Academics

The Rosenstiel School offers one of the largest, most comprehensive marine and atmospheric graduate programs in the nation. Robust academics and in-depth scientific investigation are hallmarks of the School’s programs. Currently, graduate Master of Science, Master of Arts and Doctor of Philosophy degrees are offered in:

- Applied Marine Physics
- Marine and Atmospheric Chemistry
- Marine Biology and Fisheries
- Marine Geology and Geophysics
- Meteorology and Physical Oceanography
- Marine Affairs and Policy (M.A./M.S. only)

World-renowned faculty members and highly regarded programs attract some of the most qualified students from diverse educational, and cultural backgrounds. More than 200 graduate students learn and work alongside professors developing state-of-the-art approaches to today’s most pressing environmental concerns.

Likewise, the undergraduate curriculum is designed to take full advantage of the School’s year-round access to marine environments. Approximately 300 students are introduced to various ecosystems and Earth systems through lectures, laboratories and field trips. They are also given opportunities to earn course credits by conducting independent research under the supervision of scientists who are leaders in their respective fields. Small class sizes provide an intimate college experience, with all the resources of a dynamic research university.

As part of the University of Miami’s broader academic community, the Rosenstiel School is involved in university-wide endeavors, including the Center for Computational Science, and the Leonard and Jayne Abess Center for Ecosystem Science and Policy which was created to foster interdisciplinary initiatives that bridge the gap between science and environmental policy.

The Rosenstiel School

From humble beginnings in the 1940’s, the Rosenstiel School of Marine and Atmospheric Science has grown into one of the leading academic oceanographic and atmospheric research institutions in the world. The School’s basic and applied research interests encompass virtually all marine-related sciences.

The Rosenstiel School’s main campus is located on Virginia Key, Fla. It forms part of a specially designated 65-acre marine research and education park that includes two NOAA laboratories, and a dedicated marine and science technology high school. The Rosenstiel School also operates a 78-acre advanced satellite reception and analysis center in southern Miami-Dade County.

Research Vessel

In 2000, the Rosenstiel School commissioned a state-of-the-art catamaran, the R/V F. G. Walton Smith. Named for the School’s founder, the 96-foot research vessel is operated as part of the University National Laboratory System (UNOLS).

- Air-Sea Interactions
- Applied Physics
- Aquaculture
- Atmospheric Chemistry
- Biochemistry
- Biogeochemistry
- Biological Oceanography
- Biology
- Biomedicine
- Biotechnology
- Chemistry
- Climate Change
- Coastal Zone Management
- Coral Reef Ecology
- Fisheries and Fish Ecology
- Geology and Geophysics
- Marine Policy
- Meteorology
- Ocean Acoustics
- Ocean Engineering
- Physical Oceanography
- Satellite Remote Sensing
- Surface-Based Remote Sensing
- Sustainability
- Underwater Archaeology

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Observational Oceanography

Observational instruments allow Rosenstiel oceanographers to conduct ship-based experiments and measure physical processes that affect ocean currents and the properties they transport, including: plankton, fish, heat, and organic and inorganic solutes. Moored instruments provide valuable long-term data for the study of the role of the ocean in the climate system. Aircraft observations and land-based surface-current radar measurements supplement the data collected, helping to create comprehensive models for analysis. Global surveys are also performed to assess the responsiveness of the ocean to climate change.

Coral Reef Studies

Referred to as ‘rainforests of the sea,’ reefs offer unparalleled biodiversity. Our 50+ coral scientists study reef structures to measure how increasing acidity oceans, global warming and anthropogenic emissions affect the distribution, physiology, ecology and evolution of marine organisms through studies of microarrays, genetic markers and other investigational tools.

Fisheries and Marine Ecosystems

From fisheries biology to studies of coastal zone management and sustainable aquaculture, Rosenstiel scientists have broad research interests. They acquire information via SCUBA, snorkeling, ship-based fieldwork and laboratory investigations, then create models to assess risks and help inform policies that protect marine resources. Our scientists also employ functional genomics to better understand the distribution, physiology, ecology and evolution of marine organisms through studies of microarrays, genetic markers and other investigational tools.

Advanced Remote Sensing

The Remote Sensing Group is an interdisciplinary team engaged in the research and instruction of satellite oceanography techniques and their applications. Efforts include the analysis of images acquired through UM’s Center for Southeastern Tropical Advanced Remote Sensing (CSTARS), theoretical radiative transfer modeling, and offering scientific feedback to develop new satellite instrumentation that has the potential to save lives.

Chemical Interfaces

Rosenstiel professors conduct field and laboratory studies of the chemistry that controls the distribution of trace gases in the atmosphere. Utilizing ground, aircraft and balloon sampling, they measure volatile organic compounds, mercury, trace radical species and aerosols. This work is critical to understanding global pollution issues and chemistry’s impact on climate.

Air-Sea Interactions

The air and sea influence each other profoundly. Rosenstiel researchers use applied fluid mechanics to study gas transfer, wave dynamics, sea spray, and other interfacial thermodynamic processes. Data collected through the deployment of sophisticated instruments, including research vessels and buoys, enable the direct measurement of interactions in situ. Sampling towers on remote islands, outfitted with high tech instruments, monitor aerosols in the atmosphere, which upon deposition to the sea surface, fertilize the ocean.

Hurricane Modeling and Prediction

Whether flying into the eye of a tropical cyclone, remotely observing the eyewall of a hurricane, or creating numerical models, Rosenstiel School scientists are at the forefront of hurricane forecasting and prediction. Using advanced tools, like GPS dropsondes, Doppler radar, and Earth-orbiting satellites, our researchers are helping forecasters shed light on how wind shear, ocean heat content, rain bands, humidity and other factors influence storm intensity.

Atmospheric Physics and Meteorology

Both the atmosphere and the ocean transport heat poleward, helping to define the climatic conditions under which civilization has developed. In addition to teaching Meteorology, professors and students are engaged in studies of water vapor, clouds and precipitation, and their important interactions with atmospheric radiation, as well as atmospheric dynamics.

Global Climate Dynamics

Past, present, future -- our faculty members study the Earth’s climate from every vantage point. From paleoclimatology and changes in atmospheric chemistry, to cutting-edge modeling and research on sediment cores, their work addresses fundamental questions about climate dynamics and impacts on terrestrial and marine life. Researchers are especially interested in the ocean’s role in the global carbon cycle, as the world’s oceans absorb nearly half of the CO2 produced by humans annually.

Biomedical Sciences

Operated in conjunction with the University of Miami’s Miller School of Medicine, the innovative NSF/NIEHS Center for Oceans and Human Health located at the Rosenstiel School is one of four national centers established to conduct research, education, and training focused on the vital links between coastal waters and human health. The center successfully combines research from both the biomedical and oceanographic fields.

Underwater Archaeology

Little Salt Spring, an anoxic sinkhole in North Port, Fla., is furnishing Rosenstiel students with unparalleled learning opportunities. The water chemistry and temperature have created a unique submerged landscape where late Paleo-Indian artifacts have been preserved for over 12,000 years. Students are participating in the excavation of the site, under the direction of skilled divers in UM’s Scientific Diving Program.

National Resource for Aplysia

Established by the NIH’s National Center for Research Resources, this is the only location in the world where Aplysia californica are cultured and raised for research purposes. Aplysia neurons (left) can be used in studies on genomics, digestive transport, nerve regeneration, brain function, and memory.