

**Columbia University Department of Earth and Environmental Sciences**

**Lamont-Doherty Earth Observatory of Columbia University**

Sponsored as a REU Site by the National Science Foundation

(Starred research projects\* are supported by the IODP-USSP. Two out of the three students supported by IODP-USSP are required to be members of ethnic minorities.)

**Summer Internship Program for Undergraduates (May 28<sup>th</sup>-August 3<sup>rd</sup>, 2019)**

Theme: *Interdisciplinary Cutting-Edge Research through the Analysis of Global Data*

The Lamont-Doherty Summer Intern Program offers the chance to experience cutting-edge scientific research as an undergraduate. **The program is open to US citizens or permanent residents** who have completed their junior or sophomore year in college or community college with majors in earth science, environmental science, chemistry, biology, physics, mathematics, or engineering. **Neither graduating seniors nor international students (with the exception of undergraduate students from SUSTech who are fully supported by their university) are eligible for this internship.** Members of groups traditionally under-represented in science are encouraged to apply: minorities and first-generation college students.

Applicants should have an interest in conducting research in earth, ocean or atmospheric science. One previous earth, ocean, or atmospheric science course is desirable if they are available to the student. All students are preferred to have at least one year of calculus (high school or college) and/or good grades in college level mathematics. Students choosing research in geochemistry and chemical oceanography are required to have at least two semesters of college-level chemistry. Students choosing research in marine biology are required to have at least two semesters of college-level biology. Students choosing research in geophysics, physical oceanography or atmospheric science should have at least three semesters of college-level physics.

The Marine Geoscience Data System group at Lamont provides a freely available tool called GeoMapApp that allows the exploration and visualization of global data sets ([www.geomapapp.org](http://www.geomapapp.org)). With GeoMapApp, users can create custom maps and grids, import their own data sets and grids, and explore and visualize a wide range of global data sets. These include a multi-resolution digital elevation model of the oceans and continents; plate tectonic information; undersea feature names; shipboard topography, gravity and magnetics data; earthquake catalogues; deep sea core data; Alvin submersible photos around hydrothermal vents; rock sample geochemistry; satellite-derived gravity and geoid grids; seismic reflection profiles, and more. GeoMapApp is written in Java and works on any type of computer. All interns will be instructed in the use of GeoMapApp during the second week of the intern program. Interns will be encouraged to use GeoMapApp during their research projects, as well as after they have returned to their undergraduate institutions. However, both the student and the supervisor will design the research program, and therefore individual projects may contain variable amounts of data collection and data analysis.

The following members of the Lamont research staff will act as research mentors:

**Dallas Abbott, Reinhard Kozdon and Ben Bostick.** Expertise: **Sedimentary Geology, History of Environmental Pollution, Mineralogy, Geochemistry.** Research Project: What is the Origin of Sn Rich, Ni Bearing Coatings on Pelagic Foraminifera in Pre-Modern Hudson River Sediments?

**Karin Block, Dallas Abbott and Ben Bostick.** Expertise: **Marine Geology, Environmental Science, Natural Catastrophes, Low-Temperature Geochemistry.** Research Project: Can We Use Historical Events like the Fall of the Peekskill Meteorite as Stratigraphic Markers in the Hudson River?

**Joachim Goes, Beizhan Yan and Kali McKee.** Expertise: **Microplastics, Marine Food Web, Human Health, Pollutants.** Research Project: What is the Role of Microplastics in the Aquatic Environment and Their Impact on Marine Organisms?

**Helga do Rosario Gomez and Joachim Goes.** Expertise: **Biological Oceanography, Marine Biology.** Research Project: Does the Bloom Forming Mixotroph *Noctiluca scintillans* have Special Photosynthetic

Capabilities to Survive in a Low Oxygen Acidic Ocean?

**\*Sidney Hemming and Ian Hall.** Expertise: **Geology, Geochronology, Isotope Geochemistry.** Research Project: How is the Mid-Pleistocene Transition Expressed in the XRF and Physical Properties Records in U1474?

**\*Sidney Hemming, Trevor Williams, Maureen Raymo and Stephen Cox.** Expertise: **Geology, Geochronology, Isotope Geochemistry.** Research Project: Where Did the Iceberg Alley Dropstones Originate? What Do They Tell Us About Antarctica's Glacial and Geological History?

**\*Sophie Hines and Sidney Hemming.** Expertise: **Isotope Geochemistry, Oceanography, Paleoclimate.** Research Project: How Did Deep Ocean Circulation Change Across the Mid-Pleistocene Transition? How is It Related to Changes in the Agulhas Current System?

**Tim Kenna and Frank Nitsche.** Expertise: **Geochemistry, Estuaries, Sediments, Geophysics.** Research Project: What is the Metal Contamination History in the Hudson River?

**Yael Kiro and Mike Kaplan.** Expertise: **Geochemistry, Water-Rock Interaction, Paleoclimate.** Research Project: What Does the Chemical Composition of Lake Sediments in Argentina Tell Us About Past Climates?

**Allegra LeGrande and Kostas Tsigaridis.** Expertise: **Climate Dynamics, Climate Modeling.** Research Project: What is the Role of Chemistry and Aerosols Following Volcanic Eruptions and Their Impact on Earth's Climate?

**Jerry McManus.** Expertise: **Paleoclimate, Paleoceanography, Marine Sediment Geochemistry.** Research Projects: Did Icebergs Cause the Most Dramatic Climate Changes of the Last Ice Age?

**Bill Menke.** Expertise: **Structural Seismology, Especially of Volcanic Regions.** Research Projects: How is the Lithosphere Affected by Continental Assembly? Learning from the Norumbega Fault Zone, Maine.

**James Ross and Steve Chillrud.** Expertise: **Environmental Geochemistry and Health.** Research Project: Public Health: How Can We Quantify Personal Exposure to Second Hand Smoke?

**Richard Seager, Mingfang Ting and Yochanan Kushnir.** Expertise: **Climate Variability and Change.** Research Project: How Has Mediterranean Region Hydroclimate Varied over the Past Millennium?

**Ajit Subramaniam.** Expertise: **Marine Biology, Microbiology.** Research Project: How Does Nutrient Availability Affect Phytoplankton Community Structure in the Amazon River Plume?

**Beizhan Yan, Joachim Goes and Kali McKee.** Expertise: **Microplastics, Marine Food Web, Human Health, Pollutants.** Research Project: What is the Flux of Microplastics into the Deep Sea?

**Qiang Yang and Steve Chillrud.** Expertise: **Environmental Geochemistry and Health.** Research Project: How Smart Can Air Quality Monitors Get? Developing Interactive Smart Watch Apps to Improve Data Collection Rates.

**Chris Zappa.** Expertise: **Atmosphere Ocean Sea-Ice Interaction.** Research Project: What Does Ice Growth Look like Through an Infrared Lens? The Effect of Ice on Air-Sea Gas Transfer.

STIPEND: Students will receive a stipend of \$500 per week. The program is 10 weeks in length with a total stipend of \$5000.

HOUSING and TRAVEL BENEFITS: The student will receive free, air-conditioned housing as one of two students in a double room. Students will also receive free bus transportation between the Columbia campus and Lamont. Students who are traveling to New York for this internship from more than 200 miles away will be reimbursed for a round-trip supersaver fare.

APPLICATION DEADLINE: Application form must be submitted by **February 19th, 2019.**

**There is an online application form. It is posted at: <http://webapp.ldeo.columbia.edu/interns>**

**The online application form asks for the following files:**

-Resume with description of computer skills (if any).

-A statement of interest. This statement can include a description of a particular research project that the

student wishes to undertake or it can be a more general statement of the three research projects that interest the student most. We recognize that students with no prior research experience may have difficulty formulating a research project and we will not penalize students who do not submit a detailed project description. The goal of our program is to teach students about the research process and we encourage students with no prior research experience to apply. The student should also include a statement of the characteristics of a good scientist and the availability of undergraduate research opportunities at their home institution.

-Two letters of recommendation from your professors. Additional letters are not required or desired.

-Scanned transcript(s). Transcripts need not be official but must be legible and in English.

**If transcripts are not available to append to the online application form, send scanned transcript(s) by email to:**

**Dr. Dallas Abbott  
Summer Internship Program  
Lamont-Doherty Earth Observatory  
Palisades, New York 10964  
Email: [dallashabbott@gmail.com](mailto:dallashabbott@gmail.com)**

For more information, look at our web page: <http://www.ldeo.columbia.edu/education/programs/summer-internship/intern-program-faqs>. Decisions for all but the waiting list will be made on or before April 1st, 2019. The National Science Foundation is designating this program as an NSF REU Site for the summer of 2019. Every year the research projects and advisors change. Please look for the yearly posting of new projects in mid-January.