

Geophysics at CSM

Message from the Department Head

Greetings from the Department of Geophysics at the Colorado School of Mines! As you browse this brochure, you may get a sense of the unique and outstanding geophysics program CSM has to offer.

Dating back to the first course taught by Carl Heiland in 1926, CSM has one of North America's oldest geophysics programs and one of the world's foremost departments in applied geophysics. Here are just a few of the features that distinguish the Department of Geophysics at the Colorado School of Mines.



- CSM is unique in its focus on those branches of science and engineering dealing with the natural resources and environment of planet Earth and beyond.
- The relatively small size of CSM leads to freeflowing interaction between Geophysics and other departments in the pursuit of multi-disciplinary solutions to challenging research problems.
- The Department of Geophysics encompasses a broad spectrum of activities including exploration and characterization of petroleum, mineral, and groundwater resources; characterization of environmental, geotechnical and archeological sites; monitoring of geohazards; and exploration of other planets.

- The renowned faculty of the Department of Geophysics is respected worldwide for its experience and expertise in applied geophysics.
- With about 50 graduate and 50 undergraduate students and approximately 20 faculty members, the Department of Geophysics has an informal, friendly atmosphere in which students receive personal attention.
- The superb location of Mines along the Front Range of the Rocky Mountains provides not only an extraordinary natural laboratory for pursuit of the earth sciences but also an outstanding environment for outdoor recreation.

Enjoy becoming acquainted with the Department of Geophysics through the pages of this brochure, and please contact me by phone or by E-mail if I can be of assistance to you.

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Geophysics at CSM

The Department of Geophysics offers both traditional, research oriented graduate programs and a non-thesis professional education program designed to meet specific career objectives. Our graduate students and faculty come from throughout the United States and around the world, creating a fertile international climate for stimulating cultural interaction.



The Department conducts research in a wide variety of areas mostly related to, but not restricted to applied geophysics. There are a variety of research centers and projects within the department, including the [Center for Wave Phenomena \(CWP\)](#), the [Reservoir Characterization Project \(RCP\)](#), the [Rock Physics Laboratory](#), the [Near Surface Seismic Group \(NSS\)](#), the [Environmental Geophysics Group](#), the [The Gravity and Magnetism Research Consortium](#), [Center for Petrophysics \(CENPET\)](#), and the [Physical Acoustics Laboratory](#). In addition, faculty and graduate students from the Department of Geophysics work closely with other departments across campus to develop interdisciplinary approaches for solving geoscience and geo-engineering problems.

Degree Programs

The program of study is selected by the student, in consultation with an advisor, and with thesis committee approval, according to the student's career needs and interests. The Department maintains a [Graduate Student Handbook](#), which can be found on-line. This handbook includes discussion of all of the current degree requirements, a description of departmental resources and activities, and descriptions of departmental procedures governing graduate student progress through degree programs.

The Department offers the [Master of Science \(MS\)](#) and the [Doctor of Philosophy \(PhD\)](#) degrees in both Geophysics and Geophysical Engineering. The general credit-hour and thesis requirements are similar for the science and engineering degrees. It is the focus of the actual course work and thesis research topics that distinguishes between them.

The *Professional Degree* is the Department's non-thesis postgraduate degree. It is a focused program that emphasizes course work in an area of specialty defined jointly by the student, the advisor and the committee.

The Department of Geophysics is also a participant in the *Professional Master's in Petroleum Reservoir Systems (PMPRS)* program. PMPRS is a non-thesis, one-year, interdisciplinary degree program, jointly administered by the departments of Geology and Geological Engineering, Geophysics, and Petroleum Engineering.

PMPRS is open to qualified individuals with undergraduate degrees in geological, geophysical, petroleum, or related engineering disciplines. Within the program requirements, students may individually tailor their program, which will include courses from each of the three major disciplines, as well as courses that combine the contributions of these disciplines.

The program consists of a minimum of 36 credit hours. Nine credit hours of core courses will include the following subjects:

- well log analysis and formation evaluation
- multidisciplinary petroleum studies
- integrated exploration and development

In addition, students are encouraged to include courses in petroleum risk management, economics, and decision-making. Up to six hours may consist of independent study, including an industry project.

Further details on the Department's programs and degree requirements can be found online:

<http://www.geophysics.mines.edu/>,
<http://www.geophysics.mines.edu/gp>, and
<http://www.trident.mines.edu/~sggs/handbook/intro.html>.

A unique activity of the Department of Geophysics is its mentoring program for women. Details can be found at <http://www.geophysics.mines.edu/>.

Admissions and Financial Assistance

Admissions requirements include:

- full transcripts of all course work
- three letters of recommendation
- Graduate Record Examination scores
- a personal statement indicating your goals and the reason you wish to attend CSM

Mechanical Engineering

- international students whose native language is not English must submit TOEFL scores (unless you hold a degree from an English speaking university)

For more information on graduate admissions requirements, and for the online application form, see [Graduate Admissions](#),

Most graduate students in the Department of Geophysics receive financial aid from either teaching assistantships, fellowship support from philanthropic gifts, government or private grants, and funded research projects.

Financial aid is offered only to full-time students in a degree program. International students must demonstrate financial

support for at least their first year. Support may be available through funded research projects for outstanding international candidates.

For more information, see [Financial Aid](#)

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Faculty in Geophysics

Michael Batzle, Research Associate Professor. BS University of California, Riverside; PhD, Massachusetts Institute of Technology. Rock properties; logging; geotechnics; seismic lithology.

Robert Benson, Research Associate Professor. BS, MS, PhD Colorado School of Mines. Seismic interpretation; reservoir characterization; multi-component seismic; timelapse seismic.

Norman Bleistein, University Emeritus Professor. BS, Brooklyn College; MS, PhD Courant Institute of Mathematical Sciences, New York University. Wave phenomena, direct and inverse problems in seismic exploration; sea mine detection; flaw characterization; medical imaging.

Thomas M. Boyd, Associate Professor and Dean of Graduate Studies. BS, MS Virginia Polytechnic Institute and State University; PhD Columbia University. Earthquake seismology; reflection seismology applied to near-surface problems.

Thomas L. Davis, Professor. BE University of Saskatchewan; MSc University of Calgary; PhD Colorado School of Mines. Seismic interpretation; integrated exploration and development; reservoir characterization.

Warren Hamilton, Distinguished Senior Scientist. MS University of Southern California; BA, PhD University of California, Los Angeles. Tectonic and petrologic evolution of the earth's crust and upper mantle.

Pieter Hoekstra, Distinguished Senior Scientist. PhD Cornell University. Near surface geophysics.

Thomas R. Lafehr, Distinguished Senior Scientist. AB University of California at Berkeley; PhD Stanford University. Gravity and Magnetics.

Kenneth L. Lerner, University Emeritus Professor. BS Colorado School of Mines; PhD Massachusetts Institute of Technology. Imaging of the earth's subsurface; emphasis on application of the seismic method to seismic data processing for exploration and development of hydrocarbons.

Yaoguo Li, Associate Professor. BSc Wuhan College of Geology; PhD University of British Columbia. Geophysical inverse theory; gravity, magnetic, and electrical methods in resource exploration.

Misac Nabighian, Distinguished Senior Scientist. PhD Columbia University. Gravity, magnetic and electromagnetic fields in applied geophysics; theory, data processing and interpretation.

Gary R. Olhoeft, Professor. BSEE, MSEE Massachusetts Institute of Technology; PhD University of Toronto. Petrophysics; borehole geophysics; environmental and geotechnical geophysics; planetary geophysics; electrical and electromagnetic methods.

Max Peeters, Professor. MS Delft University of Technology. Reservoir characterization; pulsed neutron logging; wave propagation through acoustic porous media; invasion corrections of wireline logs.

Roel Snieder, Keck Foundation Professor of Basic Exploration Science. MA Princeton University; PhD Utrecht University. Wave propagation; inverse problems; wave chaos; liquefaction.

Ilya D. Tsvankin, Professor. MS, PhD Moscow State University, Russia. Seismic wave propagation; seismic anisotropy; multicomponent seismology.

Adel Zohdy, Distinguished Senior Scientist. BS University of Alexandria, Egypt; MS University of California at Berkeley; PhD Stanford University. Electrical methods and groundwater geophysics.