

Columbia University Department of Earth and Environmental Sciences

Lamont-Doherty Earth Observatory of Columbia University

Summer Internship Program for Undergraduates (June 4th-August 6th, 2008)

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.** Applicants should have an interest in conducting research in the Earth or ocean sciences. Two previous Earth- or ocean-science courses are 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 should have at least three semesters of college-level physics. Minorities and women are encouraged to apply.

The Marine Geoscience Data System group at Lamont provides a freely-available tool called GeoMapApp that allows the exploration and visualisation 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:

Andrew Juhl. Expertise: **Biological Oceanography, Marine Biology, Plankton Ecology, Harmful Algal Blooms.** Current Research: Measuring Loss Rates of Sewage Indicator Bacteria from the Hudson River.

Frank Nitsche and Tim Kenna. Expertise: **Marine and Environmental Geophysics, Seafloor Mapping, Sediment Processes in Estuaries and on Continental Margins, GIS, Geochemistry.** Current Research: Detailed Inventory of Recent Deposition and Contaminants in the Hudson River Estuary.

Dallas Abbott. Expertise: **Impact Cratering, Marine Geology and Geophysics, Mantle Plumes, Precambrian Tectonics.** Current Research: Using Deep Sea Core Samples to Constrain the Sources of Holocene Age Megatsunami Deposits. Verifying Submarine Impact Crater Candidates using Deep Sea Cores. Assessing the Climate-Impact Connection during the Late Holocene.

Christopher Zappa. Expertise: **Climate Modeling, Physical Oceanography.** Current Research: Infrared Polarization Techniques as a Tool for Climate Studies: Air-Sea Interaction and Ocean Surface Temperatures.

Robert Vaillancourt. Expertise: **Biological Oceanography and Phytoplankton Bio-Optics.** Current Research: Marine Phytoplankton Optical and Pigment Properties along a Transect in the North Atlantic.

Sidney Hemming. Expertise: **Isotope Geochemistry, Paleoceanography.** Current Research: Sedimentary Provenance Constraints on the Subglacial Geology of the Eastern Weddell Sea.

Stephen Pekar. Expertise: **Paleoceanography.** Current Research: Developing High-resolution Stable Isotopic

Records for the First Climatic Optimum during the Miocene (18-16 Ma). Developing High-resolution Stable Isotopic Records from the Indian Ocean during the Late Paleocene (60-55 Ma).

Philip Orton and Wade McGillis. Expertise: **Air-sea Gas Transfer, Coastal and Estuarine Turbulent Mixing.** Current Research: The Global Carbon Cycle and Carbon Dioxide Air-Water Gas Transfer in the Hudson River Estuary.

The IGERT program will sponsor a summer intern to work on the following project:

Yochanan Kushnir, Richard Seager and Mingfang Ting. Expertise: **Climate Modeling and Diagnostics.** Current Research: Modeling and observational studies of large scale atmosphere-ocean circulation controls on global drought variability and future drought risk.

The Cooperative Institute for Climate Applications and Research (CICAR) will sponsor a summer intern to work on the research project in Climate and Society below. CICAR is a joint research partnership between Columbia University and The National Oceanic and Atmospheric Administration (NOAA).

Lareef Zubair. Expertise: **Climate Adaptation, Hydroclimatology.** Current Research: Hydro-climatic and Environmental Variability: Their Effects on the Risk of Malaria.

STIPEND: Students will receive a stipend of \$4000 for this 10-week program. In addition, the student will receive free, air-conditioned housing at Columbia University in the City of New York. (Local students who are accepted to the program and who prefer to live at home will receive an additional \$1000.) Students will also receive free bus transportation between the Columbia campus and Lamont. Students who are traveling to Lamont from more than 200 miles away will be reimbursed for a round-trip supersaver fare.

APPLICATION DEADLINE: Application form must be submitted by **March 1, 2008.**

There is an online application form. It is posted at:
<http://eesc.columbia.edu/resources/internships/lamont/Application>

The online application form asks for the following two 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 current research 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.

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

-Official college transcript(s);

-Two letters of recommendation;

These materials must be mailed on or before March 1, 2008.

Mail to: **Dr. Dallas Abbott**
Summer Internship Program
Lamont-Doherty Earth Observatory
Palisades, New York 10964
Email: dallas@ldeo.columbia.edu

For more information, look at our web page: http://www.ldeo.columbia.edu/~dallas/Answers_to_Questions.htm.
Decisions for all but the waiting list will be made on or before April 1, 2008. The National Science Foundation is funding this program for the next 2 years (2008-2009). Every year the research projects and advisors change. Please look for the yearly posting of new projects on the first of February.