

Columbia University
Lamont-Doherty Earth Observatory of Columbia University
Department of Earth and Environmental Sciences

Sponsored in part as an 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 from community colleges and/or first generation college students.**

Summer Internship Program for Undergraduates (May 29th-August 7th, 2024)

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 NSF REU Site is only 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. **Graduating seniors are not eligible. International and DACA students attending colleges and universities located in the United States are eligible for the six starred projects (**)** sponsored by USSSP and the projects mentored by Sarah Smith and Muhammad Azhar Ehsan. Members of groups traditionally under-represented in science are encouraged to apply: community college 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 should have at least two semesters of college-level chemistry. Students choosing research in marine biology should 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, Jiahua Wu. Expertise: **Marine Geology and Geophysics, Geochemistry, Volcanology, Diagenesis.** Research Project: How Does Volcanic Ash Affect Biological Productivity and Microfossil Alteration Outside the Pacific Gyres?

Dallas Abbott, Ben Bostick, Jiahua Wu. Expertise: **Geochemistry, Sedimentology, Cosmic Dust, Mineralogy.** Research Project: How Well Can We Date Marine Flooding, Solar Maxima and the Pollution History of the Hudson River?

Nathalie Boelman, Kevin Griffin, Duncan Menge. Expertise: **Arctic Ecology, Climate Change, Plant Physiology, Tundra Biogeochemistry, Plant-Animal Interactions, Remote and Autonomous Sensor Observations.** Research Project: How Does Variability in Environmental Conditions Influence the Form and Function of Arctic Tundra Ecosystems?

Muhammad Azhar Ehsan. Expertise: **Climate Change and Global Warming, Subseasonal-to-Seasonal Climate Variability and Change.** Research Project: Bias-Corrected Climate Change Projections for Asia and South America.

****Allison Franzese, Sidney Hemming.** Expertise: **Geochemistry, Radiogenic Isotopes, Paleooceanography, Marine Sediments.** Research Project: What Was the Agulhas Current System Like During the Mid-Pleistocene Transition?

Guillaume Georgeais, Yves Moussallam. Expertise: **Magma Dynamism, Diffusion Modeling, Pyroclast Texture.** Research Project: What are the Magma Dynamics at Huaynaputina Volcano?

Sidney Hemming, Claire Jasper, Maureen Raymo. Expertise: **Paleooceanography, Paleoclimate, Sedimentary Processes, Geochemistry, Geochronology.** Research Project: What is the Evidence from Reykjanes Ridge IODP Site U1562 for Variation of Northern Hemisphere Ice Sheets through the Early Pleistocene?

****Sidney Hemming, Allison Franzese, Ian Hall.** Expertise: **Paleooceanography, Paleoclimate, Sedimentary Processes, Geochemistry, Geochronology.** Research Project: What is the Evidence from Natal Valley IODP Site U1474 for Variation in the Agulhas Current through the Early Pleistocene?

****Claire Jasper, Maureen Raymo, Sidney Hemming.** Expertise: **Paleooceanography, Paleoclimate, Sedimentary Processes, Geochemistry, Geochronology.** Research Project: What is the Pacing of Northern Hemisphere Ice Sheet Growth and Retreat in the Early Pleistocene?

Einat Lev, Jasper Baur, Frank Nitsche. Expertise: **Volcanology, Numerical Modeling, GIS, Aerial Photography, Remote Sensing.** Research Project: How to Make a Volcano Disappear?

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

****Jerry McManus.** Expertise: **Paleooceanography, Geochemistry, Sedimentology, Micropaleontology.** Research Project: How Did Past Ice Age Cycles Affect the Climate in the Pacific Ocean?

Bill Menke. Expertise: **Seismology and Geophysics.** Research Project: Can Hydration Reactions in the Lower Crust Act as a Source of Stress to Trigger Micro-earthquakes in Northeastern North America?

Frank Nitsche, Tim Kenna. Expertise: **Marine Geology and Geophysics, GIS, Habitat Mapping, Coastal and Estuarine Processes, Data Management, Geochemistry, Contaminants.** Research Project: What Are the Differences in Sediment Grain Size and Contaminant Distribution in Long Island Sound?

Celeste Pallone, Jerry McManus. Expertise: **Paleooceanography, Geochemistry, Sedimentology.** Research Project: How Did Deep Ocean Circulation Change in the Eastern and Western Atlantic Basins Across Ice Age Cycles?

****Celeste Pallone, Jerry McManus.** Expertise: **Paleooceanography, Geochemistry, Sedimentology.** Research Project: How Did Atlantic Deep Ocean Circulation Change Across Ice Age Cycles?

Sarah Smith, Yutian Wu, Dan Westervelt. Expertise: **Aerosols, Remote Sensing, Climate Modeling.**

Research Project: Where Does Boreal Wildfire Smoke Go?

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

****Chengcheng Wang, Sidney Hemming, Mike Kaplan, Suzanne O'Connell.** Expertise: **Sediment Provenance, Ice Sheet Dynamics, Climate Systems, Geochemical Tracers.** Research Project: How Did Sediment Supply Change With Climate During the Pleistocene in Antarctica?

STIPEND: Students will receive a stipend of \$7000 for this 10-week program. Students who choose to live at home will have \$1000 added to their stipend. The ten weeks extends until Wednesday August 7th, 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, 2024.**

There is an online application form. It is posted at: <https://forms.gle/tjokpG25vkrv7U2QA>

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:

Laisa Sevilla
Summer Internship Program
Lamont-Doherty Earth Observatory
Palisades, New York 10964
Email: lsevilla@ldeo.columbia.edu

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, 2024. The National Science Foundation is designating this program as an NSF REU Site for the summer of 2024. The research projects and advisors change annually. The yearly posting of new projects is in mid-late January.