

MASTER OF SCIENCE PROGRAM IN ENVIRONMENTAL SCIENCE

Program Overview

Whether you are making a mid-career transition or have a background in environmental science and want to strengthen your skills, UChicago's MS in Environmental Science can open new doors. The program's core classes provide a foundation in data science tools needed across a wide range of environmental disciplines, with a capstone project to hone your skills. The program's electives allow you to specialize in areas such as climate science, biogeochemistry, ecology, and environmental policy.

You will gain the quantitative and data science skills through Foundations of Environmental Data Science I and II. These courses will provide a foundation in different types of environmental data, data analysis, data collection instrumentation, and advanced data science topics such as machine learning with a specific focus on environmental problems.

You will choose six electives (<https://geosci.uchicago.edu/academics/ms-in-environmental-sciences/curriculum/>) from a variety of courses, including up to two from other departments, which will allow you to build expertise in a specialized area. **To see what electives are being taught in our department currently please review offerings** here. (<https://geosci.uchicago.edu/academics/information-for-current-students/courses/>)

Your experience will culminate in a project-based capstone focused on real-world problems developed in consultation with field-defining faculty in our department.

Students with limited computational background can take advantage of coding boot camps offered in September.

Director of MS in Environmental Science

- Maureen Coleman

Faculty

- Dorian Abbot
- Clara Blättler
- Andrew Campbell
- Fred Ciesla
- Maureen Coleman
- Dan Czczo
- Andrew M. Davis
- Michael Foote
- Pedram Hassanzadeh
- Philipp Heck
- Dion L. Heinz
- David Jablonski
- Malte Jansen
- Allison Karp
- David Keith
- Susan M. Kidwell
- Edwin Kite
- Elizabeth J. Moyer
- Noboru Nakamura
- Sunyoung (Sunny) Park
- Michael J. Pellin
- Meghana Ranganathan
- Linta Reiji
- Tiffany Shaw
- Graham J. Slater
- Jacob Waldbauer
- Mingyi Wang
- Mark Webster

- Alexandra Worden
- Sarah Zeichner

ENVIRONMENTAL SCIENCE COURSES

ENSC 33850. Low Temperature Geochemistry. 100 Units.

This course covers topics related to the geochemistry of Earth's surface, including all its fluid and solid components. Specific emphasis will be placed on stable isotopic tools for understanding modern Earth system processes and the ancient geological record. Seminar format will allow students to choose topics of interest to them and shape the reading and discussion content of the course.

Instructor(s): Clara Blättler Terms Offered: Autumn

Equivalent Course(s): GEOS 33850

ENSC 34270. Air Quality and Climate Change. 100 Units.

Human activities since the industrial revolution have led to a sharp increase in greenhouse gases and air pollutants. These emissions, after undergoing chemical and physical processes in the atmosphere, cause air pollution and global warming. This course explores the sources, transformations, and fates of key atmospheric constituents and the underlying interactions between atmospheric science and climate change. Topics covered include: atmospheric composition, chemical forcing of climate, stratospheric ozone, tropospheric pollution, atmospheric methane, atmospheric aerosols, and solar geoengineering. The course is appropriate for graduate students and upper-level undergraduates.

Instructor(s): M. Wang Terms Offered: Winter

Prerequisite(s): CHEM 11100-11200 or equivalent

Equivalent Course(s): GEOS 34270

ENSC 36100. Environmental Data Science I. 100 Units.

This course aims to equip students with the conceptual foundations and practical tools to pursue sophisticated and independent research projects using public environmental datasets. The first quarter of this two-course sequence focuses on data exploration and visualization, using a variety of public datasets such as environmental monitoring stations, oceanographic sensor arrays, and satellite remote sensing. Students will learn the science behind each dataset, and gain practical experience in reading in various data structures and performing basic data manipulations, with an emphasis on effective visualizations. By the end of the quarter, students should be comfortable with basic data operations and ready to move on to more complex data analysis and modeling. Students not enrolled in the MS in Environmental Science must obtain instructor consent to enroll in this course.

Instructor(s): Staff Terms Offered: Autumn

ENSC 36200. Environmental Data Science II. 100 Units.

This course builds on the skills established in Environmental Data Science I. Students will use public environmental datasets to learn statistical concepts and practical techniques for more complex data analysis. Examples will be drawn from ecosystem and climate science to develop skills such as time series analysis, interpolation, and machine learning. By the end of the quarter, students should be comfortable enough with environmental data science concepts to pursue independent research questions. Students not enrolled in the MS in Environmental Science must obtain instructor consent to enroll in this course.

Instructor(s): staff Terms Offered: Winter

Prerequisite(s): Environmental Data Science I

ENSC 36300. Environmental Data Science Capstone Project. 100 Units.

This course puts into practice the skills established in Environmental Data Science I & II. Students will work in small groups with a career scientist as a 'client' to complete a project reflecting a real-world professional assignment. By the end of this quarter the students should be comfortable working on teams to explore diverse environmental questions with a range of data science techniques. Students not enrolled in the MS in Environmental Science must obtain instructor consent to enroll in this course.

Instructor(s): M. Coleman, Staff

Prerequisite(s): ENSC 36100-36200 Environmental Data Science I & II

ENSC 39501. Practicum I: Environmental Science. 100 Units.

A practicum in Environmental Science. Note that this is the first of a two quarter sequence that must be taken in order.

Instructor(s): Moyer Terms Offered: Autumn

ENSC 39502. Practicum II: Environmental Science. 100 Units.

A practicum in Environmental Science. Note that this is the second of a two quarter sequence that must be taken in order.

Instructor(s): Moyer Terms Offered: Winter

Prerequisite(s): ENSC 39501

