

# Earth Science



Department of Natural Sciences  
College of Arts, Sciences, and Letters

## The Program

The earth science program provides students with a strong background in geology, astronomy, meteorology, and oceanography, and enables them to study and understand processes that have shaped the earth and the solar system over the last 4.6 billion years. Students will learn about both the internal and surface processes acting on the earth, including the forces behind plate tectonics and its surface manifestations, earthquakes and volcanoes.

The earth science student will take advantage of new and developing technologies such as the use of global positioning systems and geographic information systems in the mapping of geologic, soil, water, and other environmental features.

The program offers advanced course work to prepare students for careers in geology that explore the causes and sources of

contamination to soil, groundwater, and surface water, including the Great Lakes. They will also look at the methods employed by geologists in the assessment and remediation or cleanup of these resources.

Students are encouraged to conduct research in an area of interest with a faculty member. The curriculum will prepare the student for graduate school or a career as a geologist, and also serve as appropriate intellectual training for persons interested in astronomy, meteorology, or oceanography.

## Preparation

A good high school preparation for the earth science program includes four years of mathematics and English; courses in earth science, chemistry and physics; good written and oral communication skills; and a knowledge of computers.

## The Concentration

All earth science students complete a core of natural science and mathematics courses followed by specialization in either geology or astronomy. An individualized specialization is also available for students who desire to combine coursework from both areas.

*Degree-seeking students are required to fulfill the required courses in effect at the time admitted or readmitted to the program. Since these are subject to change, students should see an advisor for current requirements.*

## Core courses

Introduction to Organismal and Environmental Biology  
General Chemistry I and II  
Calculus I and II  
Introductory Physics I and II  
Physical Geography  
Physical Geology  
Historical Geology  
Astronomy with laboratory  
Quantitative Analysis  
Oceanography  
Geology Field Methods  
Research/Internship  
Geomorphology

## Electives in Earth Science

Introduction to GIS  
Land Use Planning  
Hazardous Waste Management  
Environmental Geology  
Energy Resources  
Groundwater Hydrology  
Geochemistry  
Contaminant Hydrogeology  
Groundwater Modeling  
Glacial Geology  
Engineering Geology  
Spatial Analysis and GIS  
Geology of the National Parks  
Topics in Chemistry  
Topics in Geology  
Topics in Environmental Science  
Topics in Physics  
Remote Sensing  
Advanced Topics in Geology  
Advanced Applications in GIS

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## Research/Internship

All earth science concentrators must complete either three credit hours of research under the guidance of a faculty member or an internship experience. Examples of recent student research projects include:

- Groundwater transport of P in an agricultural watershed
- The use of EXR ratios to estimate the timing of a petroleum release
- Distribution and mobility of Pb in the soil at an outdoor shooting range
- Land-use impact on groundwater and surface water chemistry in an urban watershed
- Trends in soil geochemistry using geographic information systems
- Brownfield redevelopment and the role of geology in land use planning
- Chemical analysis of river sediments-Rouge River, southeastern Michigan
- Copper toxicity in lake sediments, Keweenaw Peninsula, Michigan
- Groundwater vulnerability and land use planning
- Statistical comparisons of heavy metal concentrations in river sediments
- Air-flow geometry in the sparging of fine-grained sands
- Particle size and chemical control of heavy metals in bed sediments of the Rouge River
- Presence and distribution of Cr VI in the groundwater of an urban environment.

## Employment Opportunities

Currently more than 80 graduates of UM-Dearborn are working in geological positions in southeast Michigan, mostly for environmental consulting firms that specialize in the geologic assessment of contaminated soil and groundwater. An additional ten of our alumni are working in similar positions in states other than Michigan. We also have former students working for petroleum companies, engineering firms, various local, state and federal environmental agencies, such as the Wayne County Department of Environment, Michigan Department of Environmental Quality, and the U.S. Army Corps of Engineers. Our graduates can be found working for industry, including the auto industry and banking industry as site assessment specialists, geologists, geochemists and hydrologists.

## Faculty

**Donald Bord, Ph.D.**, Astrophysics and stellar spectroscopy

**Yiwei Deng, Ph.D.**, Chemistry of natural waters

**Mao Huang, Ph.D.**, Contaminant hydrogeology, groundwater modeling

**David Matzke, M.S.**, Astronomy

**Kent Murray, Ph.D.**, Environmental geology and groundwater hydrology

**Jacob Napieralski, Ph.D.**, Glacial geology, geomorphology, remote sensing and GIS

**Carrie Swift, Ph.D.**, Astrophysics, earth science education

*Earth science advisor:*

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## For More Information

For more information concerning the earth science program:

University of Michigan-Dearborn

Department of Natural Sciences

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To request an application or to obtain more information about admission to the University:

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