

# Earth and Space Sciences

From the center of the Earth to the rim of the solar system, Earth and Space Sciences furthers our understanding of the Earth, the solar system, and their histories. Based on the geologic record and on rigorous observation and modeling of Earth's present state, our activities cut across traditional disciplines of physics, chemistry, biology, geology, and mathematics, providing a basis for making accurate predictions of future conditions.

## AREAS OF RESEARCH INCLUDE:

### ATMOSPHERES AND SPACE

Climate and Paleoclimate  
Space and Planetary Physics

### GEOBIOLOGY

Astrobiology  
Geomicrobiology  
Paleontology

### SOLID EARTH

Economic Geology  
Geomagnetism and Paleomagnetism  
Isotope Geochemistry  
Mineral Physics  
Paleoseismology and Neotectonics  
Petrology/Mineralogy/Geochemistry  
Sedimentology/Stratigraphy/  
Sedimentary Petrology  
Seismology and Tectonics  
Structural Geology, Tectonics,  
and Geodynamics  
Tsunami Science  
Volcanology

### SURFACE PROCESSES

Cosmogenic/Stable  
Isotope Geochemistry  
Geomorphology  
Glaciology  
Marine Geology and Geophysics  
Planetary Surfaces  
Quaternary Research  
Remote Sensing

## RESEARCH

The Department of Earth and Space Sciences has four broad and overlapping focus areas: the solid earth, surface processes, geobiology, and space/planetary studies. Several centers and programs, closely linked to the department, allow for unparalleled interdisciplinary educational and research opportunities. The Quaternary Research Center focuses on earth history and processes during the last several million years. The geologic record of changing environments is emphasized through the Program on Climate Change. Faculty and students with the Astrobiology Program investigate the origin and evolution of early life on Earth. The Pacific Northwest Seismic Network monitors earthquakes, volcanoes, and active tectonics of the region.

## RESEARCH HIGHLIGHTS INCLUDE:

- ▶ Discovery of the geologic record of a giant tsunami—the smoking gun of the dinosaur-killing asteroid impact.
- ▶ Elucidation of the climate record over millennial time scales from studies in Greenland and Antarctica.
- ▶ Discovery of 2.5 billion year old “whiff” of atmospheric oxygen produced by photosynthetic cyanobacteria prior to the general oxygenation of the atmosphere.
- ▶ Geologic controls on salmon recovery.
- ▶ Strong motion records from recent earthquakes, providing the information necessary for the next generation of construction standards.
- ▶ Discovery of the geologic record of major prehistoric earthquakes in the Northwest.
- ▶ Discovery of plates penetrating into the deep mantle determining the scale of mantle flow.
- ▶ First laboratory measurements of melting iron under core conditions to determine Earth's deep thermal and compositional state.
- ▶ Discovery of large electric fields in the upper atmosphere above thunderstorms.
- ▶ Space propulsion innovation.
- ▶ First 3-D mapping of the space environment around the planets.

◀ Faculty research area in Keystone Thrust, Red Rocks, Nevada

## EDUCATION

The Department of Earth and Space Sciences emphasizes field and laboratory experiences at all educational levels with close interactions between faculty and small groups of students. Graduate students working on their M.S. or Ph.D. degree study a wide variety of topics. The Master's in ESS-Applied Geoscience program (MESSAGe) that launched in September 2012 has a mission to educate geoscientists for professional practice outside academia by incorporating an off-campus internship project. Options areas within the B.S. degree include standard biology, physics, and environmental earth sciences. Students develop problem-solving skills and gain field and technology experience preparing them for graduate studies or a career in the private sector. The B.A. degree provides students with a solid foundation in earth sciences and exposes them to other sciences positioning the students for careers in teaching, science journalism, environmental law or policy. Our graduates are highly recruited by industry, government agencies, public/private companies, and educational institutions. In addition, we offer a broad spectrum of general education courses that reach thousands of students every year.

## FACULTY

Department of Earth and Space Sciences faculty honors include:

American Association for the Advancement of Science Fellows (4)  
American Geophysical Union Fellows (18),  
Fleming Medal, Macelwane Medal  
American Meteorological Society Fellows (4)  
American Physical Society Fellows (2)  
American Quaternary Association Distinguished Career Awards (2)  
Archeological Institute of America Pomerance Award  
Arctic Institute of North America Fellow  
European Geophysical Society Néel Medal  
European Geosciences Union Agassiz Medal  
Geological Society of America Fellows (23),  
Penrose Medal; Distinguished Career Award  
International Association of Sedimentologists Sorby Medal  
International Glaciological Society Seligman Crystal  
Mineralogical Society of America Fellows (6), Roebing Medal  
National Academy of Science Members (2)  
UW Distinguished Teaching Awards (2)  
UW College of the Environment Outstanding  
Researcher Awards (3)

## CONTACT INFORMATION

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Updated: October 2014

*ESS students  
at Field  
Camp in  
Montana* ▶

## OUTREACH

- ▶ The Pacific Northwest Center for Geologic Mapping Studies (GeoMapNW) develops and provides geologic data and maps to support hazard assessments and land use applications for the Puget Lowland.
- ▶ The Pacific Northwest Seismic Network (PNSN) operates seismograph stations throughout Washington and Oregon. It provides information to the public, the media, and regional governmental agencies through comprehensive web pages, tours of the laboratory, public lectures, and media interviews.
- ▶ The Washington NASA Space Grant Consortium offers educational and research programs—including college and university scholarships, graduate fellowships, research opportunities, courses, teaching resources, public events, and more—related to NASA's missions on Earth and in Space. The program received the University of Washington's 2005 Brotman Award for Instructional Excellence.

## FISCAL INFORMATION

(fiscal year ending June 30, 2014)

State/local budget: \$4,432,000

External grant/contract support (direct costs): \$21,185, 200

Endowments totaling approximately \$4,619,000, with income primarily supporting graduate fellowships, undergraduate scholarships, and student research and field experience. Over \$164,000 in awards from endowed and gift funds were granted in 2013–2014.

### Degrees Granted (July 2013–June 2014)

49 Bachelor of Science degrees	16 Master of Science degrees
12 Bachelor of Arts degrees	14 Ph.D. degrees

### Students (as of June 2014)

166 undergraduate majors
95 graduate students*

\* All graduate students are fully supported through RAs, TAs, and fellowships.

### Faculty and Researchers

24 Professors and Research Professors
11 Associate and Research Associate Professors
4 Assistant and Research Assistant Professors
1 Principal Lecturer
2 Senior Lecturers
25 Emeritus Faculty
10 Adjunct Faculty
38 Affiliate Faculty

