

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

(Starred research projects* are supported by the IODP-USSP)

Summer Internship Program for Undergraduates (June 2nd-August 9th, 2016)

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 Karin Block. Expertise: **Sedimentary Geology, Natural Catastrophes, Low Temperature Geochemistry.** Research Project: How Much Climate History Is Encrypted in Hudson River Cores?

Robin Bell, Indrani Das and Winnie Chu. Expertise: **Airborne Geophysics, Atmospheric Science, Glacial Morphology and Evolution.** Research Project: How Much Melting and Freezing is Occurring Beneath the Ross Ice Shelf in Antarctica?

James Davis. Expertise: **Space Geodesy and Sea-Level Change.** Research Project: How Has Sea-Level Changed on the U.S. East Coast, 1955 to present?

Elizabeth Ferriss and Terry Plank. Expertise: **Igneous Petrology, Volcanology and Geochemistry.** Research Project: How fast does magma move during volcanic eruptions? An investigation using water in

phenocrysts.

***Heather Ford and Gerald Rustic.** Expertise: **Paleoceanography, Geochemistry.** Research Project: How did tropical Pacific Ocean conditions influence El Nino behavior 20,000 years ago during the Last Glacial Maximum?

Roger Fu and Dennis Kent. Expertise: **Paleomagnetism and Geophysics.** Research Project: How stable is the Earth's rotation axis?

Joachim Goes and Helga do Rosario Gomes. Expertise: **Biological Oceanography, Marine Biology.** Research Project: How will the combined effects of Hypoxia and Ocean Acidification affect the unusual bloom forming mixotroph *Noctiluca scintillans* of the Arabia Sea?

***Laura Haynes and Bärbel Hönisch.** Expertise: **Paleoceanography and Stable Isotope Geochemistry.** Research Project: How did the Pacific Ocean respond to the Mid-Pleistocene Transition?

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.

Allegra LeGrande and Kostas Tsigaridis. Expertise: **Climate Dynamics, Climate Modeling.** Research Project: How Much Do Volcanic Eruptions Affect Our Climate? - Evaluating Future Climate Change and Climate Models for the IPCC.

Alberto Malinverno. Expertise: **Marine Geophysics, Quantitative Data Analysis, Geophysical Inverse Problems.** Research Project: How old is the ocean floor? A new magnetic polarity time scale for the Late Cretaceous-Eocene.

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

Jonathan Nichols and Dorothy Peteeet. Expertise: **Paleoclimate, Peatlands, Stable Isotopes, Organic Geochemistry.** Research Project: What climate conditions promote uncontrollable forest fires in Indonesia?

Terry Plank, Dan Rasmussen and Einat Lev. Expertise: **Volcanology.** Research Project: Why so big? Exploring a correlation between volcano size and chemistry and what it tells us about eruptions

Hannah Rabinowitz and Einat Lev. Expertise: **Earthquake Physics, Geophysics.** Research Project: It's getting hot in here: Do biomarkers in sediments under lava flows record a thermal diffusion profile?

Elise Rumpf and Einat Lev. Expertise: **Experimental Volcanology.** Research Project: How Does Lava Interact with Objects? An Investigation Through Laboratory Analogs.

Richard Seager, Mingfang Ting and Yochanan Kushnir. Expertise: **Climate Variability, Change and Impacts.** Research Project: How will future climate variability and change impact water and resources, and ecosystems across western North America?

Michael Steckler and Celine Grall. Expertise: **Geodynamics, Sedimentary Basins.** Research Project: How do Transform Faults Evolve and How Does Continental Structure Affect Them?

Ajit Subramaniam. Expertise: **Marine Biology, Microbiology.** Research Project: How are Marine Microbial Communities Affected by Climate Change and Land Use Changes?

Kirsty Tinto and Robin Bell. Expertise: **Airborne Geophysics, Marine Geophysics, Structural Geology.** Research Project: What Lies Beneath? Geological Mapping under the Largest Ice Shelf on Earth.

***Trevor Williams and Sidney Hemming.** Expertise: **Paleoclimate, Marine Geology.** Research Project: How does the monsoon cycle affect weathering and erosion of the Himalayas?

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 **February 15th, 2016.**

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:

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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 March 15th, 2016. The National Science Foundation is funding this program for the summer of 2016. Every year the research projects and advisors change. Please look for the yearly posting of new projects in mid-January.