members can answer questions about specific programs and courses. Prospective majors should contact the department office or visit the department's website (<https://www.uidaho.edu/sci/geo/>).

Majors

- Earth and Spatial Sciences (B.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/earth-and-spatial-sciences-bs/>)
- Geographical Information Systems (B.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geographical-information-systems-bs/>)
- Geology (B.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geology-bs/>)
- Climate Change and Solutions (B.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/climate-change-and-solutions-bs/>)

Minors

- Geography Minor (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geography-minor/>)

- Geology Minor (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geology-minor/>)
- Groundwater Hydrology Minor (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/groundwater-hydrology-minor/>)

Certificates

- Climate Change Undergraduate Academic Certificate (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/climate-change-undergraduate-certificate/>)
- Environmental Hydrogeology Undergraduate Academic Certificate (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/environmental-hydrogeology-undergraduate-certificate/>)
- Geographic Information Systems Undergraduate Academic Certificate (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geographic-information-systems-undergraduate-certificate/>)

Graduate Programs

- Geographic Information Science (M.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geographic-information-science-ms/>)
- Geography (M.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geography-ms/>)
- Geography (Ph.D.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geography-phd/>)
- Geology (M.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geology-ms/>)
- Geology (Ph.D.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geology-phd/>)
- Groundwater Hydrology (M.S.) (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/groundwater-hydrology-ms/>)

Academic Certificates

- Climate Change Graduate Academic Certificate (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/climate-change-graduate-certificate/>)
- Geographic Information Systems Graduate Academic Certificate (<https://catalog.uidaho.edu/colleges-related-units/science/earth-spatial-sciences/geographic-information-systems-graduate-certificate/>)