The Department of Earth and Atmospheric Science offers a M.S. in Geology and Ph.D. level studies in ESS, Geology, Environmental Sciences, Environmental Public Policy, or Terrestrial Ecology. Many are assisted in their research with support from the CCNY National Science Foundation Research Experience for Undergraduates (REU) program, or through other resources provided by the faculty.

A student chapter of the Society of Exploration Geophysicists (SEG) has recently been formed, with a focus on the use of geophysics for environmental and engineering applications.

**Degree Requirements**

**Thesis Option**: Most candidates for the master’s degree complete 24 credits in Earth and Atmospheric Sciences in a program of study organized in cooperation with the graduate advisor and submit a thesis for a maximum of six credits. The thesis will consist of an independent theoretical, laboratory or field investigation supervised by a faculty advisor. The thesis option totals 30 credits.

**Credit Option**: Students selecting the credit option will be required to complete 36 credits of approved course work. The option will be selected with the consent of the student’s advisor and must be approved by the Graduate Studies Committee. Students selecting the credit option must pass a written comprehensive examination during the final semester of study.

**For students with an interest in Environmental Studies, the following sequence of courses is recommended:**

- EAS A1300: Environmental Geochemistry
- EAS A2300: Subsurface Remediation
- EAS B4500: Hydrology
- EAS B4600: Ground Water Hydrology
- EAS B6500: Environmental Geophysics
- EAS B8800: Climate and Climate Change
- EAS B4400: Global Environmental Hazards
- EAS A7200: Environmental Project or A2400: GIS
- EAS B9503: Thesis Research

**Additional Requirements**

Any basic courses must be completed with at least a grade of B before the student is permitted to register beyond 15 credits, depending on the specialization.

All courses are to be chosen in consultation with the student’s advisor and are subject to the approval of the Departmental Graduate Studies Committee. A maximum of nine credits in A0000-level or advanced undergraduate courses may be taken toward the M.S. degree. A maximum of nine credits in other departments or divisions of the College or units of CUNY may be taken toward the degrees in Earth Systems Science.

**Foreign Language Proficiency**: Not required.

**Basic Skills**: All graduate students in the Department are expected to acquire basic skills in computer science and numerical data analysis.

**Advisement**

For general advisement for all program options:

Professor Steven Kidder
MR 831; 212-650-8431.

**Doctoral Courses Open to Master’s Students**

Qualified students may take or substitute, with the approval of the Graduate Committee, courses available in the doctoral program in Earth and Environmental Sciences. Those courses are described in the bulletin of The Graduate School of the City University of New York.

**Earth and Atmospheric Science Course Descriptions**

**A0000-Level Courses**

- **EAS A1300**: Environmental Geochemistry
  - Shallow earth interactions in ESS emphasizing: groundwater geochemistry; elemental cycles linked to biological activity in the oceans; geochemistry and global climate cycles; geo-biomediation; and applied analytical techniques including x-ray diffraction, potentiometric titrations, and aspects of UV/visible spectroscopy. 3 lect., 1 lab hr./wk.; 3 cr.

- **EAS A2300**: Subsurface Remediation
  - Application of scientific and engineering principles in the remediation of contaminated soils and groundwater. Topics include environmental regulations and toxicology, soil-vapor extraction and bioventing, air sparging,
pump and treat, bioremediation, surfactant-enhanced extraction, and permeable reactive barriers. Class project involves design of remediation systems for a hypothetical site. Prereq: EAS 41300 and EAS 44600 or equivalent or permission of instructor. 3 hr./wk.; 3 cr.

**EAS A4170: Satellite Meteorology**
This class teaches the use of satellite techniques in meteorology and climate research. Prereq: PHYS 20700, 20800; MATH 20100, MATH 20200, MATH 20300. 3 hr./wk.; 3 cr.

**EAS A6700: Weather Analysis**
Synoptic analysis of surface and upper-air meteorological observations, including satellite, radar, and aircraft measurements. Diagnostic calculations of vorticity, divergence and vertical motions in mesoscale, synoptic scale, and large scale weather systems. 5 hr./wk.; 4 cr.

**EAS A7200: Environmental Project**
Advanced-level project utilizes field data to solve an urban environmental problem. Can be taken in the spring semester or in the summer. Also open to postgraduates in environmental fields, by permission. Can be applied to thesis credit. 4 credits; 3 weeks in field plus lab. analyses; 4 cr.

**B0000-Level Courses**

**EAS B1000: Structural Geology**
Physical properties of rocks in different tectonic environments; deformation; petrofabric analysis. Geotectonics: orogenesis, earthquakes, interpretation of geologic maps and mapping techniques. 3 lect., 2 lab. hr./wk.; 4 cr.

**EAS B1100: Geotectonics**
This course treats the processes that change the face of the earth. It includes the concepts of mantle convection and continental drift, leading to the modern theory of plate tectonics. The perspective is global and process-oriented, with examples from nearby active plate boundaries. The plate tectonic model explains global distributions of earthquakes, volcanoes, mineral deposits, and long-term climate patterns. 3 lect. hr./wk.; 3 cr.

**EAS B1400: Geophysics**
This course covers the physical principles that govern the behavior and techniques used to infer the earth’s internal structure, composition, and mineral resources. It provides earth scientists and engineers with the techniques to determine earth structures, locate environmental pollutants, and prospect for natural resources from remote locations. Topics include: Seismology, geodesy, gravity, magnetic, and thermal properties of the earth. 3 lect. hr./wk.; 3 cr.

**EAS B2400: Igneous Petrology**
Minerals in Earth Systems Science; principles of mineral stability and mineral associations; identification and recovery of earth resources. Mineral issues on human terms: toxic waste sites, climatology, and slope stability. Course introduces mineral optics and x-ray diffraction. 2 lect., 4 lab hr./wk.; 4 cr.

**EAS B3300: Phase I Environmental Site Assessments**
The purpose of this course is to introduce students to good commercial and customary practices in the US for conducting Phase I environmental site assessments (ESA) of commercial or residential properties with respect to hazardous substances and petroleum products. A Phase I ESA is the process for determining the presence of an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into the ground, ground water, surface water of the property, or into structures on the property. Graduate students receive extensive training on mainstream quality review and assessment methods of completed Phase I ESAs in preparation to enter the workforce in upper level management positions in the environmental engineering consulting industry. 3 hr./wk.; 3 cr.

**EAS B3400: Phase II Environmental Site Assessments**
The purpose of this course is to introduce students to good commercial and customary practices in the United States of America for conducting Phase II environmental site assessments (ESA). A Phase II ESA is an evaluation process for confirming and quantifying the presence of hazardous substances or petroleum products in environmental media (i.e., soil, rock, groundwater, surface water, air, soil gas, sediment) throughout a contaminated site. A Phase II ESA typically includes a determination through field screening and chemical testing of the geological, hydrogeological, hydrological, and engineered aspects of the site that influence the presence of hazardous substances or petroleum products (e.g., migration pathways, exposure points) and the existence of receptors and assessment of the degree of exposure. Students are automatically enrolled in the 40-hour OSHA HAZWOPER (Hazardous Waste Operations and Emergency Response Standard) certification program which applies to employees who are engaged in clean-up operations that are conducted at uncontrolled hazardous waste sites.
EAS B9205: Special Topics in Oceanography I
Reviews and critical analysis of selected research publications in oceanography. Students are expected to prepare and participate in discussions on topics of current interest. 1-3 hr./wk.; 1-3 cr./sem.

EAS B9500: Thesis Research
Preparation of a thesis under the guidance of a faculty mentor. Hrs. to be arranged. 1-3 cr./sem. May be taken for total of 6 cr.; Cr. applied on completion of the thesis option.

EAS B9600: Independent Study
Individual laboratory, field, or library investigation of a problem in Earth Systems Science. Approval of instructor required. 1-3 cr./sem. Up to 6 cr. can be applied to master’s degree.

Faculty

Karin Block, Assistant Professor
A.B., University of Michigan; M.Phil., CUNY, Ph.D.

James Booth, Assistant Professor
B.S., Univ. of North Carolina, Chapel Hill; M.S., Univ. of Kentucky; Ph.D., Univ. of Washington

Patricia Kenyon, Associate Professor
B.S., Rensselaer Polytechnic Inst.; Ph.D., Cornell Univ.

Steven Kidder, Assistant Professor
B.S., Univ. of Minnesota; M.S., Univ. of Arizona; Ph.D., California Inst. of Technology

Angelo Lampousis, Lecturer
B.S. Aristotle University of Thessaloniki (Greece); M.Phil., CUNY, Ph.D.

Johnny Luo, Associate Professor
B.S., Peking Univ. (China); M.Phil., Columbia Univ., Ph.D.

Kyle McDonald, Terry Elkes Professor
B.E.E., Georgia Institute of Technology; M.S. Johns Hopkins Univ.; M.S. Ph.D., Univ. of Michigan, Ph.D.

Marco Tedesco, Associate Professor
B.S. University of Napoli “Federico II”; Ph.D., Institute of Applied Physics ‘Carrara’ and The Univ. of Potenza.

Maria Tzortziou, Associate Professor
B.S., Aristotle Univ. (Greece), M.Sc., M.S., Univ. of Maryland, Ph.D.

Zhengrong Wang, Associate Professor
B.S., Univ. of Science and Technology of China, M.S.; Ph.D., California Inst. of Technology

Pengfei Zhang, Professor and Chair
B.S. Univ. of Science & Technology of China; M.S., Montana Tech of the Univ. of Montana; Ph.D., Univ. of Utah

Professors Emeritus
Stanley Gedzelman
Edward Hindman
Margaret Anne Winslow, Professor