2017 Graduate Research Assistantship Opportunities
Find Us Online

The Rosenstiel School:
www.rsmas.miami.edu

Graduate Programs (M.S. and Ph.D.):
www.rsmas.miami.edu/academics/graduate-programs
- Atmospheric Science (ATM)
- Marine Ecosystems & Society (MES)
- Marine Biology & Ecology (MBE)
- Marine Geosciences (MGS)
- Meteorology and Physical Oceanography (MPO)
- Ocean Engineering (Non-thesis M.S. only)
- Ocean Sciences (OCE)

Master of Professional Science Program: mps.rsmas.miami.edu
Atmospheric Sciences (ATM)

Program Strengths:
• Atmospheric Chemistry
• Climate Dynamics and Prediction
• Clouds and Aerosol Processes
• Tropical Meteorology and Hurricanes
Marine Ecosystems & Society (MES)

Program strengths:
Aquaculture
Coastal zone management
Exploration science
Fishery dynamics and resource management
Marine conservation
Marine law, policy and development
Political and environmental ecology
Resource economics
Marine Biology & Ecology (MBE)

Program Strengths:
• Biological oceanography
  Near-shore and pelagic marine life
• Fisheries dynamics
  – Stock assessment, population modeling, management
• Marine biomedical sciences
  – Marine diseases, marine toxicology, genomics
• Coral Reef ecology and tropical ecosystems
Marine Geosciences (MGS)

Program Strengths:
• Geodesy and Remote Sensing/Natural Hazards
• Carbonate depositional systems (Comp. Sed. Lab.)
• Paleoceanography/Paleoclimatology
• Geomicrobiology/deep reef systems
• Fluid flow in ocean crust
Meteorology & Physical Oceanography (MPO)

Program Strengths:
- Tropical meteorology (hurricanes, tropical climate)
- Satellite oceanography and remote sensing
- Large-scale ocean circulation
- In situ observations and data assimilation
- Climate modeling
Ocean Sciences (OCE)

Program Strengths:
• Large-scale ocean dynamics and climate
• Coastal oceanography
• Air–sea interaction and remote sensing
• Biogeochemical cycles and chemical oceanography
• Biophysical interactions
Why Study at the Rosenstiel School?

Expert Faculty: Work with faculty at the top of their fields in the atmospheric sciences, ocean sciences, marine biology and ecology, marine geosciences, and marine ecosystems and society.

Unique Facilities:
- **SUSTAIN** wind-wave-storm surge tank
- Helicopter Observation Platform
- **F.G. Walton Smith Research Vessel**
- Connection & collaboration with NOAA labs (across the street)
  NOAA [Atlantic Oceanographic & Meteorological Laboratory](https://www.aoml.noaa.gov) (AOML)
  NOAA [Southeast Fisheries Science Center](https://www.nmfs.noaa.gov) (NMFS SEFSC)
- **High-Performance Computing**: one of the largest centralized academic cyber-infrastructures in the country
- **CSTARS**: satellite remote sensing

Diverse Community: Develop friendships and collaborate with faculty, researchers, and students from across the globe.
Information for Prospective Students

- Stipends ($29,724 in 2016-17), tuition waivers, and health insurance available for Ph.D. and research-based M.S. students
- Many **fellowships are available** from the University of Miami, government agencies, and private foundations
- Teaching assistant opportunities are included
- Opportunities to attend and present at:
  - Conferences (AMS, AGU, and more)
  - Workshops
  - Summer schools
Information for Prospective Students

• 5-year Ph.D. is typical
• **End of the first year:** students take a comprehensive exam based on two semesters of coursework
• **Third year:** students take a Ph.D. qualifying exam

Several research opportunities available for Fall 2017! (See slides at the end of this presentation.)
Student Life

- Most students live in great neighborhoods nearby: Key Biscayne, Brickell, Coconut Grove, and Coral Gables.
- The Rosenstiel School is home to a beach, a restaurant, and a bar called the Wetlab!
- Many students enjoy the warm waters of the bay and ocean for sailing, fishing, paddleboarding, snorkeling, and diving year-round.
- The Everglades and the Florida Keys are a haven for wildlife and offer kayaking, biking, and swamp walking within a two-hour drive.
- Miami also has an exciting cultural scene - with Art Basel, the Arsht Center for the Performing Arts, Wynwood Art District, and the new Museum Park.
Application Information

• **Apply online** by January 1!

• Evaluation is based on:
  - GRE scores (verbal and quantitative)
  - GPA
  - Letters of recommendation
  - Personal statement
  - Research experience

• Applications submitted to any graduate program can be considered by faculty in any other program, as well as by the MPS program faculty.
Ph.D. Research Opportunities in Fall 2017

• The following slides describe 5-year research assistantships that are potentially available beginning in Fall 2017

• Please email the professor directly with questions about their project and your CV

• For questions about:
  
  – The ATM graduate program
    email Elliot Atlas at eatlas@rsmas.miami.edu
  – The MES graduate program
    email Jill Richardson at jrichardson@miami.edu
  – The MBE graduate program
    email Lynne Fieber at lfieber@rsmas.miami.edu
  – The MGS graduate program
    email Guoqing Lin at glin@rsmas.miami.edu
  – The MPO graduate program
    email Mohamed Iskandarani at miskandarani@rsmas.miami.edu
  – The OCE graduate program
    email Mike Brown at mbrown@rsmas.miami.edu

• For application processing questions, please email the Rosenstiel School Graduate Studies Office at gso@rsmas.miami.edu
Cooperative Institute for Marine and Atmospheric Studies (CIMAS) Ph.D. Assistantship

Prestigious, newly established assistantship!

Student identifies co-advisors at NOAA and RSMAS, on any of the 7 listed themes.

More details on the process are here.

Theme 1: Climate Research and Impact
Theme 2: Tropical Weather
Theme 3: Sustained Ocean and Coastal Observations
Theme 4: Ocean Modeling
Theme 5: Ecosystem Modeling and Forecasting
Theme 6: Ecosystem Management
Theme 7: Protection and Restoration of Resources

Administrative contact points: Profs Ben Kirtman (bkirtman@rsmas.miami.edu) and Sharan Majumdar (smajumdar@rsmas.miami.edu)
Boundary-Layer Studies with the RSMAS Helicopter Observation Platform (HOP) and the Ocean-Land-Atmosphere Model (OLAM)

Very-high frequency measurements of atmospheric variables will be collected with the HOP to characterize the atmospheric boundary layer (ABL) at various locations and time in the continental US and off-shore. Together with state-of-the-art Large-Eddy Simulations (LES) produced with OLAM, these data will be used to improve our understanding of ABL processes.

Prof. Roni Avissar, ATM, ravissar@rsmas.miami.edu
Density-dependent variability in fish life history

- Student will develop and test methods to model changes in fish life history with changes in density caused by spatial management
- Strong math skills needed

Eggs/larvae mortality

Young of the year
growth (DD,H)
mortality (DD,H)
movement (H,DD)

Juveniles
growth (DD,H)
mortality (DD,H, F)
movement (H,DD)

Adults
growth (DD,H)
fecundity (DD,H)
mortality (H, F)
movement (H,DD)

larval dispersal (H)
The role of Saharan Dust in Atlantic Climate Variability

The observational record shows significant fluctuations in the amount of Saharan dust in the tropical Atlantic associated with changes in climate. This is true on timescales from interannual, to decadal, and is even more prominent on glacial timescales. In turn, changes in the amount of dust in the atmosphere can alter the Atlantic climate through changes in radiative forcing and surface buoyancy fluxes. We use a combination of climate models, earth system models, and modern and paleoclimate observations to understand how dust—climate interactions contribute to Atlantic climate variability.

Model simulated increase in dust deposition (in g m\(^{-2}\) yr\(^{-1}\)) during the last Heinrich Stadial, a time when the Sahara was a much more active dust source (Murphy et al., 2014)
Measurements of Marine Aerosols

Biological activity in the ocean produces organic material that is transferred to the atmosphere during wave breaking. This organic material can impact the production of clouds in the marine atmosphere. Model predictions of the emission of marine organic aerosol disagree on the magnitude of this source (see figure). To reconcile this disagreement, students will measure fluxes of sea spray aerosol using the wave tank at RSMAS and in the field.

Different parameterizations of primary organic material annually emitted from the ocean. Figure is modified from Gantt et al., (2012).
Physiological consequences of ocean acidification in fish

Elevated CO₂ leads to acid-base balance adjustments in marine fish with a resulting cascade of effects including altered neurosensory function and ion transport. The scope for adaptation is poorly understood.

Prof. Martin Grosell, mgrosell@rsmas.miami.edu
Impacts of crude oil exposure on marine pelagic fish

Low levels of crude oil exposure impairs cardiac function and development, sensory function, swim performance, embryo metabolic demand and buoyancy control – little is known about potential population level impacts and potential transgenerational effects.

Prof. Martin Grosell, mgrosell@rsmas.miami.edu
Atlantic Meridional Overturning (AMOC): Studies with Tracers

Redistribution of heat, salt and carbon anomalies by AMOC plays an important role in regulating climate variability.

We will study pathways and timescales associated with AMOC, by running and analyzing numerical simulations of various oceanic tracers.

The results will help to interpret climate variability and to improve climate predictions.
Predicting the Coming Decades

This research project seeks to understand how ocean eddies influence the climate in the coming decades. The research involves using very high resolution state-of-the-climate models to examine climate predictability.

Surface Current Kinetic Energy
From High Resolution Climate Model Simulation

cm² s⁻²

Prof. Ben Kirtman, ATM, MPO, bkirtman@rsmas.miami.edu
Atmospheric moisture fields, earthquakes and volcanoes

→ A new satellite (NISAR) will measure changes in ground height, to a few mm accuracy
→ But patterns of water vapor in the air will also appear as signals of similar amplitude
→ We need to separate these signals, by modeling the atmosphere part: an atmospheric correction process, to the geologists
→ But we atmospheric scientists can also learn interesting stuff from the process....
The goals of our research are 1) to better understand how properties of the large-scale environment around hurricanes – wind shear, dry air, and sometimes Saharan dust – modulate hurricane structure and intensity; and 2) to characterize and understand the inner-core convective structures that do and do not lead to intensification. We use satellite and aircraft observations of mid-level winds and humidity to build composite environments around intensifying or weakening storms. These are used in conjunction with very high resolution, high-quality numerical simulations to reproduce and understand the storm-environment interactions. Graduate assistants will be involved in acquiring in-situ data, performing simulations with the WRF model, and analyzing the inner-core evolution. Students with undergraduate majors in sciences outside of meteorology are welcome to apply.

Prof. David S. Nolan, dnolan@rsmas.miami.edu
Global Patterns in Coral Reef Health and Resilience

Be part of a research team examining one of the most comprehensive datasets on global coral reef health and resilience. Enabled by the Living Oceans Foundation’s Global Reef Expedition, these data were collected by an international team of scientists over five years across the major reef provinces of the Atlantic, Pacific and Indian oceans. A total of 22 missions in 15 countries. The project will identify sites of high priority for protection and develop conservation strategies that will mitigate human impacts and improve reef resiliency. More details here, click “Students”.

Prof. Sam Purkis, spurkis@rsmas.miami.edu
C, S, and B Isotopes: Global or Diagenesis

The research project seeks to understand how the carbon isotopic composition of carbonates and organic material vary through time. In addition we will examine the influence of diagenesis on the B and S isotopic proxies.

Relationships between $d^{13}$C and $d^{13}$Co in the Clino core (See Figure 1 for location). This core has been equivocally altered by freshwater yet shows a very strong correlation between $d^{13}$C and $d^{13}$Co. This correlation is a result of the addition of isotopically negative organic material being added during subaerial exposure and does not reflect the preservation of the original isotopic signals. Figure from Oehlerlert and Swart (2014).

Prof. Peter Swart, pswart@rsmas.miami.edu
Clumped Isotopes and Diagenesis

The research project aims to calibrate the clumped signal as a measure of carbonate diagenesis within environments in which the diagenetic changes are reasonably well constrained and to model these variations with indicators such as d^{18}O, d^{44}Ca, ^{87}Sr/^{86}Sr.

Data from limestones and dolomites from the Jurassic aged Arab-D formation in Saudi Arabia. The D_{47} temperatures and d^{18}Ow data show evidence of mixing between carbonates altered by high temperature fluids with positive d^{18}Ow values (caused by carbonate recrystallization) and the original precursor or a precursor.
The Low Cloud Response to Smoke Over the Southeast Atlantic

Light-absorbing aerosols and an extensive low cloud deck interact with each other in this climatically-significant region in as-yet poorly characterized ways. The student will participate in an aircraft campaign in 2018 and use the measurements to examine guiding hypotheses.

During September, 600 hPa winds escort aerosols (optical depth in warm colors) from fires in continental Africa westward over the south Atlantic stratocumulus deck (cloud fraction in blue contours). The inset, a 4E-7E longitude slice, highlights the main aerosol outflow occurring at 10S, subsiding to the north over a deepening boundary layer.

Prof. Paquita Zuidema, ATM, MPO, pzuidema@rsmas.miami.edu
Master of Professional Science Program

• Prepares students for science careers in industry, government, and non-profit organizations
• Degree programs include:
  - Applied Remote Sensing
  - Broadcast Meteorology
  - Computational Meteorology and Oceanography
  - Natural Hazards and Catastrophes
  - Weather, Climate, and Society
  - Weather Forecasting
• 24-28 course credits and a 3-6 month internship (30 credits total)
• Most students graduate in 15 months or less
• If you have any questions, please contact mps@rsmas.miami.edu
Incoming Class of 2016