

**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

(Single 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.)

(\*\*research projects specifically requesting SusTech students.)

**Summer Internship Program for Undergraduates (June 2nd-August 8th, 2020)**

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, Geochemistry.** Research Project: How Do Historical Flooding Events at the Mouth of the Hudson River Relate to Ages of Open Ocean Fossils in Hudson River Sediments?

**\*Daniel Babin, Sophie Hines, Allison Franzese and Sidney Hemming.** Expertise: **Sedimentary Geology, Geochemistry, Paleoclimate.** Research Project: Can We Use South African Clay to Learn the History of the

Agulhas Leakage?

**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 Meteor Showers and Environmental Pollution as Stratigraphic Markers in the Hudson?

**Ben Bostick.** Expertise: **Low-Temperature Geochemistry.** Research Project: How Do the Chemical Affinities and Speciation of Arsenic in Soil and Sediment Affect Its Concentration in Water?

**Clara Chang, Paul Olsen and Sean Kinney.** Expertise: **Geology, Paleoclimate, Paleontology.** Research Project: What Can Fossil Lake Sediments Tell Us About Past Climate and Environments?

**Róisín Commame and Arlene Fiore.** Expertise: **Atmospheric Chemistry and Composition, Carbon Emissions, Airborne Measurements.** Research Project: What Do Ground and Airborne Measurements of Carbon Dioxide Tell Us About Greenhouse Gas Emissions Within New York City?

**William D'Andrea.** Expertise: **Paleoclimate, Sedimentology, Organic Geochemistry.** Research Project: How Hot Has Greenland Been During the Last 10,000 Years?

**Indrani Das.** Expertise: **Ice Sheet Mass Balance, Climate.** Research Project: What Is the Current Rate of Frontal Retreat of the Greenland Ice Sheet?

**Joaquim Goes, Helga do Rosario Gomes and Kali McKee.** Expertise: **Biological Oceanography, Marine Biology.** Research Project: What Are the Effects of Deoxygenation and Increasing Atmospheric CO<sub>2</sub> on *Noctiluca scintillans*?

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

**Mike Jollands and Terry Plank.** Expertise: **Petrology, Mineralogy, Volcanology, Geochemistry, Diffusion.** Research Project: Tracking the Last Moments Before Explosive Volcanic Eruptions: What Can Water in Quartz Tell Us?

**Andrew Juhl.** Expertise: **Aquatic Ecology, Water Quality, Oceanography.** Research Project: How Have Water Quality Indicators in the Hudson River Estuary Changed Over the Last 50 Years?

**Sean Kinney, Paul Olsen and Clara Chang.** Expertise: **Geology, Geochemistry, Geochronology.** Research Project: Did One of Earth's Largest Bolide Impacts Cause an Extinction Event 215.5 Million Years Ago?

**Christopher Lepre.** Expertise: **Monsoons, Soils, Paleomagnetism, Iron Oxide Spectroscopy, Vertebrate Evolution.** Research Project: How Does Hematite Form and Can It Be Used as a Paleoclimate Proxy?

**\*Rachel Lupien and Kevin Uno.** Expertise: **Paleoclimate, Geochemistry.** Research Project: What Controls the Rains Down in Africa?

**Jerry McManus.** Expertise: **Paleoclimate, Paleoceanography, Marine Sediment Geochemistry.** Research Projects: Did the Last Ice Age Begin Simultaneously in the Northern and Southern Hemispheres?

**Bill Menke.** Expertise: **Structural Seismology, Methods of Geophysical Data Analysis.** Research Project: Is a Mini-Hotspot Lurking Beneath Florida?

**\*\*Bill Menke.** Expertise: **Structural Seismology, Methods of Geophysical Data Analysis.** Research Project: Can Artificial Neural Networks Solve Dynamical Seismological Problems?

**David Porter.** Expertise: **Cryosphere, Sea Level Rise, Coastal Communities.** Research Project: Can We Use GPS Reflectometry to Measure Tides and Sea Levels Both at Piermont Pier and in Greenland Fjords?

**\*\*Kevin Uno and Helen Habicht.** Expertise: **Paleoecology, Paleoclimate, Vegetation, Organic Geochemistry.** Research Project: What Plant Is That? Using Organic Geochemistry to Identify Plants and Ecosystems.

**\*\*Beizhan Yan and Steve Chillrud.** Expertise: **Microplastics, Pollutants, Organic and Environmental Geochemistry.** Research Project: What Is the History of Microplastic Contamination in New York City?

**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 18th, 2020.**

**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 scientific skills.

- 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, 2020. The National Science Foundation is designating this program as an NSF REU Site for the summer of 2020. Every year the research projects and advisors change. Please look for the yearly posting of new projects in mid-January.