Graduate Studies in

Geological Sciences

http://www.geol.umd.edu

About The Graduate Program

We offer programs leading to the M.S. and Ph.D. degrees. Our students are required to engage in independent and original research under a mentoring program that promotes creative thinking. Our research strengths have four themes:

Geochemistry and Cosmochemistry, investigations of low- to high-temperature processes operating from Earth's surface to it's core, and elsewhere within the past and present Solar System;

Solid Earth Science, 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, 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;

Geophysics, including 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. In addition, our students have collaborations and connections with other science departments and units on campus. Our campus is within the Washington DC Metro area, thus we have an abundance of contacts and collaborations with 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. 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.

View looking across the Phepane Dome, a dome-shaped structure of metasedimentary rock surrounded by mafic igneous rock of the Bushveld Complex, South Africa

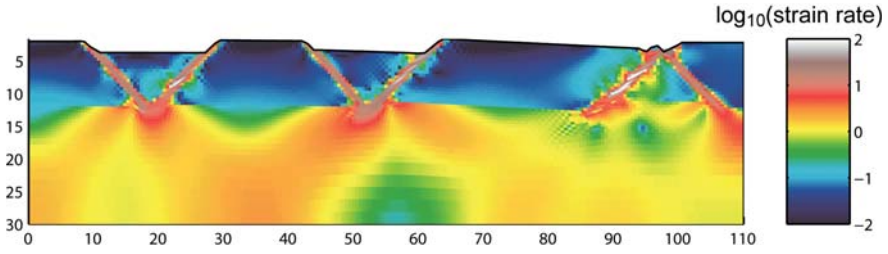
Our current student demographics are diverse, with an approximate 50:50 mix of male and female students of which typically 10-20% are minority students. Approximately 70% of our graduate students are Ph.D. candidates (the remaining are M.S. students), and some of the M.S. students will petition to become 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. Dissemination of research results is a hallmark of our graduate program and we proudly highlight recent student publications (see http://www.geol.umd.edu/graduates/gradpubs.htm) and presentations at national and international meetings (see http://www.geol.umd.edu/graduates/gradpresentations.htm)

Research Groups And Facilities

Student research is normally conducted within a research group headed by a member of the faculty, although students commonly interact with multiple research groups. The Department maintains a suite of state-of-the-art facilities for conducting geochemical, geophysical, petrologic, hydrologic and structural research. These facilities are available for use by all qualified students. The following groups and facilities comprise the environment available for research within the Department of Geology at University of Maryland:

Geochemistry and Cosmochemistry	
Geochemistry Laboratories	http://www.geol.umd.edu/GL
Isotope Geochemistry Laboratory	http://www.geol.umd.edu/IGL
Plasma Laboratory	http://www.geol.umd.edu/plasma-lab
Rock Preparation and Mineral Separation Facilities	http://www.geol.umd.edu/rockprep
Stable Isotope Laboratory	http://www.geol.umd.edu/SIL
Solid Earth Science	
Geographic Information Systems Laboratory	http://www.geol.umd.edu/gislab
Laboratory for Crustal Petrology	http://www.geol.umd.edu/LCP
Laboratory for Mineral Deposits Research	http://www.geol.umd.edu/LMDR
Nanoscale Imaging and Spectroscopy Properties Laboratory	http://www.nisp.umd.edu/
Electron Probe Microanalyzer Facility	http://www.geol.umd.edu/probe
Tectonics Interest Group	http://www.geol.umd.edu/TIG
Surficial Processes and Environments	
Global Change	
Antonio Busalacchi	http://www.essic.umd.edu/~tonyb/tonyb.html
Raghu Murtugudde	http://www.essic.umd.edu/~ragu
Stable Isotope Laboratory	http://www.geol.umd.edu/SIL
Ning Zeng	http://www.atmos.umd.edu/~zeng
Laboratory for Hydrologic Studies	
Geophysics	http://www.geol.umd.edu/geophysics
Geodynamics Laboratory	http://www.geol.umd.edu/geodynamics
Laboratory for Rock Physics	http://www.geol.umd.edu/LRP
Nonlinear Dynamics Laboratory	http://www.complex.umd.edu/



Development of regularly-spaced faults and graben in the crust of Jupiter's satellite, Ganymede

Resident Faculty Research Interests

Michael Brown Professor and Chair, Ph.D., Keele (UK), 1975. High-T metamorphism, crustal anatexis and melt segregation, ascent and emplacement; the P-T-t evolution/ tectonics of metamorphic belts.

Philip A. Candela Professor, Ph.D., Harvard, 1982. Thermodynamics and mass transfer dynamics of magmatic-hydrothermal systems; experimental studies of the distribution of ore metals in high-temperature, multi-component, polyphase systems; field studies of granitic rocks in the western US.

Michael Evans Associate Professor, Ph.D., Columbia University, 1999. Dynamical paleoclimatology, paleoclimatic observations within the context of modern physical climatology - with particular focus on tropical processes. Main thrusts: - proxy paleoclimatology, objective analysis, and numerical modeling.

James Farquhar Associate Professor, Ph.D., Alberta (Canada), 1995. Stable isotope geochemistry: atmosphere-surface interactions,atmospheric evolution, sulfur and oxygen biogeochemistry, meteorite studies, isotopic exchange and thermometry.

Laura B. Hebert Assistant Research Scientist, Ph.D., California Institute of Technology, 2008. Numerical modeling of subduction zones and back-arc basins; the role of nominally-anhydrous minerals in slab-adjacent mantle hydration, dynamics, and initiation of melting; geochemical modeling of slab inputs to the arc and back-arc.

Saswata Hier-Majumder Assistant Professor, Ph.D., University of Minnesota, 2004. Theoretical modeling of multicomponent fluid dynamics with geophysical interest; segregation and transport of magma in the mantle; experimental determination of influence of water on the kinetic properties of silicates.

Thomas R. Holtz Senior Lecturer, Ph.D., Yale, 1992. Evolution, functional morphology, biomechanics, and adaptive trends of extinct vertebrates, especially theropod dinosaurs; phylogenetic reconstruction of Mesozoic global paleobiogeography and adaptive radiations in the history of terrestrial life.

Alan Jay Kaufman Professor, Ph.D., Indiana University, 1990. Determination of changes in isotopic composition of oceans through time, analysis of stragraphic suites of little-altered carbonate rocks, the co-evolution of tectonic, biogeochemical, and paleoenvironmental events in Earth history.

Sujay S. Kaushal Assistant Professor, Ph.D. University of Colorado, 2003. Biogeochemistry; land use and climate change; managing the nitrogen cycle; regional carbon cycle; water resources.

Daniel P. Lathrop Professor, Ph.D., University of Texas at Austin, 1991. Turbulence, Geophysical and Astrophysical Magnetic Fields.

William F. McDonough Professor, Ph.D., Australian National University, 1988. Chemical and isotopic studies of the solid earth, cosmochemistry analytical methods and forensic analysis.

Aaron J. Martin Assistant Professor, Ph.D., University of Arizona, 2005. Evolution of orogenic belts, quantitative analysis of the records of tectonic evolution preserved in sedimentary basins. Integration of field- and laboratory-based techniques. Current foci on the Himalaya and the western United States.

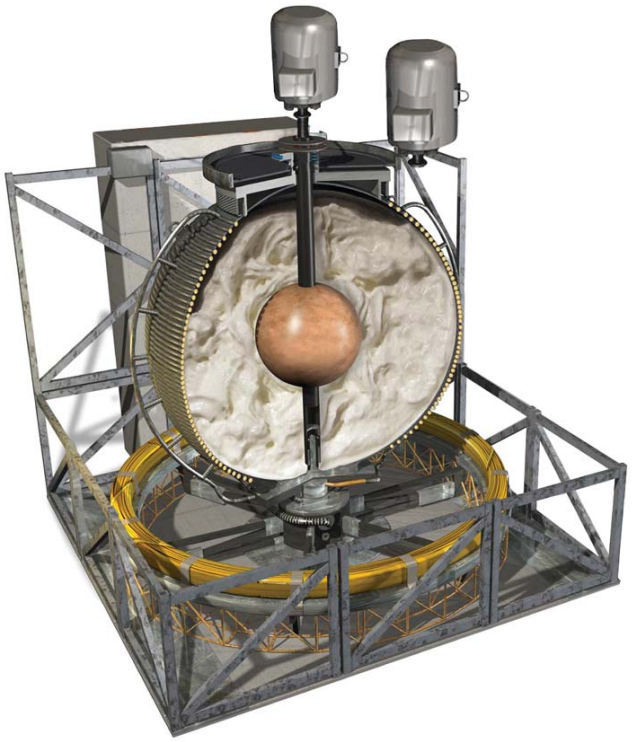
Graduate student Sara Peek and Professor Alan J. Kaufman blowin' in the arctic Siberian wind while doing field work in Ediacaran Period sediments along the Khorbusuonka River.

John W. Merck, Jr. Lecturer, Ph.D., University of Texas at Austin, 1997. Phylogeny and evolutionary history of the euryapsids, primarily marine reptiles of the Mesozoic; phylogeny reconstruction using digitally simulated phylogenies and data from CT scans of fossil specimens.

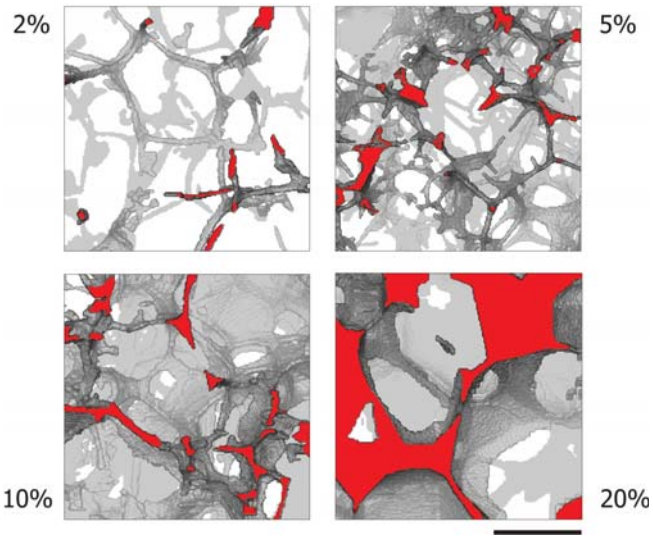
Laurent G. J. Montesi Assistant Professor, Ph.D., Massachusetts Institute of Technology, 2002. Patterns of deformation at the surface of the planets of the solar system and how these patterns are influenced by the formation of faults, by the localization of deformation on narrow shear zones.

Sarah Penniston-Dorland Assistant Professor, Ph.D., Johns Hopkins University, 2005. Assessing fluid flow in crust from the record fluids leave behind in rocks using field, mineralogical, chemical, isotopic and textural data coupled with equilibrium thermodynamics and mass transport models.

Philip M. Piccoli Associate Research Scientist, Ph.D., University of Maryland at College Park, 1992. Field studies of silicic igneous rocks; role of accessory phases in granitic systems; microanalysis of rock-forming minerals; geochemistry of fluids associated with plutonic and volcanic systems.



The three meter diameter experiment is a model of the Earth's core. By rotating 13.5 tons of liquid sodium, the Lathrop group studies the dynamics of the geodynamo magnetic field production.



The 3D reconstruction of partially molten olivine/basalt aggregates with different melt fractions. Melt channels (marked by the gray interface with the interior of the channel in red) form an interconnected network along grain edges at all melt fractions from 0.02 to 0.20. The scale bar is 50 micron.

Karen L. Prestegaard Associate Professor, Ph.D., University of California at Berkeley, 1982. Sediment transport and depositional processes in mountain gravel-bed streams; mechanisms of streamflow generation; hydrologic consequences of climate change; hydrology of coastal and riparian wetlands.

Igor S. Puchtel Associate Research Scientist, Ph.D., Russian Academy of Sciences, Moscow, 1992. Chemical and temporal evolution of Earth's mantle and core; late accretion of planetary bodies; application of radiogenic isotope systems.

Roberta L. Rudnick Professor, Ph.D., Australian National University, 1988. Continental crust, cratonic mantle-lithosphere, archean eclogite-TTG link, geochemical Earth reference model.

Richard J. Walker Professor, Ph.D., SUNY Stony Brook, 1984. Geochemical evolution of the Earth's crust and mantle; origin and evolution of early solar system materials; geochemistry of highly siderophile elements.

Ann G. Wylie Professor, Ph.D., Columbia, 1972. Economic geology of Appalachian metal and industrial deposits; mineralogy and human health; the study of ore minerals as petrogenetic indicators; geology and tectonic history of the central Appalachian Piedmont.

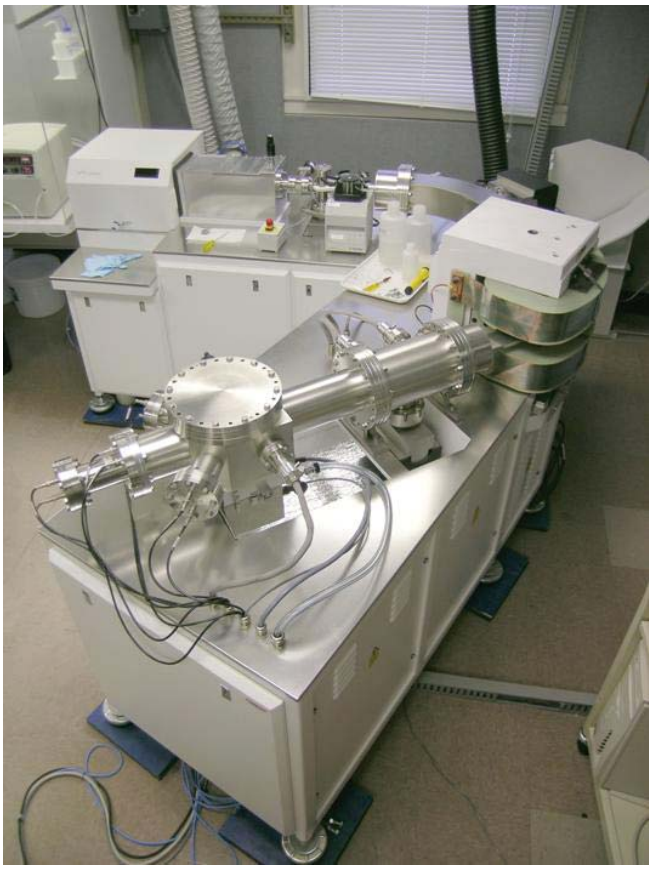
Wenlu Zhu, Assistant Professor, Ph.D., SUNY Stony Brook, 1996. Experimental rock physics; laboratory and theoretical studies on deformation and percolation of crustal rocks; transport properties of hydrothermal vent deposits; submarine geomorphology.

Application Procedures

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.

Application Requirements and Process

A baccalaureate degree in geology/geophysics/geochemistry/chemistry/physics/mathematics or a related science and the General Graduate Record Exam (GRE) are required. TOEFL is required of all foreign students for whom English is not their native language.



Application Form - Deadlines

All students should apply electronically via the web at: http://www.gradschool.umd.edu/admissions

We consider applicants to our program at any time. However, for best consideration, especially with regard to financial support, we recommend applications for Fall admission (August start) be received on or prior to January 15, and admission for Spring admission (January start) be received prior to October 15. Early application, as well as contacting potential research advisors is recommended.

Additional information about the Department of Geology can be obtained at: http://www.geol.umd.edu

General information about the University of Maryland Graduate Program, including on-line application, can be obtained at: http://www.gradschool.umd.edu

Correspondence and Information

Graduate Secretary
Department of Geology
University of Maryland
College Park, Maryland 20742, USA

E-mail: grad-sec@umd.edu
Telephone: (301) 405-4385

A Nu Plasma multi-collector ICP-MS uses a high temperature plasma to ionize elements that have been either chemically separated and purified from a material, or liberated from a solid matrix via laser ablation, and has been used to measure the isotopic compositions of Mo, Li, W, Pt, Ru and Re.

Unpacking the Twin Otter before starting the day's fieldwork. The Fosdick granite-migmatite complex in the Fosdick Mountains of West Antarctica.

General Information

Location

The College Park campus of the University of Maryland is located in the town of College Park, a northeastern suburb of Washington D.C. A wealth of cultural and educational activities is located in the metropolitan area. The Metro (Washington area subway) connects the area with downtown D.C.

The University and the Department

The University of Maryland, College Park, is a major public research university located on 1,250 acres along the Baltimore-Washington D.C. high-tech corridor. The Department of Geology is part of the College of Computer, Mathematical and Physical Sciences, which has ~1,500 undergraduate students, ~900 graduate students, and a faculty of over 500. The Department was established in 1973 and its graduate program begun in 1982. A strong sense of collegiality and cooperative spirit characterizes the Department.

Student Group

The Department of Geology currently has approximately 35 graduate students, out of a campus-wide graduate student enrollment of ~ 9,800; Campus-wide undergraduate enrollment is ~25,000.

Financial Aid

Teaching Assistantships, Research Assistantships and Graduate School Fellowships, with 12-month stipends ranging between approximately $23,300 and $28,860, including tuition remission and medical coverage, are available to qualified applicants.

Cost of Study

Assistantships do not cover the cost of mandatory fees that currently amount to approximately $600 per semester for full-time students.

Graduate Housing

Currently there is no on-campus graduate housing at the UMD. However, there are two all graduate student housing options in close proximity to campus. These are Graduate Hills and Graduate Gardens (both at http://www.graduatehills.com).

The Off-Campus Housing Services in the Stamp Student Union is one of the best places to search for housing in the College Park and surrounding areas. The office manages OCH101, a housing search database, and Roommate Finder (http://roommate.umd.och101.com) that get you connected with other students.