Marine and Environmental Sciences

Website (https://cos.northeastern.edu/marine-environmental-sciences/)

Geoffrey C. Trussell, PhD
Professor and Chair
Jennifer Bowen, PhD
Associate Professor and Associate Chair

617.373.3176
617.373.4378 (fax)

The academic programs of the Department of Marine and Environmental Sciences provide students a deep, multidisciplinary understanding of the chemical, physical, geological, socio-ecological, and biological processes that shape Earth's myriad ecosystems. This fundamental understanding, coupled with a focus on the many environmental challenges facing our planet, seeks to yield knowledge and solutions that promote sustainability. Our graduates leave Northeastern prepared to address diverse issues including collapsing fisheries, the impacts of climate change (e.g., sea level rise), coastal erosion, and pollution. To address and solve today's complex environmental problems, environmental professionals are expected to work effectively as part of a multidisciplinary team containing natural and social scientists, engineers, and policymakers. Hence, our undergraduate program emphasizes experiential education in addition to traditional classroom learning. This approach better prepares students to engage in collaborative work and enhances their employment opportunities after Northeastern.

Our Bachelor of Science in Environmental and Sustainability Science degree is designed for students seeking a comprehensive understanding of the scientific implications of environmental problems and the multidisciplinary solutions that environmental scientists can produce to solve them. All students take foundational courses in Earth science, ecology, and sustainability. They then choose from one of four concentrations for deeper learning. For students interested in understanding how physical and geochemical processes shape existing and emerging environmental threats, they can pursue the Earth, Oceans, and Environmental Change concentration. Students interested in how ecological and evolutionary processes influence our ability to conserve, restore, and manage ecosystems can elect our Conservation, Restoration, and Management concentration. Our concentration in Sustainable Planning and Development is designed for students who want to examine how science informs the nexus of food, water, and energy to promote greater sustainability. Lastly, students interested in leveraging a strong scientific foundation to study coupled human and natural systems that are most threatened by environmental change can focus on our concentration in Environment and Society.

Students interested in merging a scientific foundation in environmental problem solving with skills from sociology, business, public health, law, and the arts might be interested in our Bachelor of Arts in Environmental Studies program. This major provides students a core foundation in both the scientific and human dimensions of environmental problem solving. Students then choose from one of five concentrations developed in connection with other colleges. These concentrations include Environmental and Human Health; Environmental Ethics and Social Justice; Environmental Law, Governance, and Management; Communication and Visualization of Environmental Problems and Solutions; and The Green Economy: Business, Entrepreneurship, and Environmental Sustainability.

Our Bachelor of Science in Marine Biology degree is designed to provide a strong foundation in marine biology and related disciplines. This major is strongly influenced by the Three Seas Marine Biology program that is largely based at Northeastern University's Marine Science Center (MSC) in Nahant, but many courses satisfying this major are also offered on the main campus in Boston. Students in this major study all aspects of marine systems from invertebrate zoology to oceanography. For those students seeking a broader foundation that is not solely focused on marine systems, we also offer a Bachelor of Science in Ecology and Evolutionary Biology (EEB). Students majoring in EEB develop a strong theoretical foundation in ecology and evolution while also building practical skills in data science, genomics, and other areas at the cutting edge of science. Our core curriculum for both marine biology and EEB satisfy the vast majority of requirements for prehealth fields, including veterinary sciences and medical fields.

We offer a number of combined majors in both the BA track and the BS track. Students are also able to create their own combined majors with approval from faculty committees in both departments.

Fieldwork is a critical component of training in our programs, and many of our courses use field sites throughout New England to explore environmental processes or problems in their more complex and natural state. In addition to sponsoring local trips, our students also participate in longer field excursions to places like Iceland, Antarctica, the Florida Keys, the Cascade Mountains of Washington, and many others. Students also have the option to complete undergraduate research experiences with a faculty member. Undergraduate research projects can involve fieldwork and/or lab work guided by faculty mentors, and many projects evolve into senior and honors theses.

Our graduates work across a wide range of disciplines. Student training in the foundations of each major, coupled with extensive training in data science and scientific communication, allows our students to succeed in a range of positions from hydrology to public policy to oceanography. We have graduates working as environmental lawyers; lobbyists; consultants; planners; data analysts; educators; soil, air, and water quality technicians; veterinarians; foresters; geneticists; bioinformaticians; research divers; aquaculturists; and many more fascinating fields.

THREE SEAS PROGRAM

Three Seas is an accelerated, research-focused, graduate-level program that allows advanced undergraduate and beginning graduate students in marine biology and related areas to spend a year of field study in three distinct marine environments. As a prime example of Northeastern University's innovative teaching initiative, Three Seas emphasizes experiential learning by providing students with hands-on research experience to develop the critical skills needed to succeed in a career in science.

The program begins with students spending a semester studying the classic rocky intertidal and salt marsh ecosystems at Northeastern University's Marine Science Center (MSC) in Nahant, 12 miles north of the main campus. The following semester, the program travels abroad to both the University of Washington's Friday Harbor Laboratories (FHL) and to the Smithsonian Tropical Research Institute (STRI).

FHL, located on San Juan Island, is 70 miles north of Seattle and part of an archipelago that lies between the mainland and Vancouver Island. In the cold and well-mixed waters of the Puget Sound, students study rocky

shores, mudflats, sand beaches, kelp forests, and a range of subtidal environments.

STRI is located in the town of Bocas del Toro, on Isla Colon, an island on the northern Caribbean side of Panama. Students study Panama's tropical ecosystem on both the Caribbean and Pacific coasts, which includes fringing coral reefs, seagrass, and mangrove habitats.

For more information, visit the Three Seas Program website (https://www.northeastern.edu/threeseas/).

MARINE SCIENCE CENTER SUMMER INTERNSHIP PROGRAM

This program provides a monthly stipend during the summer to students while they participate in intensive research with faculty members based at the Marine Science Center (MSC). Although students conduct independent research at the MSC laboratory primarily in the summer, these experiences can also extend throughout the year.

ACADEMIC PROGRESSION STANDARDS

Same as college standards.

Programs

Core Majors

- Ecology and Evolutionary Biology (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/ecology-evolutionary-biology-bs/) (BS)
- Environmental Studies (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-studies-ba/) (BA)
- Environmental and Sustainability Sciences (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-sustainability-sciences-bs/) (BS)
- Marine Biology (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/marine-biology-bs/) (BS)

Combined Majors

- Computer Science and Environmental and Sustainability Sciences (http://catalog.northeastern.edu/undergraduate/computer-information-science/computer-information-science-combined-majors/computer-science-environmental-sustainability-sciences-bs/) (BS)
- Data Science and Ecology and Evolutionary Biology (http://catalog.northeastern.edu/undergraduate/computer-information-science/computer-information-science-combined-majors/data-science-ecology-evolutionary-biology-bs/) (BS)
- Data Science and Environmental and Sustainability Sciences (http://catalog.northeastern.edu/undergraduate/computer-information-science/computer-information-science-combined-majors/data-science-environmental-sustainability-sciences-bs/) (BS)
- Environmental and Sustainability Sciences and Chemistry (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-sustainability-sciences-chemistry-bs/) (BS)
- Environmental and Sustainability Sciences and Economics (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-sustainability-sciences-economics-bs/) (BS)
- Environmental and Sustainability Sciences and Landscape Architecture (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-sustainability-sciences-landscape-architecture-bs/) (BS)
- Environmental Studies and History (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-studies-history-ba/) (BA)
- Environmental Studies and International Affairs (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-studies-international-affairs-ba/) (BA)
- Environmental Studies and Philosophy (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-studies-philosophy-ba/) (BA)
- Environmental Studies and Political Science (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-studies-political-science-ba/) (BA)
- Sociology and Environmental Studies (http://catalog.northeastern.edu/undergraduate/social-sciences-humanities/sociology-anthropology/sociology-environmental-studies-ba/) (BA)

Minors

- Ecology and Evolutionary Biology (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/ecology-evolutionary-biology-minor/)
- Environmental and Sustainability Sciences (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-sustainability-sciences-minor/)
- Environmental Studies (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-studies-minor/)
- Geosciences (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/geosciences-minor/)
- Marine Sciences (http://catalog.northeastern.edu/undergraduate/science/marine-environmental/marine-sciences-minor/)

Retired Programs

- `Computer Science and Environmental Science, BS (http://catalog.northeastern.edu/archive/2020-2021/undergraduate/computer-information-science/computer-information-science-combined-majors/computer-environmental-science-bs/)`

  Please see successor program: Computer Science and Environmental and Sustainability Sciences, BS (http://catalog.northeastern.edu/undergraduate/computer-information-science/computer-information-science-combined-majors/computer-science-environmental-sustainability-sciences-bs/)

- Data Science and Environmental Science, BS (http://catalog.northeastern.edu/archive/2020-2021/undergraduate/computer-information-science/computer-information-science-combined-majors/data-science-environmental-science-bs/)

  Please see successor program: Data Science and Environmental and Sustainability Sciences, BS (http://catalog.northeastern.edu/undergraduate/computer-information-science/computer-information-science-combined-majors/data-science-environmental-sustainability-sciences-bs/)

- Environmental Science, BS (http://catalog.northeastern.edu/archive/2020-2021/undergraduate/science/marine-environmental/environmental-science-bs/)

  Please see successor program: Environmental and Sustainability Sciences, BS (http://catalog.northeastern.edu/undergraduate/

science/marine-environmental/environmental-sustainability-sciences-bs/*)*

- Environmental Science and Chemistry, BS (http://catalog.northeastern.edu/archive/2020-2021/undergraduate/science/marine-environmental/environmental-science-chemistry-bs/)

  Please see successor program: Environmental and Sustainability Sciences and Chemistry, BS *(*http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-sustainability-sciences-chemistry-bs/*)*

- Environmental Science and Landscape Architecture, BS (http://catalog.northeastern.edu/archive/2020-2021/undergraduate/science/marine-environmental/environmental-science-landscape-architecture-bs/)

  Please see successor program: Environmental and Sustainability Sciences and Landscape Architecture, BS *(*http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-sustainability-sciences-landscape-architecture-bs/*)*

- Environmental Studies and Economics, BS (http://catalog.northeastern.edu/archive/2020-2021/undergraduate/science/marine-environmental/environmental-studies-economics-bs/)

  Please see successor program: Environmental and Sustainability Sciences and Economics, BS *(*http://catalog.northeastern.edu/undergraduate/science/marine-environmental/environmental-sustainability-sciences-economics-bs/*)*