GEOLOGY (GEOL)

Graduate Degree Program
College: Computer, Mathematical, and Natural Sciences

Abstract
The Department of Geology offers programs leading to the M.S. and Ph.D. degrees. On a full time basis, the M.S. normally requires two to three years of work, which includes courses, the completion of an M.S. research thesis, and an oral defense of the thesis. On a full time basis, the Ph.D. commonly requires three to four years of work, if conducted after the completion of an M.S. program, or four to five years from the time of admission if pursued directly from the Bachelor level. The Ph.D. program normally includes course work, a qualifying examination and proposal defense, a dissertation, and an oral defense and examination of the dissertation.

Our students are required to engage in independent and original research under a mentoring program that promotes creative thinking. This is most commonly achieved via the collaboration between students and faculty in ongoing research programs. Geology is concerned with the Earth, its origin and evolution and the origin of life, and the processes by which Earth's atmosphere, surface and interior have been and continue to be modified. To pursue these topics we have developed research strengths in four themes: Geochemistry, which involves investigations of low- to high-temperature processes operating on Earth's surface to it’s core and within the Solar System; Solid Earth Science, which is the study of the minerals, rocks, and structures that constitute Earth, and the tectonic and other processes by which they are formed and altered; Surficial Processes and Environments, which involves the study of active and past fluxes (and reservoirs) of water, dissolved components, and sediment on Earth's surface and the interactions of these fluxes with the biosphere and atmosphere; and, Geophysics, which includes investigations of Earth's interior structure and dynamics, as well as planetary physics. These areas are not mutually exclusive, and students are encouraged to develop a program that suits their interests. Developing areas within the Department include planetary geology and forensics.

Although students will choose an advisor within the Department of Geology, they may also wish to take advantage of research opportunities provided by collaboration with other departments on campus, such as Mathematics, particularly the Applied Mathematics and Scientific Computation Program (AMSC), Atmospheric and Oceanic Science, Physics, Geography, and Chemistry, as well as other institutions in the area including the Smithsonian Institution, United States Geological Survey, NASA, Department of Terrestrial Magnetism, Geophysical Lab and National Institute of Standards and Technology. The Earth System Science Interdisciplinary Center is a collaborative venture between the Departments of Geography, Geology and Atmospheric and Ocean Science on Campus, and the Earth Sciences Directorate at NASA Goddard. This wealth of in-house and collaborative resources positions our graduate students with an unmatched spectrum of opportunities and gives them access to a strong multi-disciplinary program of international stature.

Our current student demographics are diverse, with an approximate 50:50 mix of male and female students of which 10-20% are minority students. Approximately 60% of our graduate students are Ph.D. candidates (the remaining are M.S. students), and some of the M.S. students will petition to become Ph.D. candidates following the successful completion of their M.S. degree program. Other M.S. candidates are focused solely on the M.S. degree, which is the commonly held degree for practicing professionals in government and industry.

Our graduate students benefit from the opportunities of working within an advanced graduate program. Our graduates go on to distinguished post-doc, research and applied positions in academic, government and industrial settings. We proudly acknowledge having placed our students into prestigious post-doc positions and government laboratories and we highlight their publications (see https://www.geol.umd.edu/graduate/gradpubs.php), presentations at national and international meetings (see https://www.geol.umd.edu/graduate/gradpresentations.php) and awards (see https://www.geol.umd.edu/graduate/gradfunding.php).

Financial Assistance
Graduate students are eligible for Departmental teaching assistantships, Graduate School fellowships and grant-supported fellowships and research assistantships. In addition, some curatorial, library and other part-time work is sometimes available.

Contact
See the Department of Geology Web page at URL http://www.geol.umd.edu for additional information. The Department's Graduate Studies in Geological Sciences also provides additional information on the requirements, examinations, faculty research interests and publications, research facilities and financial aid. Copies are available from:

Graduate Coordinator
1118 Geology Building
8000 Regents Drive
University of Maryland
College Park, MD 20742
Telephone: 301.405.4065
Email: geolgrad@deans.umd.edu

Website: http://www.geol.umd.edu

Courses: GEOL

Keyword: Structural, geochemical, and petrologic investigations of tectonic and metamorphic processes; mechanisms of sediment transport; sedimentary cycling; surface, near-surface, and deep-crustal fluid flow; laboratory, geochemical and field studies of magmatic and ore-forming processes; and geochemical investigations of early solar system evolution

Admissions
General Requirements
• Statement of Purpose
• Transcript(s)
• TOEFL/IELTS/PTE (international graduate students (https://gradschool.umd.edu/admissions/english-language-proficiency-requirements))

Program-Specific Requirements
• Letters of Recommendation (3)
• Graduate Record Examination (GRE)

Qualified students with a B.S. degree in geology, physics, mathematics, chemistry, biology, engineering or other related sciences are invited to
apply for admission to the graduate programs. Our graduate degree program in geophysics welcomes students with undergraduate degrees in physics and or astronomy having little to no background in geology. Coursework expectations for students applying to the program is at least a year of calculus, a semester of physics for science majors, and for those in the in geology and geochemistry track a year of chemistry or its equivalent. All students must submit the Graduate Record Examination scores to be considered for admission.

For more admissions information or to apply to the program, please visit our Graduate School website: www.gradschool.umd.edu/admissions

Application Deadlines

<table>
<thead>
<tr>
<th>Type of Applicant</th>
<th>Fall Deadline</th>
<th>Spring Deadline</th>
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<tbody>
<tr>
<td>Domestic Applicants</td>
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<tr>
<td>US Citizens and Permanent</td>
<td>11 Jan</td>
<td>14 Dec</td>
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<td>Residents</td>
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<td>International Applicants</td>
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<tr>
<td>F (student) or J (exchange</td>
<td>11 Jan</td>
<td>28 Sep</td>
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<td>visitor) visas; A, E, G, H,</td>
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<td>I and L visas and immigrants</td>
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Other Deadlines: Please visit the program website at http://www.geol.umd.edu

Requirements

- Geology, Doctor of Philosophy (Ph.D.) (https://academiccatalog.umd.edu/graduate/programs/geology-geol/geology-phd)
- Geology, Master of Science (M.S.) (https://academiccatalog.umd.edu/graduate/programs/geology-geol/geology-ms)

Facilities and Special Resources

The Department maintains a suite of state-of-the-art facilities and equipment for research, including: three solid source mass spectrometers, six gas source mass spectrometers, with inlet devices for inorganic and organic isotope analyses, single and multicollector inductively-coupled plasma mass spectrometers (ICP-MS), three UV lasers for in situ analyses with gas-source and plasma mass spectrometer, two chemical clean labs, with ion chromatographic facilities, JEOl 8900 superprobe with an Oxford instrument minicathodoluminescence detector, Scanning and Transmission Electron Microscopes, color image analysis system, fluid inclusion stage, high temperature and high pressure equipment for dry or hydrothermal experiments, diamond anvil cell facilities, including laser heating and external heating, two triaxial deformation apparatus with flow through capacity and acoustic emission recording, flame and graphite furnace atomic absorption equipment, spectrophotometers, HPLC with fluorescence detector, UV lamps and monochromometer for photochemistry, anoxic chamber, Geographic Information Systems (GIS) computational laboratory, electromagnetic and acoustic doppler velocity meters, laboratory and field hydrogeology equipment, campus drill rig, microstructures and fabrics analysis instruments, research microscopes with reflectance capabilities, rock preparation and mineral separation laboratories, computer network with direct access to supercomputer facilities, nitrogen Permeameter 400, helium Porosimeter 300, Solaris Impedance Meters.

Further information is found at the following URL https://www.geol.umd.edu/graduate/index.php

Faculty

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First/Middle Name</th>
<th>Graduate Faculty Status</th>
<th>Academic Credentials</th>
<th>Positions</th>
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<tbody>
<tr>
<td>Alexander</td>
<td>Conel</td>
<td>Special Member</td>
<td>B.S., Geology, Imperial College, 1983; PhD., Experimental Physics, University of Essex, 1987.</td>
<td>University Affiliate, Geology</td>
</tr>
<tr>
<td>Ash</td>
<td>Richard</td>
<td>Special Member</td>
<td>B.S., Queen Mary College, University of London, 1986; Geology Ph.D., Open University, United Kingdom, 1990.</td>
<td>Assistant Research Scientist</td>
</tr>
<tr>
<td>Beaulieu</td>
<td>Jake</td>
<td>Special Member</td>
<td>B.S., University of Wisconsin-Oshkosh, 2000; Ph.D., University of Notre Dame, 2007.</td>
<td>University Affiliate, Geology</td>
</tr>
<tr>
<td>Bohlke</td>
<td>John K.</td>
<td>Adjunct Member</td>
<td>B.A., University of Michigan-Ann Arbor, 1973; M.S., University of Miami, 1978; Ph.D., University of California-Berkeley, 1986.</td>
<td>Adjunct Professor, Geology</td>
</tr>
<tr>
<td>Brown</td>
<td>Michael</td>
<td>Full Member</td>
<td>B.A., University of Keele, 1969; Ph.D., 1975.</td>
<td>Professor, Geology</td>
</tr>
<tr>
<td>Busalacchi</td>
<td>Antonio J.</td>
<td>Full Member</td>
<td>B.S., Florida State University, 1977; M.S., Florida State University, 1980; Ph.D., Florida State University, 1982</td>
<td>Affiliate Professor, Geology</td>
</tr>
<tr>
<td>Name</td>
<td>Title</td>
<td>Institution 1</td>
<td>Degree 1</td>
<td>Institution 2</td>
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<tr>
<td>Campbell</td>
<td>Adjunct Member</td>
<td>B.S., California Institute of Technology, 1988; Ph.D., University of Chicago, 1993.</td>
<td>Adjunct Associate Professor, Geology</td>
<td>Gaetani</td>
</tr>
<tr>
<td>Candela</td>
<td>Full Member</td>
<td>B.S., City University of New York-Brooklyn College, 1977; Ph.D., Harvard University, 1982.</td>
<td>Professor, Geology</td>
<td>Helz</td>
</tr>
<tr>
<td>Cottrell</td>
<td>Adjunct Member</td>
<td>B.S., Brown University, 1997; Ph.D., Columbia University, 2004.</td>
<td>Adjunct Associate Professor, Geology</td>
<td>James</td>
</tr>
<tr>
<td>Fei</td>
<td>Adjunct Member</td>
<td>B.S., Zhejiang University, 1982; Ph.D., CUNY Graduate Center, 1989.</td>
<td>Adjunct Professor, Geology</td>
<td>Kearney</td>
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</table>
Lathrop  Daniel P.  Full Member  B.A., University of California-Berkeley, 1987; Ph.D., University of Texas-Austin, 1991.  Professor, Geology; Professor, Physics; Professor, Chemical Physics; Affiliate Professor, Electrical and Computer Engineering

Patterson  Gerald Wesley Special Member  B.S., University of Florida, 1997; M.S. Brown University, 2004; Ph.D., Brown University, 2007.

Penniston-Dorland  Sarah  Full Member  B.A., Harvard University, 1986; M.Ed., Harvard University, 1990; M.S., University of Texas-Austin, 1997; M.A., Johns Hopkins University, 1999, Ph.D., 2005.

Lekic  Vedran  Full Member  A.B., Harvard University, 2004; Ph.D., University of California, Berkeley, 2009.  Assistant Professor, Geology; Assistant Professor, Applied Mathematics & Statistics, and Scientific Computation

Lorrey  Andrew  Special Member  B.A. Boston University, 1998; M.S. University of Maine at Orono, 2002; Ph. D. University of Auckland, 2008.  University Affiliate, Geology

Piccoli  Philip Michael Adjunct Member  B.A., Senior University of Montana, 1984; M.S., University of Pittsburgh, 1987; Ph.D., University of Maryland-College Park, 1992.

McDonough  William F.  Full Member  B.A., University of Massachusetts-Boston, 1979; M.S., Sul Ross State University, 1983; Ph.D., Australian National University-Canberra, 1988.  Professor, Geology


Montesi  Laurent G. J.  Full Member  B.S., Pierre et Marie Curie University, 1994; M.S., Paris-Sud University, 1996; Ph.D., Massachusetts Institute of Technology, 2002.  Associate Professor, Geology; Associate Professor, Applied Mathematics; Professor, Statistics, and Scientific Computation

Puchtel  Igor S.  Special Member  M.S., Moscow Associate Geological Prospecting Academy; Ph.D., Russian Academy of Sciences-Moscow, 1992.
Rudnick Roberta L.  Full Member  B.S., Portland State University, 1980; M.S., SUl Ross State University, 1983; Ph.D., Australian National University-Canberra, 1988.

Schmerr Nicholas  Full Member  B.S. Beloit College, 2001, Ph.D. Arizona State University, 2008.

Shahar Anat  Adjunct Member  B.S., Geological Engineering, Cornell University, 2002; M. Eng., Geological Sciences, Cornell University, 2003; Ph.D., Geochemistry, UCLA, 2008

Siddoway Christine  Special Member  B.A., Carleton College, 1984; M.S., University of Arizona, 1989; Ph.D., University of California-Santa Barbara, 1995.