



THE GRADUATE SCHOOL | MONTANA STATE UNIVERSITY

## Earth Sciences

### DEGREES OFFERED

- M.S. in Earth Sciences
- Ph.D. in Earth Sciences
- Ph.D. in Ecology and Environmental Science



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The Department of Earth Sciences at Montana State University has a faculty of 13 earth scientists, geologists and geographers. The Master of Science and Doctor of Philosophy in Earth Sciences programs have around 45 active graduate students and stress independent thesis research with some supporting course work. Faculty expertise and research in the department spans a large majority of the subfields of Earth Sciences.

Our geography faculty includes specialties from settlement geography to bioclimatology, from international urban geography to GIS to snow science. The interests of our geology faculty range from petrogenesis to paleobiology to structural geology, and from dinosaur taphonomy and stratigraphy to geomorphology. Our geobiology faculty have research interests in vertebrate paleontology, paleoecology, biogeography, paleoclimatology and geomicrobiology. Program strengths are in basin analysis and energy resources, dinosaur paleontology, geography of the northern Rocky Mountains, architecture and composition of the lithosphere, snow science and cryospheric processes, and climate change.

### ADMISSION

Applicants should have a GPA of 3.0 or higher, GRE scores better than the 50th percentile and a strong academic background in Earth Sciences (geography, geology or geobiology). Foreign students must have a TOEFL score better than 550 for the paper test and 231 for the computer test. **The department does not accept general applicants to our graduate program. An applicant should identify a major advisor from the list of faculty, contact that individual, and determine whether there is space available in that advisor's program.**

For students who wish to study geography, the department requires the equivalent of a geography minor (eight semester geography courses including map skills and world regional,

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Photos, front - small: Earth Science graduate students sample geothermal water.

Photos, this page - from top: Geomorphology student samples local soils; Vertebrate Paleontology students collect fossils and other samples at Egg Mountain near Choteau, Montana; Graduate students and faculty participate on a regional field trip

## Earth Sciences, continued

human and physical geography) as background. A geography undergraduate degree is preferred, and coursework and practical experience involving geographic skills such as cartography, field methods, aerial photograph interpretation, remote sensing, GIS and quantitative methods are considered a desirable part of an applicant's background. Successful applicants must be accepted both by the department and by The Graduate School.

### PROGRAM REQUIREMENTS

Students are expected to develop a solid curricular foundation in geography, geology or geobiology. All graduate students in the Department of Earth Sciences are required to take EARTH 594-001, Graduate Seminar for two credits in the fall of their first year. Graduate programs include a core of geography, geology or geobiology courses, and are further tailored in consultation with the advisor and graduate committee to the specific talents and interests of the individual student. Coursework in disciplines outside the department is encouraged to support and enhance specific research areas in the Earth Sciences.

### FINANCIAL ASSISTANCE

Teaching and research assistantships are available each year. Graduate scholarships are awarded annually on a competitive basis in the second year of residence to assist with thesis research.

Funding opportunities are also available through The Graduate School on a competitive basis. For information on awards through The Graduate School please visit: [www.montana.edu/gradschool/fellowships/index.html](http://www.montana.edu/gradschool/fellowships/index.html)

### FACULTY

#### Department Head

Mary Hubbard - *Structural geology with an interest in the tectonic history of mountain belts.*

### PROFESSORS

David Lageson - *Structural geology and tectonics, carbon sequestration*

David Mogk - *Evolution of Precambrian crust in SW Montana, petrogenesis of continental crust, geochemical evolution of the crust*

James Schmitt - *Tectonics and sedimentation in foreland and extensional basins, alluvial fan sedimentology, vertebrate taphonomy*

Cathy Whitlock - *Quaternary environmental change, vegetation, fire, and climate history of the western U.S. and southern South America*

William Wyckoff - *Cultural and historical geography of the United States*

### REGENTS PROFESSORS

Jack Horner - *Systematics of paleobiology, Jurassic and Cretaceous dinosaurs*

### ASSOCIATE PROFESSORS

Jian-Yi Liu - *Economic-urban geography of China*

Mark Skidmore - *Biogeochemistry, geomicrobiology of glaciated systems, and the geochemistry and biogeochemistry of carbon sequestration in the subsurface*

David Varricchio - *Paleoecology of dinosaurs using taphonomic and anatomic evidence at sites world wide*

### ASSISTANT PROFESSORS

Julia Haggerty - *Environmental governance, resource management, and energy policy*

Jordy Hendriks - *Snow & avalanche hazard, climate change, snow hydrology, alpine & arctic systems*

Jean Dixon - *Geomorphology; landscape evolution; feedbacks between physical erosion and chemical weathering, earth surface geochemistry*

Jamie McEvoy - *Human-environment interactions in Mexico and U.S. West, political ecology of water management, climate change vulnerability and adaptation*

### RESEARCH PROFESSORS AND AFFILIATES

Karl Birkeland - *Snow, avalanches*

David Bowen - *Stratigraphy of basin-fill deposits, carbon sequestration*

Stuart Challender - *GIS/Planning, & Spatial Analysis*

Frankie Jackson - *Taphonomy, dinosaur reproductive biology*

David McWethy - *Human-set fires & their consequences, Ecosystem resilience to human activities in different settings*

Greg Pederson - *Climate Change, water resources, and Ecosystem interactions*

Kenneth L. Pierce - *Quaternary geology, geomorphology*

Colin Shaw - *Structural geology, metamorphic petrology, microstructural analysis*

Kaj Williams - *Atmospheric science, permafrost, snow/ice microphysics*