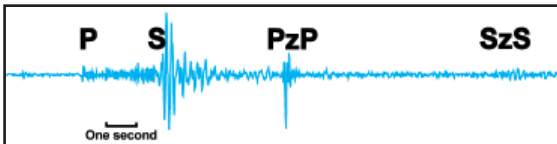


Geophysical Instrumentation

The program maintains laboratories for shallow geophysical exploration and atmospheric studies including gravity meters, magnetometers, DC resistivity, tiltmeters, geodetic instrumentation, infrasonic sensors, high resolution and time lapse cameras, GPR, seismic recording equipment, and shot gun and mini-vibroseis sources. Additional state-of-the-art teaching and research equipment is available from the on-campus IRIS PASSCAL Instrument Center.



Earthquake seismogram showing strong seismic reflections (PzP, SzS) from the top of the mid-crustal Socorro magma body.

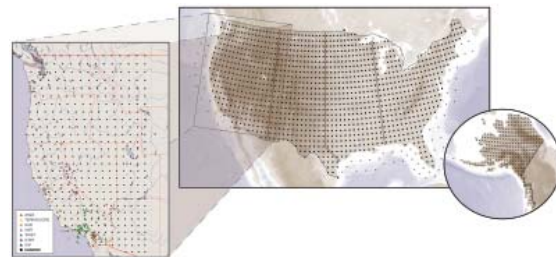
IRIS PASSCAL Instrument Center and EarthScope USArray Array Operations Facility
New Mexico Tech is an active member of the Incorporated Research Institutions for Seismology (IRIS), a consortium of over 100 major institutions dedicated to advancing the seismological study of the Earth. NMT is the host institution for the IRIS Program for Array Seismic Studies of the Continental Lithosphere (PASSCAL) Instrument Center. This on-campus, NSF-supported facility maintains and deploys the world's largest collection of state-of-the-art portable seismographs. These instruments are



The IRIS PASSCAL Instrument Center and EarthScope USArray Array Operations Facility at New Mexico Tech.

routinely used for seismological research and education by NMT as well as the general national and international research communities in dozens of experiments per year throughout the world.

The USArray Array Operations Facility is a principal center of activity for seismological components of EarthScope, a historic NSF-funded geophysical and geological exploration of the North American Continent. Together, PASSCAL and USArray operations employ over 40 NMT staff and students.



Thousands of seismic stations in EarthScope USArray will image the deep interior of the Earth under North America to better understand geological history and ongoing geophysical processes such as earthquakes and volcanoes.

Careers

Job opportunities in geophysics include diverse and highly paid positions in university or government research, in energy-related industries, and in education. Individuals with undergraduate degrees may be competitive candidates for entry-level industry positions, but many academic and research-level employers prefer a graduate degree. Undergraduates completing the BS in Earth Science with option in Geophysics are well prepared for graduate study in geophysics, hydrology, environmental sciences, quantitative geology, or other areas in the Earth and physical sciences.

Contact Information

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Geophysics Program

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Earth and Environmental Science Department

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Additional Links

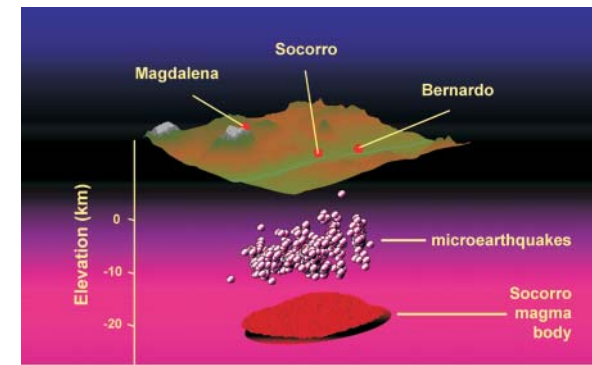
Mount Erebus Volcano Observatory
erebus.nmt.edu

IRIS PASSCAL Instrument Center
www.passcal.nmt.edu

New Mexico Tech
www.nmt.edu



The Mineral Science and Engineering Complex (MSEC), home of the Earth and Environmental Science Department and Geophysics Program.



GEOPHYSICS



What is Geophysics?

An interdisciplinary science that applies physics to geological problems involving the character and origin of a myriad of natural and man-made phenomena, including the electrical, magnetic, density, and elastic properties of the solid earth.

The Earth and Environmental Science (EES) Department at New Mexico Tech (NMT) offers an undergraduate (BS) degree in Earth Science with Geophysics option, and graduate (MS and PhD) degrees in Geophysics. The Geophysics, Hydrology, and Geology/Geochemistry programs are integrated within the Earth and Environmental Science Department, the largest and most diverse department on campus. The Geophysics Program includes six faculty members, as well as numerous adjunct and other active U.S. and international teaching and research associates.

Students pursuing geophysics careers should have enthusiasm for complex problem solving, mathematics, computer technology, and quantitative science. The development of cutting-edge curricula and research opportunities tailored to student interests is facilitated by the inherently interdisciplinary nature of Earth science and by the collaborative emphasis and high faculty-to-student ratio within the EES department.

Undergraduate Program

The BS degree in Earth Science with option in Geophysics is designed for students interested in a rigorous physics- and mathematics-oriented curriculum coupled with a strong Earth science core. This option includes the following required courses in addition to the standard BS requirements (refer to the New Mexico Tech Catalog):

Geophysics

- Whole Earth Structure & Composition
- Near Surface Geophysics
- General Geophysics
- Field or senior project study
- 2 electives chosen from:
 - Advanced Structural Geology
 - Formation Evaluation
 - Remote Sensing
 - Exploration Seismology
 - Volcanology
 - Field Geophysics
 - Reflection Seismic Data Processing
 - Reflection Seismic Data Interpretation
 - graduate level Geophysics courses

Physics

- Vibrations and Waves
- Electricity and Magnetism

Mathematics

- Linear Algebra
- Vector Analysis
- Ordinary Differential Equations

Geology

- Geobiology
- Surface Processes
- Earth's Crust
- Geochemistry
- Global Change Hydrology
- Evolution of the Earth
- Introduction to Field Mapping

Graduate Program

Students pursuing MS or PhD degrees in Geophysics participate in nationally and internationally significant research programs. Research commonly includes collaboration with other EES programs, NMT departments, and other institutions.

Research

The Geophysics Program has nationally regarded expertise in seismology and infrasound and its interdisciplinary links to crust and mantle imaging, volcanology, and faulting processes in a broad geological context. One ongoing emphasis is on earthquake processes in shallow subduction zones, including Alaska, Central America, and Japan. Another long-standing interest is in understanding the internal structure and processes of volcanoes and the deep Earth using seismological data in association with a broad range of other data. Other general areas of research interest include inverse problems, hydrological and structural properties of fault zones and marine sediments, deep ocean drilling science, and seismological instrumentation. Major ongoing projects are funded by the National Science Foundation (NSF), National Laboratories, the U.S. Geological Survey, and other sponsors.



Geophysics students at Mount Erebus volcano, Ross Island, Antarctica.

Facilities

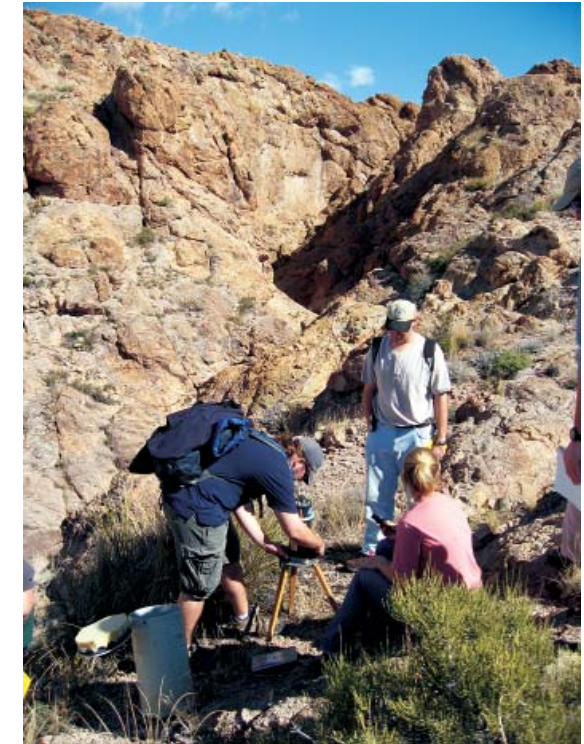
Computing Facilities

The Geophysics Program maintains an extensive wired and wireless domain of UNIX workstations, Macintoshes, PCs, and associated peripherals for exclusive use by EES students in research and classes.

Seismic Networks

The Geophysics Program maintains a statewide system of seismic stations and an on-campus seismological observatory for receiving and analyzing this data. Faculty and students are integrally involved, in association with the U.S. Geological Survey, in the monitoring and reporting of seismic activity in the New Mexico region, including persistent microearthquake activity associated with the local mid-crustal Socorro magma body.

In close association with the Geology/ Geochemistry Program and the U.S. Antarctic Program, the Geophysics Program operates a network of interdisciplinary volcanology research stations on Mount Erebus volcano, Ross Island, Antarctica, that includes seismic, GPS, infrasound, video, and other sensors.



Geophysics students measuring a gravity anomaly to estimate offset on a normal fault.