

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 (June 5th-August 10th, 2018)

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 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 required to have at least one year of calculus. 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 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-resolutional 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 and Ben Bostick. Expertise: **Sedimentary Geology, History of Environmental Pollution, Geochemistry.** Research Project: Can We Use Historical Events as Stratigraphic Markers in the Hudson River?

Karin Block and Dallas Abbott. Expertise: **Marine Geology, Environmental Science, Natural Catastrophes, Low-Temperature Geochemistry.** Research Project: How do Invasive Species and Meteorite Dust Affect Hudson River Sediments?

Suzana Camargo. Expertise: **Hurricanes, Climate, Climate Models, El Nino-Southern Oscillation.** Research Project: How Do You Find Hurricanes in a Climate Model?

Steve Chillrud and James Ross. Expertise: **Environmental Geochemistry and Health.** Research Project: Does Anyone in Your Household Smoke? Improving Methods for Assessment of Second Hand Smoke Exposure for Public Health Studies.

William D'Andrea. Expertise: **Paleoclimate, Sedimentology, Organic Geochemistry.** Research Project: How Did Climate Variability Impact the *Rapanui* People of Easter Island?

Joachim Goes and Helga do Rosario Gomez. 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?

***Laura Haynes and Bärbel Hönisch.** Expertise: **Paleoceanography, Ocean Carbonate Chemistry, Geochemistry.** Research Project: What Caused Atmospheric CO₂ to Decline During the Mid-Pleistocene Transition?

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

Bill Menke. Expertise: **Seismic Imaging, Geophysics, Hotspots.** Research Projects: How Similar are the Mini-Hotspots in Eastern and Western North America?

Elise Myers and Andy Juhl. Expertise: **Microbial Ecology, Water Quality, Public Health, Bacteria.** Research Project: Nevertheless, They Persisted. How Do Sunlight and Temperature Impact the Persistence of Waterborne Microbial Contamination?

Jonathan Nichols. Expertise: **Paleoclimate, Organic Geochemistry, Carbon Cycle, Peatlands, Hydrological Cycle.** Research Project: Can Big Data Answer Big Questions About the Global Carbon Cycle?

Julie Oppenheimer and Amanda Lindoo. Expertise: **Volcanology, Solid Earth, Analog Experiments.** Research Project: How Do Metals Segregate in Subduction Zones and Planetary Bodies?

***Robert Poirier, Reinhard Kozdon and Maureen Raymo.** Expertise: **Micropaleontology, Paleoclimate, Sea Level, Geochemistry.** Research Projects: What Makes a Good Fossil Climate Record? What Conditions Affect Fossil Preservation?

Kevin Uno. Expertise: **Paleoecology, Paleoclimate, Vegetation, Organic Geochemistry.** Research Project: What Can Molecular Fingerprints of Modern Plants Tell Us about Ancient Ecosystems?

Beizhan Yan, Andy Juhl and Pam Factor-Litvak. Expertise: **Storms, Flooding, Human Health, Pollutants.** Research Project: Does Frequent Tidal Flooding Lead to More Significant Cumulative Environmental and Health Impacts than Superstorms in New York City?

Qiang Yang and Steve Chillrud. Expertise: **Environmental Geochemistry, Health, Air Pollution, Data Analysis.** Research Project: Is Biking and Breathing in NYC Bad for Your Heart? A Validation and Health Study on Whether There Is a Cardiovascular Hit for Biking in Close Proximity to Traffic.

STIPEND: Students will receive a stipend of \$500 per week. The typical 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, 2018.**

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 areas of Research Project 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 snail mail to:

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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, 2018. The National Science Foundation (contingent upon funding from Congress) is designating this program as an NSF REU Site for the summer of 2018. Every year the research projects and advisors change. Please look for the yearly posting of new projects in mid-January.