GENERAL INFORMATION

Program sponsor: Princeton Environmental Institute
Position number: C1SAR1
Project title: Characterization of Antarctic Sea Ice Edge Spring Bloom Using Observations and Simple Models
Organization/research group: Program in Atmospheric and Oceanic Sciences
Primary location(s) of internship: Princeton University, Sayre Hall
Additional cities and/or countries to be visited (if applicable): n/a

Note: If this internship is located in a country with an International SOS risk rating of High or Extreme, final candidates must participate in a travel review process overseen by the Travel Oversight Group (TOG), and obtain safety guidance prior to departure. The University reserves the right to revoke support and funding for travel at any time there has been a significant deterioration in the safety and security conditions surrounding travel arrangements, or in the sector of the country, or countries, where travel is to occur.

FACULTY SPONSOR(s)/HOST INFORMATION

Name(s): Jorge Sarmiento
University Department(s): Geosciences
E-mail: jls@princeton.edu          Phone: 609-258-6585
Website: https://www.princeton.edu/geosciences/people/sarmiento/

INTERNSHIP/RESEARCH PROJECT INFORMATION

Internship/project description:

As sea ice retreats each year around Antarctica, large blooms of phytoplankton can be observed in satellite ocean color measurements. The recent deployment of profiling floats equipped with biogeochemical sensors as part of the Southern Ocean Carbon and Climate Observations and Modeling (SOCCOM) project presents a novel opportunity to characterize the impact of these blooms and understand their driving processes. This project will analyze observations of oxygen, nitrate, pH, backscatter (particulates), and chlorophyll from under-ice profiling floats to characterize ice edge blooms during the spring sea ice retreat. We will construct a simple box model to help in the interpretation and understanding of what combination of biological production and mixing is necessary to reproduce these observations and explore high resolution model output to determine how well this ice edge production is reproduced in our state-of-the-art climate simulations.

Student's role and responsibilities:

- The student will analyze data from under ice floats and characterize common features in biogeochemical observations during the seasonal sea ice retreat
- This project will utilize and improve existing box models used to understand the impact of the biological and physical processes on observed biogeochemical parameters
- The student will be introduced to relevant background literature to supplement the data analysis.
- Participate in a journal club on a broad range of oceanography topics.
- Present results in an oral presentation at the end of summer.
- Final results will be summarized in a written report.
- Familiarity with Matlab or other programming languages desired.
Internship/project learning objectives:
The basic goal of this project is to learn to interpret oceanographic biogeochemical observations and how biology, chemistry, and physics interact in the seasonal ice zone. The student will develop practical skills in data analysis and simple box models. Depending on the project progression and student interest, we will compare in situ observations to climate model representations of the same processes. Students will also gain experience in scientific presentations and writing.

PROGRAM REQUIREMENTS

Academic background and any course pre-requisites:
Useful, but not required: Ocean, Atmosphere and Climate; General Physics

Technical skills:
The data analysis scripts that the work will be based on are written in Matlab. Some knowledge of, or a willingness to learn Matlab is required.

Additional training(s):
n/a

Equipment:
Students should bring a laptop, though one will be provided if necessary.

Physical demands:
n/a

Language abilities/competencies (if applicable): n/a

Additional information about the internship/project:
 n/a

INTERNATIONAL TRAVEL REQUIREMENTS (if applicable)

Visa(s) required?  Yes ☐  No ☐
Research permit/pass required?  Yes ☐  No ☐
Immunizations required?  Yes ☐  No ☐

INTERNship/PROJECT SUPERVISOR(S)

Name and title of primary supervisor: Jorge Sarmiento
Email: jls@princeton.edu  Phone: 609-258-6585

Name and title of additional supervisor, if applicable: Seth Bushinsky, Geological Sciences / Atmospheric and Oceanic Sciences (https://scholar.princeton.edu/bushinsky/)
Email: sb17@princeton.edu  Phone: (609) 258-2904

PROGRAM DATES AND FUNDING INFORMATION

Weekly Stipend: $500
Number of Positions Available: 1
Tentative Start Date (mm/dd/yyyy): 6/3/2019
Number of Weeks: 8
Tentative End Date (mm/dd/yyyy): 7/26/2019

Note: PEI funding is for full-time work, 35 hours per week minimum, and for a period of at least 8 continuous weeks.

Application deadline: January 11, 2019