

**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 (June 1st-August 3rd, 2022)**

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](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, Karin Block.** Expertise: **Geology, Geochemistry, Sedimentology.** Research Project: Will the Next Global Crisis Be Produced by a Large Volcanic Eruption? Constraining the Source Volcanoes for 6th Century Eruptions.

**Dallas Abbott, Ben Bostick.** Expertise: **Marine Geology and Geophysics, Geochemistry, Mineralogy.** Research Project: What are the Origins of Pure SiO<sub>2</sub>, Tailed Spherules Found in Ross Sea and Western Pacific Sediments?

**Dhruv Balwada, Julius Busecke, Ryan Abernathey.** Expertise: **Physical Oceanography, Climate Data Science.** Research Project: How Reliably Can We Estimate the Flux of Heat and Tracers Using Argo Floats?

**Benjamin C Bostick, Farideh Narouei.** Expertise: **Geochemistry.** Research Project: Monitoring Arsenic Concentrations in Drinking Water with Portable, Real-Time Electrochemical Analysis

**\*\*Ben Bostick, Ajit Subramaniam, Sarah Nicolas, Susanne Straub, Dallas Abbott.** Expertise: **Geochemistry, Biological Oceanography, Remote Sensing, Synchrotron, Volcanism, Sedimentology.** Research Project: How Did Large Marine Volcanic Eruptions During the Holocene Influence Oceanic Productivity?

**Roisin Commane, Martin Stute, Andy Juhl.** Expertise: **Methane Emissions, Atmospheric Composition, Water Quality.** Research Project: How Does the Potent Greenhouse Gas Methane Produced in Landfills Reach the Atmosphere?

**Shuo Ding, Terry Plank.** Expertise: **Experimental Petrology, Geochemistry, Volcanology.** Research Project: The CO<sub>2</sub> to SO<sub>2</sub> Ratio: Can It Be Used to Predict Volcanic Eruptions?

**\*\*Troy Ferland.** Expertise: **Paleoecology, Paleoclimate, Fire, Organic Geochemistry.** Research Project: Did Fire Cause Grassland Expansion in Eastern Africa?

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

**\*\*Steven Goldstein, Sidney Hemming, Michael Kaplan, Joohee Kim.** Expertise: **Geology, Isotope Geology, Sedimentology, Glaciology, Paleo-oceanography.** Research Project: How Can Dust From Ocean Drilling Program Cores From Near Southern Africa Be Used to Fingerprint Past Climate Change?

**Sidney Hemming, Stephen Cox, Heng Chen, Anne Gothmann.** Expertise: **Geochronology, Paleoceanography, Geochemistry, Noble Gases, Coral Biogeochemistry.** Research Project: What Can Fossil Corals Tell Us About the Evolution of Ar-40 in the Earth's Atmosphere?

**Christine McCarthy and Jacob Tielke.** Expertise: **Experimental Rock and Ice Deformation, Planetary Geophysics.** Research Project: How Does the Microstructure of Ice Affect its Macroscopic Behavior?

**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.** 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?

**Paul E. Olsen, Sean Kinney, Clara Chang, Bennett Slibeck.** Expertise: **Paleontology, Geochronology, Petrology, Geochemistry, Paleobiology.** Research Project: What Clues Do Zircon Crystals Provide About the Sources of Gigantic, Climate-Changing Volcanic Eruptions and Their Transit From the Mantle to the Surface?

**\*\*Paul E. Olsen, Sean Kinney, Clara Chang, Bennett Slibeck.** Expertise: **Paleontology, Astrochronology, Petrology, Geochemistry, Paleobiology.** Research Project: What is the Astronomical Pacing of Climate at 10,000 to Million-Year Time Scales within Mediterranean and Arctic Ocean Sediments?

**Rob Skarbak.** Expertise: **Earthquake Source Processes, Rock and Ice Friction.** Research Project: What Controls Shallow Earthquakes in Subduction Zones?

**Ajit Subramaniam.** Expertise: **Biological Oceanography, Phytoplankton Community Structure, Remote Sensing.** Research Project: What Controls the Phytoplankton Community in the Tropical Atlantic Ocean?

**Luca Telesca.** Expertise: **Marine Biology, Biomineralization, Oyster Reef Ecology, Shellfish Aquaculture.** Research Project: What Is the Impact of Environmental Change on Oyster Reefs?

**Maria Tzortziou, Joaquim Goes, and Helga Gomes.** Expertise: **Biological Oceanography, Aquatic Biogeochemistry, Climate Change, Remote Sensing, Ecosystem-Human Interactions.** Research Projects: What Are the Impacts of Extreme Episodic Events on the Health and Ecology of the Long Island Sound Ecosystem and How Do These Influence Vulnerable Coastal Communities?

**STIPEND:** Students will receive a stipend of \$600 per week. The program is 10 weeks in length with a total stipend of \$6000. The ten weeks extends until Tuesday August 9<sup>th</sup>, when final papers are due.

**HOUSING and TRAVEL BENEFITS:** The student will receive free housing in a single room at Dominican College. Students will also receive free bus transportation between the Dominican 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 23rd, 2022.**

**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 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  
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, 2022. The National Science Foundation is designating this program as an NSF REU Site for the summer of 2022. Every year the research projects and advisors change. Please look for the yearly posting of new projects in mid-January.