

Columbia University Department of Earth and Environmental Sciences

Lamont-Doherty Earth Observatory of Columbia University

An Ocean-Earth-Atmospheric Sciences REU Site: Sponsored by the National Science Foundation

Summer Internship Program for Undergraduates (May 28th-August 4th, 2015)

Themes: Analyzing Global Databases

The Lamont-Doherty Summer Intern Program offers the chance to experience 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.** Minorities and women are encouraged to apply.

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 Gary Mesko. Expertise: **Geology, Impacts, Sedimentary Geology, Mineralogy, Petrology.** Research Project: What is the origin of two deep circular lakes in the Russian heartland?

Alexandra Bausch and Joachim Goes. Expertise: **Biological and Chemical Oceanography.** Research Project: Why are dinoflagellates taking over the Arabian Sea? Testing hypotheses using incubation experiments.

Roger Anderson and Albert Boulanger. Expertise: **Energy Efficiency, Machine Learning, Artificial Intelligence, Computer Science, Power Systems.** Research Project: Does understanding Manhattan microweather help with Manhattan building performance predictions?

William D'Andrea and Andrew Juhl. Expertise: **Paleoclimate, Organic Geochemistry, Marine**

Microbiology. Research Project: What do trans-fats have to do with climate change? Studying Earth's best natural thermometer.

Heather Ford. Expertise: **Paleoceanography of Deep Ocean Circulation.** Research Project: How did the Pacific Ocean transport heat in the past?

Allison Jacobel and Jerry McManus. Expertise: **Paleoclimate, Paleoceanography and Environmental Isotope Geochemistry.** Research Project: Is pink the new white? A comparison of the geochemical signatures of *Globigerinoides ruber* chromotypes.

Yael Kiro and Steve Goldstein. Expertise: **Geochemistry, Water-Rock interaction, Paleoclimate.** Research Project: How dry and how long were the most extreme arid periods in the Middle East? Reconstructing water budget and water sources from Dead Sea sediments.

Bess Koffman, Cristina Recasens, Michael Kaplan and Sidney Hemming. Expertise: **Paleoclimate, Geochemistry, Ice and Sediment Cores.** Research Project: How old is the dust? Can we use K-Ar dating to show where dust comes from in the Southern Hemisphere?

Allegra LeGrande and Kostas Tsigaridis. Expertise: **Climate Dynamics, Climate Modeling.** Research Project: How reliable is the modeling of climate forcing from volcanic eruptions?

Einat Lev. Expertise: **Physical Volcanology, Geodynamics.** Research Project: What controls the stability of lava domes?

Wade McGillis and Diana Hsueh. Expertise: **Carbon-water Cycle, Boundary Layer Dynamics, Urban Ecology and Green infrastructure.** Research Project: Where does the Carbon go? Assessing small urban river weathering in New York City.

Jerry McManus and Adi Torfstein. Expertise: **Paleoclimate, Paleoceanography, Geochemistry, Marine Sediments.** Research Project: Whither ^{231}Pa and ^{230}Th in the Gulf of Aqaba, Red Sea?

Bill Menke. Expertise: **Seismic Imaging.** Research Project: How deep are the roots of the North American continent?

Jonathan Nichols and Dorothy Peteet. Expertise: **Paleoclimate, Peatlands, Stable Isotopes, Organic Geochemistry.** Research Project: Can New Zealand Peatlands Reveal the Drivers of Late Glacial Rise in Atmospheric CO_2 ?

Kim Popendorf. Expertise: **Marine Microbial Biogeochemistry.** Research Project: Where's the P in plankton? An investigation of marine microbial strategies for phosphorus use.

Richard Seager, Jason Smerdon, Ben Cook, Park Williams, Minfang Ting and Yochanan Kushnir. Expertise: **Climate Dynamics, Climate Modeling.** Research Project: How will future climate variability and change impact water and resources, and ecosystems across western North America?

Kevin Uno, Pratigya Polissar and Peter deMenocal. Expertise: **Human Evolution, Paleoclimate, Stable Isotopes, Molecular Biomarkers, Terrestrial Paleoecology.** Research Project: How old are African savannas?

STIPEND: Students will receive a stipend of \$5000 for this 10-week program.

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 **March 15, 2015**.

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.

In addition to the online application form, send the following material by regular mail (NOT email):

-Official college transcript(s);

The transcript(s) must be mailed on or before March 15, 2015.

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 15, 2015. The National Science Foundation is funding this program for the summer of 2015. Every year the research projects and advisors change. Please look for the yearly posting of new projects on the first of February.