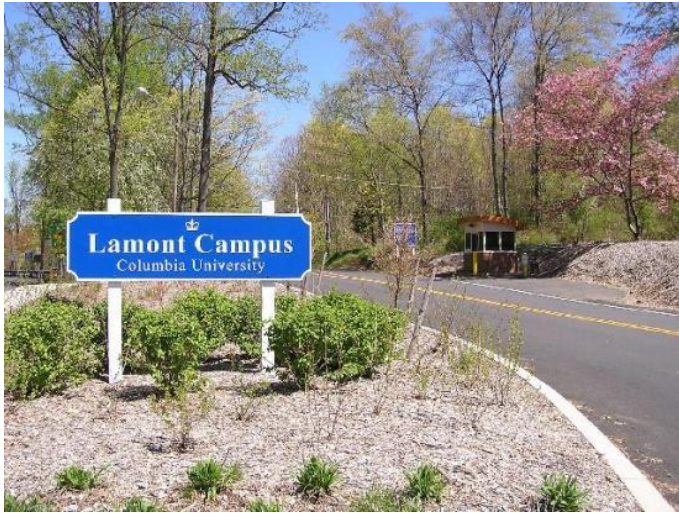


Lamont-Doherty Earth Observatory

COLUMBIA UNIVERSITY | EARTH INSTITUTE

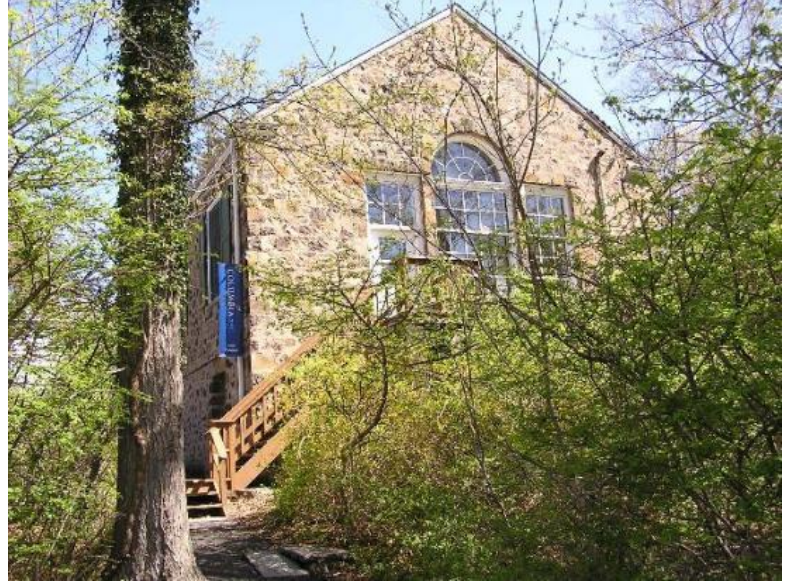
Lamont-Doherty Earth Observatory seeks fundamental knowledge about the **origin, evolution and future of the natural world**. Its scientists study the planet **from its deepest interior to the outer reaches of its atmosphere, on every continent and in every ocean**, providing a rational basis for the difficult choices facing humanity.

Lamont Campus of Columbia University



- Located in Palisades NY at NJ/NY State Line
- ‘Weekend’ home of Lamont family (bankers)
- Donated to Columbia by widow of Thomas Lamont in 1949
- Doherty Foundation (Citgo oil company) donated \$6 in 1966





One of the World's Leading Research Institutes

“Past Achievements”

- Pioneered techniques to study sea floors, earthquakes, heat flow, etc.
- Mapping ocean floors (Marie Tharp & Bruce Heezen)
- Paleomagnetism

“Current Areas of Research”

- Climate Change
 - >Paleoclimates
 - >Impact on flora and fauna
 - >Isotope analyses
 - >Seismology (earthquakes)
 - >Ocean currents
 - >etc., etc.



<http://www.ideo.columbia.edu/about-ideo>



Biology and Paleo
Environment

...use biology (usually looking at **fossils**) to **uncover clues about Earth's past environment**. We also strive to understand **how the modern environment**— through its oceans, atmosphere and land—**affects present-day biology**

Tree rings, plankton, polar fauna and flora,
Hudson River and marine microbes



...seek to understand Earth's environments by studying its history—and the **processes, past and present**, that have governed these environments. Using **advanced chemical and isotope analyses**, Division scientists **study samples of air, water, biological remains, rocks and meteorites** in order to elucidate a broad range of scientific issues



...explorers at heart, motivated by curiosity to understand these remote and forbidding parts of our planet. MultiChannel Seismic (MCS) Reflection techniques which allow us to **probe more deeply into the Earth**, and multibeam bathymetric and side-looking sonar imagers for **mapping large areas of the seafloor** in ever **greater detail**.



Ocean and
Climate Physics

...delve into the **mysteries of Earth's climate** in order to **document its change** and to build an **understanding of its controlling forces**. Climate change is a crucial factor that has influenced human history over the ages. Therefore, reliable prediction is vital both to humankind's future and to the well-being of the planet.



...forefront of **theoretical and observational seismology, solid earth dynamics, rock mechanics, structural geology and tectonics, and sedimentary geology**, and are making lasting contributions to the study of earthquakes, the structure of the **Earth's crust, mantle, and core**, and the large-scale **motions and deformation** of the tectonic plates.



Road to Smerdyachee Lake



Moon over Smerdyachee



2014 Field Party at Lake Smerdyachee



Setting up a tent





Tree ring studies
(dendrochronology)
in Mongolia



...and now

“Marcus G. Langseth”



We Can't Go to Such Exotic Places ...

- ...but we can provide some sense of what happens in “field research,” as compared with “lab research.”

What kind of problems can we explore?

What kind of observations do we need to record?

How can we analyze them?

What preparations do we need to make?