

**Marine and Atmospheric Sciences (MAS)****Dean**

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**Degrees Awarded**

M.A. in Marine Conservation and Policy; M.S. in Marine and Atmospheric Science; Ph.D. in Marine and Atmospheric Science; M. Phil. in Marine and Atmospheric Science; Graduate Certificate in Geospatial Sciences

**Web Site**

<http://www.somas.stonybrook.edu/>

**Application**

[https://app.applyyourself.com/AYApplicantLogin/fl\\_ApplicantLogin.asp?id=sunysb-gs](https://app.applyyourself.com/AYApplicantLogin/fl_ApplicantLogin.asp?id=sunysb-gs)

**Marine and Atmospheric Science**

The Marine and Atmospheric Sciences (MAS) graduate program is located within the School of Marine and Atmospheric Sciences (SoMAS). Research activities within SoMAS are coordinated through the Marine Sciences Research Center (MSRC), and the Institute for Terrestrial and Planetary Atmospheres (ITPA). MSRC is the center for research, graduate education, and public service in the marine sciences for the entire State University of New York system. SoMAS faculty have active research programs in all major oceanographic and atmospheric disciplines 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, 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 ITPA faculty 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 and Atmospheric Sciences with concentrations in either oceanography or atmospheric 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 an accelerated B.S./M.S. program allowing high achieving Stony Brook undergraduate students in the Marine Sciences (MAR), Marine Vertebrate Biology (MVB), Atmospheric Sciences (ATM), and a B.A./M.A. with the Environmental Studies (ENS) B.A.. Program to allow student 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 will provide students with an understanding of contemporary marine conservation issues and help them develop the necessary skills to apply this knowledge in marine conservation 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 such as law, teaching, communications or business. This program requires a minimum of 30 credits of graduate coursework and is designed to be completed in 12 months of full time study.

**The M.S. Program in Marine and Atmospheric Sciences**

The M.S. program offered by SoMAS consists of a rigorous interdisciplinary approach to oceanography and atmospheric sciences based on 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 more importantly, it is

designed to equip students with the background and tools needed for effective careers without additional training. Required course work is identical to the Ph.D. program allowing M.S. to continue on 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 2-3 years.

#### **Ph.D. Program in Marine and Atmospheric Sciences**

The Ph.D. program is designed to prepare students to independently identify and attack oceanographic and atmospheric problems. It builds on a series of core required courses (taken by both PhD and M.S. students), and allows students to create their own course of advanced study, helping them to become effective, independent problem solvers. The Ph.D. in Marine and Atmospheric Sciences prepares students to compete effectively for academic positions, direct research programs at government or private laboratories, and direct research and assessment programs at non-governmental 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 Programs**

In addition to the M.A., M.S. and Ph.D. programs of study, certificate programs provide the opportunity for advanced study for students who do not wish to pursue a degree. Students interested in either of these programs should contact the Graduate Program 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 18 credits in addition to holding a BA, BS, or graduate degree. Program courses are offered with flexible scheduling that is 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 Graduate Record Examination (GRE) General Test;
- C. Acceptable scores on the TOEFL (paper: 600, computer: 230, iBT: 90) or IELTS (6.5) for foreign students;
- E. Three letters of recommendation;
- F. 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 semester college courses in math or science, including at least one course in biology.

There are two tracks in the M.S. and Ph.D. programs—one in Marine Sciences and one in Atmospheric Sciences. Students should indicate which track they wish to pursue on their applications.

For admission to either the M.S. or Ph.D. graduate programs in Marine and Atmospheric Sciences, the following are normally required:

- A. B.A. or B.S. degree in atmospheric sciences, biology, chemistry, geology, mathematics, physics, or other suitable science discipline, the course work equivalent to obtain such a degree;
- B. Two semesters of coursework in mathematics through calculus, physics, and chemistry, and as appropriate to specialization area, biology, chemistry, physics, geology, or math, with advanced work in at least one of these disciplines;

In their personal statements, all students should state why they wish to enter the specific SoMAS graduate program and what career they hope to embark upon. In addition, M.S. and Ph.D. students should provide an indication of both the specific research areas they would like to address and potential faculty advisors. Obtaining a position in specific research laboratories is very competitive, so applicants are encouraged to contact potential advisors prior to submitting their application.

#### **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. In addition to ITPA, SoMAS is home to the Institute for Ocean Conservation Sciences, the Marine Animal Disease Laboratory, a diagnostic and research facility focused on the health of living marine resources, 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 and Information Center (MASIC) is the branch of the campus library system located at SoMAS. Officially designated as a

prototype for technology-based branch libraries on the campus, MASIC offers students and faculty a core collection of journals and monographs relevant to the multi-disciplinary pursuits of SoMAS and its affiliated institutes as well as a state-of-the-art computer teaching laboratory.

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 green house 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 newly renovated marine station at Stony Brook Southampton, located 46 miles away on the beautiful east end of Long Island. State of the art class rooms, laboratories and animal culture facilities are available in the new Southampton Marine Station. Several SoMAS faculty keep research laboratories at Stony Brook Southampton, and additional wet lab space is available in the new 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:

Skill Area Requirements - 9 courses in 6 different areas (A-F)

- A) Marine Sciences: 2 courses, one of which has to be in a basic biological field
- B) Conservation: 2 courses, MAR 507 Marine Conservation Biology (req.), plus 1 elective
- C) Communications: 2 required courses: MAR 557 Case Study and Project Planning Seminar, and a Journalism Course (either JRN 500, or JNR 501,502,503, 504, 505).
- D) Policy/law/economics/management: 1 course
- E) Quantitative assessment: 1 course
- F) Field biology: 1 course
- G) Capstone Project or Internship in Marine Conservation and Policy, MAR 589 or MAR 592 (6 credits required); can be completed during summer session, or during academic year.
- H) 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 and Atmospheric Sciences

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

- A. An overall B (3.0) average in the required foundation and advanced core courses with no grade lower than a C. See details of required coursework below;
- B. Seminar MAR 580 (two semesters);
- C. Master's research proposal due by end of first year, signed by advisor and two readers;
- D. Sea experience or appropriate field experience for students in the marine track only;
- E. Oral presentation of thesis work;
- F. Submission of approved thesis.

The M.S. degree requires a minimum of 30 credits, composed of at least 10 credits of thesis research in addition to required and elective course work.

#### Requirements for Ph.D. Degree in Marine and Atmospheric Sciences

In addition to the minimum Graduate School requirements, and general requirements for the M.S. Degree, the following are required:

- A. Comprehensive Examination: The primary purpose of the Comprehensive 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 oceanography or atmospheric sciences, including an understanding of the current concepts of his or her field. Success on the examination implies the ability to use this information to address questions of a multidisciplinary nature;
- B. Ph.D. degree dissertation proposal approved by a dissertation committee and oral preliminary examination;

- C. Practicum in teaching;
- D. Oral defense of dissertation;
- E. Submission of approved dissertation.

#### Required Courses

##### Marine Track:

A. Core Courses: 1) MAR 508 and MAR 509, Foundations of Marine Sciences I and II; 2) One of the following advanced core courses depending on discipline (MAR 501 Physical Oceanography, MAR 502 Biological Oceanography, MAR 503 Chemical Oceanography, MAR 506 Geological Oceanography); MAR 547 Dynamic Oceanography I, MAR 548 Dynamic Oceanography II and 3) One quantitative analysis course from among appropriate offerings at SoMAS or in other departments.

B. Scientific Communication MAR 568;

C. MAR 580 Graduate Seminar (2 Semesters)

D. A minimum of six additional credits in specialty courses selected by the student and his or her advisor and approved by the advisor;

E. To ensure satisfactory progress toward the dissertation, Ph.D. students must participate in four credits of research-oriented, seminar-style elective courses. This requirement may be completed after advancing to candidacy.

##### Atmospheric Track:

A. Core courses: 1) MAR 541 and MAR 542, Foundations of Atmospheric Sciences I and II; 2) One of the required oceanography core courses (MAR 501 Physical Oceanography, MAR 503 Chemical Oceanography, MAR 506 Geological Oceanography, MAR 508 Foundations of Marine Science I: Biogeochemical Processes, MAR 545 Paleoceanography and Paleoclimatology) or MAR 547 Dynamic Oceanography I; and 3a) for M.S. students, two, or 3b) B or Ph.D. students three out of the following advanced courses (MAR 505 General Circulation of the Atmosphere, MAR 538 Modern Methods of Data Analysis, MAR 544 Atmospheric Radiation, MAR 548 Dynamical Oceanography II, MAR 565 Tropical Meteorology, MAR 572, Geophysical Simulation, MAR 583 Doppler Weather Radar, MAR 593 Atmospheric Physics, MAR 594 Atmospheric Dynamics, MAR 596 Atmospheric Chemistry and MAR 598 Synoptic and Mesoscale Meteorology);

B. MAR 595 Graduate Seminar in Atmospheric Sciences (two semesters);

C. Minimum of 24 course credits for Ph.D. students.

##### Graduate Faculty

##### Distinguished Professors

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

Fisher, Nicholas S. Ph.D., 1974 State University of New York at Stony Brook: Marine biogeochemistry of metals, marine pollution, phytoplankton, herbivore interactions.

Lee, Cindy, Ph.D., Emeritus, 1975, University of California, San Diego (Scripps): Marine geochemistry of organic compounds; organic and inorganic nitrogen cycle biochemistry.

##### 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.

Chang, Edmund K.M., Ph.D., 1993, Princeton University: Atmospheric dynamics and diagnoses climate dynamics; synoptic meteorology.

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

Colle, Brian A., Ph.D., 1997, University of Washington: Synoptic meteorology; mesoscale numerical modeling and forecasting; coastal meteorology.

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

Geller, Marvin A., Ph.D., Emeritus, 1969, Massachusetts Institute of Technology: Atmospheric dynamics; climate and the upper atmosphere.

Gobler, Christopher, Ph.D. 1999, Stony Brook University: Phytoplankton, harmful algal blooms, estuarine ecology, aquatic biogeochemistry.

Hameed, Sultan, Ph.D., 1968, University of Manchester, England: Atmospheric sciences.

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.

Pikitch, Ellen, K. Ph.D., 1983, Indiana University: Fisheries science, conservation biology and marine policy

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.

Swanson, R. Lawrence, Ph.D., 1971, Oregon State University: Physical oceanography of coastal waters and estuaries; ocean dumping; coastal zone management.

Taylor, Gordon T., Ph.D., 1983, University of Southern California; Marine microbial ecology; microbial mediation of biogeochemical processes; biofouling.

Wang, Dong-Ping, Emeritus, 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**

Black, David E., Ph.D., 1998, Rosenstiel School of Marine and Atmospheric Science, University of Miami: Paleoclimatology, paleoceanography, deep-sea sediments, marine micropaleontology.

Brownawell, Bruce J., Ph.D., 1986, Massachusetts Institute of Technology, Woods Hole Oceanographic Institution: Biogeochemistry of organic pollutants in seawater and groundwater.

Cerrato, Robert M., Ph.D., 1980, Yale University: Benthic ecology; population and community dynamics; recolonization.

Collier, Jackie L., Ph.D., 1994, Stanford University: Phytoplankton physiology and ecology; freshwater and marine plankton; molecular microbial ecology.

Frisk, Michael, Ph.D., 2004, University of Maryland: Biology, life history, and conservation of elasmobranchs.

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.

Lwiza, Kamazima M.M., Ph.D. 1990, University of Wales: Structure and dynamics of shelf seas.

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

Warren, Joseph, Ph.D., 2001, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution: Acoustical oceanography, zooplankton behavior and ecology.

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

Yu, Jie, Ph.D. 2000, Massachusetts Institute of Technology: Theoretical fluid dynamics and applied mechanics, with emphases on wave mechanics, hydrodynamic instabilities, coastal hydrodynamics and seabed mechanics

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

#### **Assistant Professors**

Beaupré, Steven R., Ph.D. 2007: Global carbon cycle, isotope biogeochemistry, isotope reaction analyses.

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

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

Farhadzadeh, Ali, Ph.D. 2011. University of Delaware: Numerical and experimental modeling of storm surge and wave, sediment transport and nearshore morphology evolution, impacts of sea level rise and storm intensification on coastal infrastructure and communities.

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

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.

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

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

Thorne, Lesley. Ph.D. 2010, Duke University: Bio-physical and trophic interactions in marine ecology; application of spatial analysis and landscape ecology techniques to marine conservation.

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

Wolfe, Christopher. Ph.D. 2006, Oregon State University: Physical oceanography, large-scale circulation, theory and modeling

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 conservation biology

Padilla, Diana, Ph.D. 1987, University of Alberta: Mollusk ecology; invasive species.

#### **Adjunct Faculty**

Flagg, Charles, Ph.D. 1977, Massachusetts Institute of Technology/Woods Hole Oceanographic Institution: Structure and dynamics of coastal oceans.

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

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.

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