Marine and Atmospheric Science

The Marine and Atmospheric Sciences (MAS) graduate program of the School of Marine and Atmospheric Sciences (SoMAS) offers programs in marine conservation and policy, marine science, atmospheric science, geospatial science, and sustainability leading to M.A., M.S., and Ph.D. degrees. SoMAS is one of the leading centers for research, graduate education, and public service in the marine sciences, atmospheric sciences and in sustainability studies – for marine science it is the center for the State University of New York system. SoMAS faculty have active research programs in all major oceanographic and atmospheric disciplines, as well as in sustainability research, and many focus on interdisciplinary approaches to understanding environmental processes and issues. Specific areas of cross-disciplinary focus include biogeochemical transformation of energy and elements, ocean-atmosphere connections, conservation and management of marine resources, environmental health and contaminants, environmental modeling and prediction, and patterns and impacts of global climate change.

SoMAS is ideally situated for studies of a variety of coastal environments including estuaries, lagoons, salt marshes, barrier islands, and continental shelf waters. Long Island has a greater diversity of coastal environments in a limited geographical range than any other comparable area in the United States. The proximity of New York City and the burgeoning population of Long Island and Connecticut make New York coastal waters an excellent laboratory for assessing human impacts on the coastal seas and understanding land/sea interactions at all levels. In addition to working on coastal issues, SoMAS scientists have active research programs on all the world's oceans and examine atmospheric processes on the Earth and other planets.

SoMAS offers an M.A. in Marine Conservation and Policy and an M.S. and Ph.D. in Marine, Atmospheric, and Sustainability Sciences. Interested students should address inquiries to the graduate program director. Tuition scholarships and stipends are available for students in the research-based M.S. and Ph.D. programs.

SoMAS also offers accelerated B.S./M.S. and B.A./M.A. programs, allowing high-achieving Stony Brook undergraduate students in the Marine Sciences (MAR B.S.), Marine Vertebrate Biology (MVB B.S.), Atmospheric Sciences (ATM B.S.), and Environmental Studies (ENS B.A.) to begin working on their masters degree prior to completing their bachelors degree, allowing up to 12 credits of course work to count towards both degrees.

Graduate Degree Program Descriptions

The M.A. Program in Marine Conservation and Policy

The Graduate Program in Marine Conservation and Policy (MCP) provides students with an understanding of contemporary marine conservation issues and helps them develop the necessary skills to apply this knowledge in positions that require advanced training and a broad skill set, but are not research-based. Graduates of this program should be able to compete effectively for positions in government, environmental consultancy, and non-governmental organizations, and to apply marine conservation and policy knowledge in other fields including law, teaching, communications, or business. This program requires a minimum of 30 credits of graduate coursework (at least 24 credits must be completed after matriculation into the M.A. in MCP program) and is designed to be completed in 12 months of full-time study.
The M.S. Program in Marine, Atmospheric, and Sustainability Sciences

The M.S. program offered by SoMAS takes a rigorous approach to oceanography, atmospheric, and sustainability sciences with interdisciplinary course work and a research thesis. It is designed to prepare students for positions in research, management, environmental protection, and resource development. The program provides students with a firm basis for more advanced study, but also is designed to equip students with the background and tools needed for effective careers without additional training. Required course work is very similar to the Ph.D. program, allowing M.S. students to continue in the Ph.D. program provided they have demonstrated adequate performance and found a suitable faculty advisor. The time required to complete this program depends on the scope of research undertaken. Most students complete their degree in 2 to 3 years.

Ph.D. Program in Marine, Atmospheric, and Sustainability Sciences

The Ph.D. program is designed to prepare students to independently identify and approach problems in marine sciences, atmospheric sciences, and sustainability. It builds on a series of core required courses and allows students to create their own plan of advanced study, helping them to become independent problem solvers. The Ph.D. in Marine, Atmospheric, and Sustainability Sciences prepares students to compete effectively for academic positions or to direct research and assessment programs at government, private, or nongovernmental organizations. A M.S. degree is not required for admission to the Ph.D. program. Most students take 5 to 6 years to complete their Ph.D.

Certificate Program

In comparison to the M.A., M.S. and Ph.D., certificate programs provide the opportunity for shorter and more focused programs of advanced study. Students interested in these programs should contact the certificate program’s Faculty Director.

Advanced Graduate Certificate in Geospatial Science (GSS)

The advanced graduate GSS certificate allows graduate students and working professionals to advance their GIS and/or remote sensing knowledge and employment opportunities with an industry-recognized certificate. The program requires students to earn 15 credits in addition to holding a B.A., B.S., or graduate degree. The program offers fully online that are intended to allow full-time students to complete the certificate requirements in one year. Some basic knowledge of operating personal computers is necessary to complete the course work. No more than 6 credits used to satisfy another graduate degree can be applied to the GSS certificate. For further information contact the GSS program’s Faculty Director.

Admission Requirements

All students must meet the general requirements of the Graduate School which include:

A. Completion of a B.A. or B.S. with a cumulative grade point average of at least 3.0 (B);

B. Acceptable scores on the TOEFL (paper: 600, computer: 230, iBT: 90) or IELTS (6.5) for foreign students;

C. Three letters of recommendation;

D. Official transcript(s);

All applications should be submitted electronically through the Graduate School.

For admission to the M.A. program, students must have completed at least 4 semesters of college courses in math or science, including at least one course in biology. The Graduate Record Examination (GRE) is not required for admission to the M.A. program.

For admission to either the M.S. or Ph.D. graduate program, the following are normally required:

A. B.A. or B.S. degree in a discipline related to the intended field of study, or coursework equivalent to such a degree;

B. At least eight semesters total of some combination of introductory coursework in mathematics, biology, chemistry, geology, physics, sustainability, and/or related disciplines, with more advanced work in at least one of these disciplines;

C. The Graduate Record Examination (GRE) is not required; however, we will accept and consider scores for applicants who feel it strengthens their application.

In their personal statements, all students should describe why they wish to enter the specific SoMAS graduate program and what their career goals are. In addition, M.S. and Ph.D. students should provide an indication of both the specific research areas they are interested in and potential faculty advisors. Obtaining a position in specific research groups is very competitive, so applicants are encouraged to contact potential advisors prior to submitting their application. Further information and guidance for applicants can be found on our website https://www.stonybrook.edu/commcms/somas/education/graduate/apply

Facilities

The main laboratories and offices of SoMAS are housed in a cluster of buildings on South Campus with more than 8,000 square meters of usable floor space. Laboratories are well equipped for most analyses, and students and faculty have access, with special arrangements, to nearby Brookhaven National Laboratory (BNL) and Cold Spring Harbor Laboratory. SoMAS is home to the Institute for Terrestrial and Planetary Atmospheres, Institute for Ocean Conservation Sciences, the Marine Animal Disease Laboratory, the Waste Reduction and Management Institute, the Living Marine Resources Institute, the Long Island Groundwater Institute, the New York Sea Grant College Program, and several analytical
facilities. The Safina Institute also maintains an office at SoMAS. The Marine and Atmospheric Sciences Information Center (MASIC) is the branch of the campus library system located at SoMAS.

SoMAS manages the Flax Pond Marine Laboratory located on a 0.6 square kilometer salt marsh approximately seven kilometers from campus. This facility provides flow-through seawater and space suitable for culture and experimentation on living marine resources. Part of the facility is in a greenhouse offering ambient light and temperature conditions. Laboratory and sea-table space are available to faculty and students at SoMAS and other collaborating university programs. SoMAS also manages the marine station at Stony Brook Southampton, located 46 miles away on the beautiful east end of Long Island. State of the art classrooms, laboratories and animal culture facilities are available in the Southampton Marine Station. Several SoMAS faculty keep research laboratories at Stony Brook Southampton, and additional wet lab space is available in the Marine Station for student and faculty research.

SoMAS operates a fleet of research vessels, the largest of which is the R/V SEAWOLF, a 24-meter research vessel designed specifically for oceanographic research. The SEAWOLF is ideally suited for extended research trips, large-scale oceanographic sampling, and trawling. Several other smaller boats are available for local cruises out of either the Stony Brook or Southampton campuses.

**Requirements for the M.A. Degree in Marine Conservation and Policy**

In addition to the minimum Graduate School requirements, the following are required:

A. Skill Area Requirements - 9 courses in 6 different areas
   1. Marine Sciences: 2 courses, one of which has to be in a basic biological field
   2. Conservation: 2 courses, MAR 507 Marine Conservation Biology (req.), plus 1 elective
   3. Communications: 2 required courses: MAR 557 Case Study and Project Planning Seminar, and a Journalism Course (either JRN 500, or other relevant coursework).
   4. Policy/law/economics/management: 1 course
   5. Quantitative assessment: 1 course
   6. Field biology: 1 course

B. Capstone Project or Internship in Marine Conservation and Policy, MAR 589 or MAR 592 (6 credits required); can be completed during the summer session, or during academic year.

C. Students make an oral presentation of their Capstone Project or Internship and submit a project or internship report.

**Requirements for the M.S. Degree in Marine, Atmospheric, and Sustainability Sciences**

A. An overall B (3.0) average in the Core and Foundation courses with no grade lower than a C. Details of required coursework below;

B. The three Core courses MAR 527, MAR 591, MAR 543 and two semesters of either MAR 580 or SUS 580 seminars;

C. Two Foundation courses selected from the following: MAR 501, MAR 502, MAR 503, MAR 504, MAR 506, MAR 508, MAR 509, MAR 516, MAR 541, MAR 542, MAR 545, MAR 547, SUS 502;

D. Three Specialty courses selected from among all the regular MAR and SUS graduate courses excluding the Core and Foundation courses listed above except by permission. ‘seminar’ courses (MAR 519, MAR 584, MAR 585, MAR 603), courses specific to the M.A. program (MAR 556, MAR 557, MAR 589, MAR 592), and with no more than 3 credits of MAR 552 (Directed Study). Courses from outside SoMAS may also count toward this requirement with approval of the Advisory Committee and Graduate Programs Committee;

E. Six credits of MAR 590 Thesis Research;

F. Five additional credits of elective coursework;

G. Master’s research proposal due by end of first year, signed by advisor and two readers;

H. Oral presentation of thesis work;

I. Submission of approved thesis.

**Requirements for Ph.D. Degree in Marine, Atmospheric, and Sustainability Sciences**

In addition to the minimum Graduate School requirements, the following are required:

A. An overall B (3.0) average in the Core and Foundation courses with no grade lower than a C. Details of required coursework below;

B. The three Core courses MAR 527, MAR 591, MAR 543 and two semesters of either MAR 580 or SUS 580 seminars;

C. MAR 670 Teaching Practicum;

D. Three Foundation courses selected from the following: MAR 501, MAR 502, MAR 503, MAR 504, MAR 506, MAR 508, MAR 509, MAR 516, MAR 541, MAR 542, MAR 545, MAR 547, SUS 502;
E. Five Specialty courses selected from among all the regular MAR and SUS graduate courses excluding the Core and Foundation courses listed above except by permission, ‘seminar’ courses (MAR 519, MAR 584, MAR 585, MAR 603), courses specific to the M.A. program (MAR 556, MAR 557, MAR 589, MAR 592), and with no more than 3 credits of MAR 655 (Directed Study). Courses from outside SoMAS may also count toward this requirement with approval of the Advisory Committee and Graduate Programs Committee;

F. 10 credits of MAR 650 Dissertation Research;

G. 21 additional credits of elective coursework;

H. Preliminary Examination: The primary purpose of the Preliminary Examination is to assess the student’s knowledge of his or her field and the student’s ability to relate his or her specific research interests to the broader field. The student must demonstrate a general knowledge of their discipline, including an understanding and ability to apply the current concepts of their field. Success on the examination implies the ability to use this information to address questions of a multidisciplinary nature;

I. Ph.D. degree dissertation proposal approved by a dissertation committee and successful oral qualifying examination;

J. 18 credits of MAR 699 Dissertation Research

K. Oral defense of dissertation

L. Submission of approved dissertation

**Core Courses for the M.S. and Ph.D. in Marine, Atmospheric, and Sustainability Sciences**

MAR 527: Current Issues in Global Climate Change (2 credits)

MAR 543: Critical Reading and Proposal Development (1 credit)

MAR 580: Oceans, Sustainability, and Atmospheres Colloquium (0 credits)

MAR 591: Responsible Conduct in Research and Scholarship and Professional Development (1 credit)

SUS 580: Research Seminar (0 credits)

**Foundation Courses for the M.S. and Ph.D. in Marine, Atmospheric, and Sustainability Sciences (all three credits)**

MAR 501: Physical Oceanography

MAR 502: Biological Oceanography

MAR 503: Chemical Oceanography

MAR 504: Statistics and Experimental Design

MAR 506: Geological Oceanography

MAR 508: Foundations Marine Science 1: Biogeochemical

MAR 509: Foundations Marine Science 2: Physics of Oceans, Atmos, Climate

MAR 516: Ecosystem Science for Fisheries Management

MAR 541: Foundations of Atmospheric Sciences I

MAR 542: Foundations of Atmospheric Sciences II

MAR 545: Paleoceanography and Paleoclimatology

MAR 547: Geophysical Fluid Dynamics I

SUS 502: Perspectives on Sustainability

Graduate Faculty

**Distinguished Professors**

Aller, Robert C., Ph.D., 1977, Yale University: Marine geochemistry; marine animal-sediment relations.

Cochran, J. Kirk, Ph.D., 1979, Yale University: Marine geochemistry; use of radionuclides as geochemical tracers; diagenesis of marine sediments.

Fisher, Nicholas S., Ph.D., 1974, State University of New York at Stony Brook: Marine biogeochemistry of metals; marine pollution; phytoplankton; herbivore interactions.
Distinguished Service Professors
Bowman, M.J., Ph.D., 1971, University of Saskatchewan, Canada: Coastal dynamics; oceanic fronts; productivity and physical processes.
Bokuniewicz, Henry J., Ph.D., 1976, Yale University: Near shore transport processes; coastal sedimentation; marine geophysics.

Professors
Allam, Bassem, Ph.D., 1998, University of Western Brittany, France: Diseases of shellfish.
Aller, Josephine Y., Ph.D., 1975, University of Southern California: Marine benthic ecology; invertebrate zoology; marine microbiology; biogeochemistry.
Cerrato, Robert M., Ph.D., 1980, Yale University: Benthic ecology; population and community dynamics; recolonization.
Chen, Yong, Ph.D., 1995, University of Toronto: Fisheries ecology; stock assessment; population dynamics; fisheries
Colle, Brian A., Ph.D., 1997, University of Washington: Synoptic meteorology; mesoscale numerical modeling and forecasting; coastal meteorology.
Frisk, Michael, Ph.D., 2004, University of Maryland: Biology, life history, and conservation of elasmobranches.
Gobler, Christopher, Ph.D., 1999, Stony Brook University: Phytoplankton; harmful algal blooms; estuarine ecology; aquatic biogeochemistry.
Khairoutdinov, Marat, Ph.D. 1997, University of Oklahoma: Climate modeling; high resolution cloud modeling; cloud microphysics; super parameterization; massively parallel super-computing; cloud parameterization.
Knopf, Daniel A., Ph.D., 2003, Swiss Federal Institute of Technology, Switzerland: Atmospheric chemistry; microphysics and chemistry of atmospheric aerosols; heterogeneous atmospheric chemistry and kinetics; instrument development.
Kollias, Pavlos, Ph.D. 2000, University of Miami: Radar applications for weather and climate research.
Lonsdale, Darcy J., Ph.D., 1979, University of Maryland: Zooplankton ecology with special interest in physiology; life history studies.
Lopez, Glenn R., Ph.D., 1976, Stony Brook University: Benthic ecology; animal-sediment interactions.
Mak, John E., Ph.D., 1992, University of California, San Diego (Scripps): Atmospheric chemistry and biosphere-atmosphere interactions; isotope geochemistry.
McElroy, Anne E., Ph.D., 1985, Massachusetts Institute of Technology, Woods Hole Oceanographic Institute: Aquatic toxicity, fate and effects of organic contaminants.
Scranton, Mary I., Ph.D., 1977, Massachusetts Institute of Technology, Woods Hole Oceanographic Institution: Marine biogeochemistry; geochemistry of reduced gases; chemical cycling in anoxic systems.
Taylor, Gordon T., Ph.D., 1983, University of Southern California: Marine microbial ecology; microbial mediation of biogeochemical processes; biofouling.
Wang, Dong-Ping, Ph.D., 1975, University of Miami: Coastal ocean dynamics.
Zhang, Minghua, Ph.D., 1987, Institute for Atmospheric Physics, Academia Sinica, Beijing: Atmospheric sciences; modeling of climate.

Associate Professors
Beaupré, Steven R., Ph.D., 2007, Global carbon cycle; isotope biogeochemistry; isotope reaction analyses.
Black, David E., Ph.D., 1998, Rosenstiel School of Marine and Atmospheric Science, University of Miami: Paleoclimatology; paleoceanography; deep-sea sediments; marine micropaleontology.
Collier, Jackie L., Ph.D., 1994, Stanford University: Phytoplankton physiology and ecology; freshwater and marine plankton; molecular microbial ecology.
French, Michael, Ph.D., 2012, University of Oklahoma: Supercell and tornado dynamics; Doppler weather radar applications; mesoscale meteorology.
Kim, Hyemi, Ph.D., 2008, Seoul National University: Low frequency climate variability; tropical meteorology; ocean-atmosphere interaction; prediction and predictability; tropical cyclone activity; extreme events.


Peterson, Bradley, Ph.D., 1998, University of South Alabama: Community ecology of seagrass dominated ecosystems.

Reed, Kevin, Ph.D., 2012, University of Michigan: Climate modeling; tropical cyclones; climate extremes; atmospheric dynamics.


Volkenborn, Nils, Ph.D., 2005, University of Bremen, Germany: Sediment biogeochemistry; benthic ecology; animal-sediment relationships; benthic-pelagic coupling; environmental change and coastal ecosystem functioning.


Wehrmann, Laura, Ph.D., 2010, Max Planck Institute for Marine Microbiology, Bremen, Germany: Biogeochemistry; trace-metal cycling in marine environments; early diagenetic processes; geomicrobiology; deep biosphere.

Wilson, Robert E., Ph.D., 1973, Johns Hopkins University: Estuarine and coastal ocean dynamics.

Wolfe, Christopher, Ph.D., 2006, Oregon State University: Acoustical oceanography; zooplankton behavior and ecology.

Zhu, Qingzhi, Ph.D., 1997, Xiamen University, China: Biogeochemistry; environmental analytical chemistry; trace element sensors.

**Assistant Professors**


Finn, Donovan, Ph.D., 2009, University of Illinois at Urbana-Champaign: Sustainable and resilient communities; climate change adaptation; long term disaster recovery.

Hamideh, Sara, Ph.D., 2015, Texas A&M University: Urban and regional sciences; hazard mitigation; post-disaster housing recovery; resilience planning.

Jang, Sung-Gheel, Ph.D., 2005, University of Illinois at Urbana-Champaign: Coastal GIS; spatial data analytics; sustainable and resilient urban systems.

McSweeney, Jacqueline, Ph.D., 2017, Rutgers University: Sediment transport dynamics in Delaware Estuary.

Taylor, David, Ph.D., 1994, University of Tennessee: Environmental humanities; natural history and nature writing; outreach/community engagement; Cuba Studies; environmental ethics.

Yager, Karina, Ph.D., 2005, Yale University: Impacts of climate change in mountain environments.

**Joint and Associate Faculty**

Baines, Stephen, Ph.D., 1993, Yale University: Aquatic biogeochemistry of carbon and trace elements. Assistant Professor, Ecology and Evolution

Levinton, Jeffrey, PhD., 1971, Yale University: Marine ecology. Professor Ecology and Evolution

Lynch, Heather, Ph.D., 2006, Harvard University: Spatiotemporal dynamics of Antarctic penguins and development and application of statistics and mathematics to conversation biology. Professor, Ecology and Evolution

McDonough, Carrie, Ph.D., 2017, University of Rhode Island Graduate School of Oceanography: Fate, transport, and bioaccumulation of organic contaminants in aquatic environments; human exposure to pollutants; high-resolution mass spectrometry. Assistant Professor, Civil Engineering

Padilla, Dianna, Ph.D., 1987, University of Alberta: Mollusc ecology; marine ecology; invasive species. Professor, Ecology and Evolution

**Adjunct Faculty**

Dheilley, Nolwenn M., PhD., 2010, Macquarie University, Australia: Evolution of host-parasite interactions, functional genomics.

Dvarskas, Anthony, Ph.D., 2007, University of Maryland, College Park: Environmental economics, ecosystem services and resilience of coastal ecosystems, economics of restoration, natural capital accounting.

Flood, Roger D., Ph.D., 1978, Massachusetts Institute of Technology, Woods Hole Oceanographic Institution: Marine geology; sediment dynamics; continental margin sedimentation.

Liu, Ping, Ph.D., 1999, Chinese Academy of Sciences: Climate change, dynamics, and modeling.

Nye, Janet, Ph.D., 2008, University of Maryland: Fish ecology; climate variability; global environmental change; ecosystem-based management.

Pales-Espinosa, Emmanuelle, Ph.D., 1999, University of Nantes, France: Shellfish physiology; particle selection mechanisms in suspension feeding bivalves; algology.

Price, Roy, Ph.D., 2008, University of South Florida: Cycling of elements in coastal marine environmental and hydrothermal vents.

Venkatesan, Arjun K., Ph.D., 2013, Arizona State University: Contaminant fate & transport; organic contaminants; environmental analytical chemistry; physical-chemical treatment of water.

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.