

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 USSSP. Three out of the six students supported by USSSP are required to be members of ethnic minorities.

Summer Internship Program for Undergraduates (May 31st-August 2nd, 2023)

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 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 should 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). 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, Karin Block. Expertise: **Marine Geology and Geophysics, Geochemistry, Volcanology.** Research Project: Can We Develop Better Markers for Extraterrestrial Materials and/or Distal Ash Layers?

Dallas Abbott, Ben Bostick. Expertise: **Marine Geology, Geochemistry, Mineralogy.** Research Project: How Did Large Marine Volcanic Eruptions During the Holocene Influence Ocean Productivity?

Raf Antwerpen, Marco Tedesco. Expertise: **Cryosphere, Greenland, Remote Sensing, Climate Modeling, Sea Level Change, Climate Change.** Research Project: Why Is the Ice on Falljökull Glacier in Iceland Dark?

Logan Brenner. Expertise: **Paleoclimate, Paleoceanography.** Research Project: Can We Measure the

Geochemistry of Barnacles in the Hudson River to Learn About the Environment?

****Allison Franzese.** Expertise: **Geochemistry, Isotope Geology, Paleoceanography.** Research Project: What Drives Geochemical Variability in Terrigenous Sediments at IODP Site U1479?

Joaquim Goes and Kali McKee. Expertise: **Biological Oceanography, Phytoplankton Biochemistry.** Research Project: The Enigmatic Physiology of the *Noctiluca Scintillans* – How Does It Thrive in a Rapidly Changing Sea?

Helga do Rosario Gomes and Jinghui Wu. Expertise: **Biological Oceanography, Phytoplankton Ecology, Remote Sensing, Optical Oceanography, Statistics.** Research Project: How Are Rising Ocean Temperatures and Ocean Acidification Along the U.S. East Coast Shaping Marine Phytoplankton Communities Along the U.S. East Coast?

Kevin Griffin. Expertise: **Arctic Ecosystem Ecology.** Research Project: What Is the Role of Climate Variability in Controlling Arctic Ecosystem Structure and Function?

****Mike Kaplan, Sidney Hemming, Steven Goldstein, and Allison Franzese.** Expertise: **Geology, Isotope Geology, Sedimentology, Glaciology, Paleo-oceanography.** Research Project: What Do Deep-Sea Sediments From the South Atlantic Ocean Tell Us About Dust and Climate Over Millions of Years?

Folarin Kolawole. Expertise: **Structural Geology, Tectonics.** Research Project: What is the Earthquake Hazard and Fault Displacement Along the Magma Poor Portions of the East African Rift?

Philip LaPorta, Margaret Brewer-LaPorta. Expertise: **Tectonic Stratigraphy, Sedimentology, Archaeological Geology.** Research Project: What are the Geological Controls on Pre-Contact Quarries in the Southern Appalachians?

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

****Jerry McManus, Gabe Weinstein and Celeste Pallone.** Expertise: **Paleoclimate, Paleoceanography, Geochemistry, Marine Sedimentology.** Research Project: How Did Past Ice Age Cycles Affect the Climate in the Pacific Ocean?

Bill Menke. Expertise: **Seismology, Tomographic Imaging, Data Analysis.** Research Project: Can Precariously-Perched Rocks Constrain the Maximum Post-Glacial Shaking From Earthquakes in the Northeastern United States?

****Jennifer Middleton, Gisela Winckler.** Expertise: **Paleoceanography, Geochemistry, Sediments.** Research Project: Did Dustiness in the South Pacific Increase Over the Mid-Pleistocene Transition (~1.25 to 0.7 Million Years Ago)?

Frank Nitsche, Tim Kenna. Expertise: **Marine Geophysics, Coastal Studies, Sediment Dynamics, Seafloor Mapping, GIS, Geochemistry, Sediment and Water Analysis.** Research Project: What Are the Differences in Sediment Grain Size and Contaminant Distribution in Long Island Sound?

****Celeste Pallone, Jerry McManus.** Expertise: **Paleoclimate, Paleoceanography, Isotope Geochemistry, Sedimentology.** Research Project: How Did the Mediterranean Outflow Water Vary With Past Climate?

****Celeste Pallone, Jerry McManus.** Expertise: **Paleoclimate, Paleoceanography, Isotope Geochemistry, Sedimentology.** Research Project: How Did the Deep Ocean Circulation Change Across the Mid-Pleistocene Transition?

Michael Steckler and Cecilia McHugh. Expertise: **Geophysics, Stratigraphy, Marine Geology, Sedimentology.** Research Project: What Is the Earthquake History of the Jamaica Passage?

Luca Telesca. Expertise: **Marine Ecology, Biomineralization, Oyster Reef Restoration, Climate Change.** Research Project: How Will Restored Oyster Reefs Grow in a Changing Climate?

Kirsty Tinto, Caitlin Locke. Expertise: **Geology of Polar Regions, Aerogeophysical Surveys, Gravity, Magnetism.** Research Project: How Can We Identify the Geology Beneath the Greenland Ice Sheet?

Xiaojun Yuan, Dhruv Balwada. Expertise: **Sea-Ice Dynamics and Prediction, Physical Oceanography, Machine Learning.** Research Project: Will Machine-Learning Approaches Improve Antarctic Sea Ice Seasonal Predictability?

STIPEND: Students will receive a stipend of \$6000 for this 10-week program. Students who choose to live at home will have \$1000 added to their stipend. The ten weeks extends until Tuesday August 9th, when final papers are due.

HOUSING and TRAVEL BENEFITS: The student will receive free housing in a college dorm room. Students will also receive free bus transportation between the college 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 22nd, 2023.**

There is an online application form. It is posted at: <https://webapp.ldeo.columbia.edu:8443/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 you have more than one undergraduate transcript, combine them into a single document for upload.

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
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For more information, look at our web page:

<https://lamont.columbia.edu/education-outreach/student-summer-opportunities-intern-programs>. Decisions for all but the waiting list will be made on or before April 1st, 2023. The National Science Foundation is

designating this program as an NSF REU Site for the summer of 2023. The research projects and advisors change annually. The yearly posting of new projects is in mid-January.