

# GEOSCIENCE

## What can I do with this degree?

“Geoscience programs at Winona State University prepare students for a broad spectrum of careers and/or entry to graduate school through a discovery-based undergraduate curriculum rich with field and research opportunities. WSU Geoscience graduates find jobs in a variety of geologically related fields. Opportunities in environmental geology are excellent, and continue to increase as land-use problems grow more acute. Positions in the petroleum industry are becoming increasingly available as domestic exploration efforts increase in response to global economic pressure. In recent years, roughly 40% of Geoscience graduates opt to enter the workforce, about 20% enter the teaching profession, and the remaining 40% pursue graduate study, recognizing that the master's degree enhances opportunities for advancement and long-term career stability.” (Winona State University Geoscience, n.d.)

“Geoscience graduates solve a broad range of environmental problems as consultants in both industry and government; they discover and manage our planet’s mineral and energy resources; they teach in our elementary schools, high schools and colleges; they work in museums and national parks; they practice environmental law and write for newspapers and magazines; they even explore other planets. The possibilities are limited only by your imagination.” (Winona State University Geoscience, n.d.)

According to the College Employment Research Institute (2013), hiring for bachelor’s degrees is expected to be similar to 2012, with the Mountain West (AZ, CO, ID, MT, NM, NV, WY, and UT) showing the strongest growth of 5% and the Upper Plains (IA, MN, ND, SD, WI) showing a slight decline of 1%. The National Association of Colleges and Employers (2013) reports starting salaries for the Class of 2013 (all majors) nationally are up 2.4% with an average starting salary of \$45,327. Topping the list of industries with highest starting salaries to bachelor’s degree graduates, regardless of major, is Mining, Quarrying, and Oil and Gas Extraction at \$85,733.

AREAS*	EMPLOYERS*	PREPARATION*
<b>GEOLOGY/EARTH SCIENCE</b> Geologists study the structure, composition and history of the earth's surface. They determine the processes by which changes are taking place and the implications for using mineral and petroleum resources, water conservation, predicting earthquakes, & civil engineering problems. <ul style="list-style-type: none"> <li>• Engineering geologists</li> <li>• Geologists</li> <li>• Geochemists</li> <li>• Geophysicists</li> <li>• Oceanographers</li> <li>• Paleontologists</li> <li>• Petroleum geologists</li> <li>• Seismologists</li> </ul>	<ul style="list-style-type: none"> <li>• Architectural, engineering, and related service organizations</li> <li>• Oil and gas extraction industry (note: about 3 out of 10 geoscientists were employed in Texas because of the prominence of the oil and gas industry in that state). According to NACE (2013), the Mining, Quarrying, and Oil and Gas Extraction industry was at the top in terms of average starting salary</li> <li>• Management, scientific, and technical consulting service organizations</li> <li>• State and federal government</li> </ul>	<ul style="list-style-type: none"> <li>❖ Earn a bachelor’s degree, which is required for most entry-level positions. In several states, geoscientists may need a license to offer their services to the public.</li> <li>❖ Invest in your technology skills including computer modeling, data analysis, and digital mapping</li> <li>❖ Gain field and laboratory experience while pursuing a degree.</li> <li>❖ Seek out opportunities to gain valuable experience in data collection and geologic mapping</li> <li>❖ Develop your skills in critical thinking, interpersonal relations, problem solving, physical stamina, speaking and writing</li> <li>❖ Understand and meet your state’s licensure requirements</li> <li>❖ Consider continuing your education in graduate school. A master’s degree (M.S.) is an excellent investment in a future career and will diversify your job opportunities and increase your earning potential. A doctoral degree (Ph.D.) is typically needed only for college teaching and some research positions.</li> </ul>

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<b>ENVIRONMENTAL GEOSCIENCE</b> Environmental scientists and specialists use their knowledge of the natural sciences to protect the environment. They identify problems and find solutions that minimize hazards to the health of the environment and the population. <ul style="list-style-type: none"> <li>Environmental engineer</li> <li>Environmental health specialists</li> <li>Environmental protection specialists</li> <li>Environmental chemists</li> </ul>	<ul style="list-style-type: none"> <li>Federal, state, and local government</li> <li>Management, scientific, and technical consulting services organizations</li> <li>Architectural, engineering, and related services organizations</li> </ul>	<ul style="list-style-type: none"> <li>❖ Earn a bachelor's degree, which is required for most entry-level positions. In several states, geoscientists may need a license to offer their services to the public.</li> <li>❖ Develop skills in analysis, interpersonal relations, problem solving, and communication</li> <li>❖ Take coursework in hydrology, waste management, and fluid mechanics and consider classes in environmental policy and regulation.</li> <li>❖ Participate in an internship and gain experience in computer modeling, data analysis, and geographic information systems</li> <li>❖ Begin career by gaining experience as a field analyst, research assistant, or technician</li> <li>❖ Consider continuing your education in graduate school. A master's degree (M.S.) is an excellent investment in a future career and will diversify your job opportunities and increase your earning potential. A doctoral degree (Ph.D.) is typically needed only for college teaching and some research positions.</li> </ul>
<b>PLANETARY GEOSCIENTISTS</b> Planetary geoscientists use their understanding of the Earth to better understand the other various bodies in our solar system (planets, satellites, asteroids) and use those other bodies to learn more about the Earth. They make extensive use of telescopes, space satellites, cameras & computers. <ul style="list-style-type: none"> <li>Planetary Geologist</li> <li>Astronomer</li> <li>Physicist</li> </ul>	<ul style="list-style-type: none"> <li>Colleges, universities, and professional schools</li> <li>Federal government, especially the National Aeronautics and Space Administration (NASA) and the US Department of Defense</li> <li>Management, scientific, and technical consulting services organizations</li> <li>Research and development organizations in the physical, engineering, and life sciences</li> </ul>	<ul style="list-style-type: none"> <li>❖ In general, an advanced degree (master's or doctoral) is needed for most positions at the various agencies, organizations, and universities that have access to the telescopes, laboratories, and space missions necessary for this type of research.</li> <li>❖ Invest in education and experience needed to develop needed skills in mathematics, analysis, critical-thinking, interpersonal relations, problem solving, speaking, and writing</li> <li>❖ Obtain security clearance if seeking certain federal government positions involving nuclear energy and other sensitive research areas</li> </ul>
<b>ATMOSPHERIC SCIENCE &amp; METEOROLOGY</b> Atmospheric scientists study weather, climate, and other aspects of the atmosphere. They develop reports and forecasts from their analysis of weather and climate data. <ul style="list-style-type: none"> <li>Broadcast meteorologists</li> <li>Climate scientists</li> <li>Hydrometeorological technician</li> </ul>	<ul style="list-style-type: none"> <li>Federal government, including the National Weather Service of the National Oceanic and Atmospheric Administration (NOAA), the US Department of Defense, and the Armed Forces</li> <li>Professional, scientific, and technical services</li> <li>Colleges, universities, and professional schools</li> <li>Research and development organizations</li> </ul>	<ul style="list-style-type: none"> <li>❖ Earn a bachelor's degree, which is required for most entry-level positions</li> <li>❖ Ensure coursework meets hiring requirements of the federal government or other employers</li> <li>❖ Consider supplementing with coursework in physics, mathematics, and computer programming</li> <li>❖ Invest in skills including critical thinking, math, speaking and writing</li> <li>❖ Consider continuing your education in graduate school. A master's degree (M.S.) is an excellent investment in a future career and will diversify your job opportunities and increase your earning potential. A doctoral degree (Ph.D.) is typically needed only for college teaching and some research</li> </ul>

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<ul style="list-style-type: none"> <li>• Forensic meteorologists</li> <li>• Research meteorologists</li> <li>• Warning coordination meteorologist</li> <li>• Weather forecasters</li> </ul>	<ul style="list-style-type: none"> <li>• in the physical, engineering, and life sciences</li> <li>• Radio and television broadcasting</li> </ul>	positions.
AREAS*	EMPLOYERS*	PREPARATION*
<b>OCEANOGRAPHY</b> Oceanographers use the principles of engineering, mathematics, and physics to study ocean movements, and physical properties of plant and animal life. The results are used to protect marine life, utilize ocean products, forecast weather, and control land erosion and pollution. <ul style="list-style-type: none"> <li>• Oceanographic technician</li> <li>• College atmospheric and space science teachers</li> <li>• Geoscientists</li> <li>• Hydrologists</li> <li>• Natural sciences managers</li> </ul>	<ul style="list-style-type: none"> <li>• State and Federal Government</li> <li>• Colleges, universities, and professional schools</li> <li>• Environmental consulting companies</li> <li>• Utility and power companies</li> <li>• Research and development organizations and technology companies manufacturing oceanographic sensors and instrumentation</li> </ul> <p>Additional source: The Oceanography Society (n.d.)</p>	<ul style="list-style-type: none"> <li>❖ Earn a bachelor's degree, which is required for most entry-level positions</li> <li>❖ Take coursework in calculus, computer applications and programming, technical writing, as well as advanced courses in biology, chemistry, and physics</li> <li>❖ Gain experience in effective writing and communication</li> <li>❖ Participate in an internship and fieldwork</li> <li>❖ Invest in developing skills including decision making, listening, time management, mathematics, problem solving, reading comprehension, reasoning, science, and writing and authoring</li> <li>❖ Consider continuing your education in graduate school. A master's degree (M.S.) is an excellent investment in a future career and will diversify your job opportunities and increase your earning potential. A doctoral degree (Ph.D.) is typically needed only for college teaching and some research positions.</li> </ul> <p>Additional source: iSeek (n.d.)</p>

\* Source: Career Dimensions, Inc. (2013) unless otherwise noted

## Employment and salary information for a sample of job positions relating to geoscience (not all possible options are listed):

### Geologist/Geoscientist

Employment of geologists is expected to grow faster than average through 2018. The need for energy, environmental protection, and responsible land and water management will spur employment demand. People established in their career generally earn between \$ 56,280 and \$ 117,040 per year. Exceptional performers can earn in excess of \$161,260, based on data collected from the US Department of Labor (Career Dimensions, 2013). According to US Department of Labor, Bureau of Labor Statistics, the May 2012 median annual US wage for Geoscientists, except hydrologists and geographers, is estimated to be \$82,500.

### Environmental Science Professor

Employment of environmental science professors is expected to grow faster than average through 2018 due primarily to increases in college and university enrollment over the next decade. Tenure track positions in 4-year colleges will be harder to obtain. More opportunities are available at online universities and community colleges. People established in their career generally earn between \$ 47,810 and \$ 92,170 per year. Exceptional performers can earn in excess of \$124,050, based on data collected from the US Department of Labor (Career Dimensions, 2013).

### Meteorologist

Employment of meteorologists is expected to grow faster than average through 2018. Most opportunities will be in private consulting firms, especially those serving farming, commodity investors, insurance companies, utilities, and transportation and construction firms. People established in their career generally earn between \$ 58,680 and

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\$104,520 per year. Exceptional performers can earn in excess of \$127,250, based on data collected from the US Department of Labor. (Career Dimensions, 2013). According to US Department of Labor, Bureau of Labor Statistics, the 2010 media pay for atmospheric scientists, including meteorologists, is \$87,780 per year, growing at an annual rate of 11%, about as fast as average.

### Oceanographer

Employment of oceanographers is expected to grow as fast as average through 2018. The need for energy, environmental protection, and responsible land and water management will spur employment demand. Employment in management, scientific, and technical consulting services should continue to grow as more oceanographers work as consultants. People established in their career generally earn between \$ 56,280 and \$117,040 per year. Exceptional performers can earn in excess of \$161,260, based on data collected from the US Department of Labor (Career Dimensions, 2013).

### **For information related to geoscience careers, please visit the following websites:**

- American Association of Petroleum Geologists (AAPG): [www.aapg.org/](http://www.aapg.org/)
- American Geophysical Union: <http://sites.agu.org/>
- American Geosciences Institute: [www.agiweb.org/](http://www.agiweb.org/)
- Association for the Sciences of Limnology and Oceanography: [www.aslo.org/](http://www.aslo.org/)
- Marine Technology Society (MTS): [www.mtsociety.org/home.aspx/](http://www.mtsociety.org/home.aspx/)
- National Oceanic and Atmospheric Administration (NOAA): [www.noaa.gov/](http://www.noaa.gov/)
- OceanLink: [www.oceanlink.info/](http://www.oceanlink.info/)
- The Oceanography Society: [www.tos.org/](http://www.tos.org/)

### **For additional information please visit the websites below:**

- Bureau of Labor Statistics Occupational Outlook Handbook: <http://www.bls.gov/oco/>
- Career One Stop: <http://www.careeronestop.org/>
- iSeek – Minnesota's Career, Education, and Job Resource: <http://www.iseek.org/>
- O\*Net Online: <http://www.onetonline.org/>

### **REFERENCES**

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