

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)

Summer Internship Program for Undergraduates (June 6th-August 11th, 2017)

Themes: Analyzing Global Databases

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 are eligible for this internship.** Members of groups traditionally under-represented in science are encouraged to apply: minorities, women 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 Karin Block. Expertise: **Sedimentary Geology, Environmental History, Natural Catastrophes, Low-Temperature Geochemistry.** Research Project: How Do Geochemical Markers in Hudson River Sediments Correlate with Environmental Changes and Catastrophes?

Natalie Boelman and Ruthie Oliver. Expertise: **Arctic-boreal Ecology, Bird Tracking, Climate Change.** Research Project: Where Do the Birds Go? Investigating the Fall Migration of Arctic-boreal Breeding American Robins.

James Davis. Expertise: **Space Geodesy and Sea-Level Change.** Research Project: How Well Can Current Models for Ocean Dynamics and Ice-mass Loss Predict the Geographic Variability of Sea Level Change?

***Allison Franzese, Sidney Hemming, Steve Goldstein and Merry Cai.** Expertise: **Paleoceanography, Geochemistry, Isotope Geology.** Research Project: Did the Agulhas Leakage Change over the Past 1.5 Million Years? Evidence from Terrigenous Sediment Sources from IODP Expedition 361 Cores.

Joachim Goes and Beizhan Yan. Expertise: **Biological Oceanography, Marine Biology, Organic Geochemistry.** Research Project: Plastic Microbeads in the Waters around New York - How Widespread and How Toxic?

Steve Goldstein, Allison Franzese, Sidney Hemming and Merry Cai. Expertise: **Geochemistry, Isotope Geology.** Research Project: Geochemical “Fingerprints” of the Agulhas Current: Are They Changed by South African Rivers?

Andy Juhl. Expertise: **Microbial Ecology, Oceanography, Water Quality.** Research Project: Who’s Hanging Out in the Hudson River? “Shedding Light” on the Persistence of Waterborne Microbial Contamination.

Yael Kiro, Wally Broecker, Merry Cai and Steve Goldstein. Expertise: **Geochemistry, Water-Rock interaction, Paleoclimate.** Research Project: Where Did Dust Come from during Cold Times in Europe? Identifying Dust Sources using Chemical and Isotopic Tracers.

Caroline Leland and Laia Andreu-Hayles. Expertise: **Tree Rings, Stable Isotope Geochemistry.** Research Project: Do You Pine for a Better Understanding of Past Climate? Linking Tree-Ring Stable Isotopes and Environmental Histories.

Bill Menke and Dallas Abbott. Expertise: **Seismic Imaging, Geophysics, Thermal Processes, Hotspots.** Research Projects: What are the Geophysical Signatures of Mantle Upwellings beneath the US East Coast? How is the Recently-Identified Mantle Upwelling beneath New England Affecting Its Lithosphere?

***Suzanne O’Connell, Sidney Hemming, Mike Kaplan and Merry Cai.** Expertise: **Isotope Geochemistry, Geochronology, Sedimentary Geochemistry, Paleoceanography, Paleoclimate.** Research Project: What Are the Timing, Periodicity and Sources of Pleistocene Ice Rafted Detritus Deposits in ODP Leg 113 Site 693 in the Southeast Weddell Sea?

***Pratigya Polissar, Kevin Uno, Peter deMenocal and Sam Phelps.** Expertise: **Paleoclimate, Stable isotopes, Molecular Biomarkers, Terrestrial Paleoecology.** Research Project: Do Plant-wax Biomarkers Capture Past Global Climate Gradients?

Angela Slagle and Dave Goldberg. Expertise: **Carbon Sequestration, Marine Geology and Geophysics.** Research Project: Where Can We Store Lots of CO₂? A Study of Geologic Carbon Storage Offshore Washington & British Columbia.

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 17th, 2017.**

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 official transcript(s).

If transcripts are not available to append to the online application form, send scanned transcript(s) by snail mail to:

**Dr. Dallas Abbott
Summer Internship Program
Lamont-Doherty Earth Observatory
Palisades, New York 10964
Email: 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, 2017. The National Science Foundation is designating this program as an NSF REU Site for the summer of 2017. Every year the research projects and advisors change. Please look for the yearly posting of new projects in mid-January.