**2019 Center for Climate and Life at Lamont-Doherty Earth Observatory High School Program**

The Center for Climate and Life at Lamont-Doherty Earth Observatory (LDEO) of Columbia University is offering summer internship opportunities for high school students interested in Earth Science research experience. Located in Palisades, NY, just 30 minutes north of Manhattan, Lamont-Doherty has a bucolic 160-acre campus above the Hudson River. With over 500 total staff, our scientists conduct fundamental Earth Science research from the inner core to the outer reaches of the atmosphere including: climate change, oceanography, geochemistry, ocean and life sciences, marine genomics, tree ring research, seismology, and geophysics.

Summer High School interns will work in small groups (2-4 students) on research topics designed and led by Lamont scientists. Students will have hands-on experience in real research labs and will learn how to research papers, perform measurements, collect data, and give presentations.

**Internship Details**: There are no formal application prerequisites but some demonstrated interest or experience in Earth Sciences research is preferred. Students will be expected to work collaboratively in small groups, read scientific papers, participate in discussion groups, work independently and reliably, and demonstrate a high degree of maturity and responsibility. The work can be intellectually demanding and laboratory work can be tedious and must be conducted with great attention to detail. You will have to complete readings and share updates each week, and at the end of the summer, your team will have to produce a science poster and a draft of a research article on your project.

**Duration:** Internships are four weeks long, full time, with students arriving Monday, July 8th and completing their internships by August 2, 201. Students must be able to attend the full program.

**In addition:** Students must participate in two safety-training sessions prior to working in any labs. The training will likely take place at the end of June.

**Hours:** The program runs Monday through Friday, typically 9am-5pm. A free shuttle bus transports students who live in NYC to and from the main Columbia University campus in Manhattan.

**Application Procedure:** Prospective candidates must submit an application by e-mail to **Jean Leote. The application must be received by Lamont-Doherty by April 5th at 5:00pm**. You can type directly into this form and return it as an e-mail attachment.

**PROGRAM APPLICATION - PART A - required, to be filled out by student Personal Information**

1. Name (First, MI, Last): Benjamin O Goldman
2. Permanent Home Phone Number: 914-949-2250
3. Cell Phone Number: 914-263-6624
4. Email Address: bg502257@live.wpcsd.k12.ny.us
5. Permanent Address: 69 Grandview Ave., White Plains, NY, 10605
6. High School and graduation year: White Plains High School, graduating in 2022
7. Relevant Coursework: Please list any science/math courses you have taken so far in high school. (Include courses in which you are currently enrolled.)

High school level but taken in middle school:

* Algebra 1
* Geometry Honors
* Earth Science

Taken in high school:

* Algebra 2/Trigonometry Honors
* Pre-Calculus Honors
* Biology Honors
* Chemistry Honors
* Science Research

Please answer each of the following questions (brief 1-2 paragraphs each):

1. **Your interest in us**: Why do you want to join this summer internship program? What areas of science interest you most? Do you have a long-term goal of what you’d like to do? What experiences, skills, or personality traits do you think will help you get the most out of this experience?

Through the Lamont-Doherty Earth Observatory High School Program, I hope to build relationships with mentors in the field of climate research, learn more about the methods that professional researchers use, develop greater familiarity with pressing climatic research issues, and as well as become involved with the local scientific community. I hope to gain experience studying climate, and believe this internship would compliment my work at the Science Research Program Project at White Plains High School, a selective program I started at the beginning of this year. I recently began a research project on El Nino/Southern Oscillation (ENSO) variability from 1900 to the present, under the guidance of my advisor, Professor John Fasullo of NCAR .

Eventually, I hope to publish my work and present it with my class at local science competitions. My experience through the Science Research Program at my high school will help me to get the most out of this summer internship opportunity. . This 3-year course guides my peers and me to develop an original research study. Through coursework over the past two years, I have learned how to analyze and present research papers, communicate with professional scientists, and apply the scientific method. I have learned that I am a talented mathematical thinker: I can solve problems effectively and understand the relationships present in data. Additionally, I am skilled at analyzing climatological data using Python. I have spent over 50 hours practicing and experimenting with Python’s data analysis tools. Moreover, because I am proactive, I always try to get work done ahead of time and focus on planning for the future. I think these skills and qualities will continue to help me with completing tasks with limited time. Additionally, my math skills show that I pay great attention to detail. I can find errors and solve them. I can also apply my attention to detail by detecting patterns and coming up with new methods of analyzing them.

1. **About you**: This internship requires maturity, focus, drive, and a willingness to learn and use your intellect and creativity. Can you tell us an example from your life that can speak to these qualities?

An unexpectedly stressful event occurred when I was 15. It definitely tested my maturity, drive, focus, and willingness to learn and showed me that I know how to use my intellect, even under pressure. I was at the entrance to Laguardia Airport; headed to see my cousin in Boulder, Colorado, and about to take my first plane flight alone. I am slightly embarrassed to tell this story, as I nearly missed my flight despite my preparation.

The flight’s liftoff time had been moved to an hour earlier, and somehow I had missed the change, as had my parents. I suddenly had only ten minutes to board the plane. First, my father and I had to navigate the airport’s intricate network of busses, trying our hardest to follow confusing instructions. Quickly calculating the time to takeoff, I left my dad at security. Once I got through, I followed the signs to reach my gate, arriving with about three minutes to spare.

In this experience, I had to navigate a crowded, unknown environment by myself, showing maturity. Catching my plane required focus, as I needed to pay careful attention to all the signs and announcements at the airport. I automatically used my intellect and creativity while reasoning the best way to reach the gate while waiting in line at the security checkpoint. (Looking back, I also learned to carefully check the departure time and have a plan in case the times change!) This experience also tested my ambition as it would have been easy to give up and catch a later flight. I had to use my intellect and creativity to determine how to find my gate and what to do if I missed my flight. Most importantly, this experience demonstrated my ability to improvise, as I created a plan for how to reach my flight while under immense pressure.

The challenges I overcame in this experience apply to my life as a scientist. Experiments can go wrong for reasons outside my control. I will have to figure out what to do with limited resources. I am able to cope with pressure and still produce quality work. I can handle unexpected setbacks and navigate tough situations. I can quickly respond to issues. Most importantly, I am able to follow through on commitments. I am willing to take risks when it means the accomplishment of my goal.

1. **Research interest**. Do you have a preference for which lab project you would like to join this summer? Why?

I would especially like to work on the project titled “Reconstructing the Long-term Climate History of the Pacific Southern Ocean.” While conducting background research on analysis of ENSO variability during the Holocene and during the Last Glacial Maximum as part of my school’s Science Research Program, I have observed that there often is insufficient data to draw robust conclusions about prehistoric climate and that conclusions are heavily reliant on model data. I would greatly enjoy an opportunity to play a part in solving this issue. While my long-term project on recent ENSO variability differs from the purpose of the Long-term Climate History project, I feel that working on this project would help me gain a deeper understanding of past climate and learn about where paleoclimate data comes from. I would also gain the skills necessary to analyze prehistoric climate variability later in my life. Additionally, I want to try a new experience because it seems like fun; I enjoy trying new things and this summer experience is no exception. I did not request to work on the project involving analyzing climate changes in Antarctica only because I think that my data analysis skills are developed enough that I can continue to pursue Python independently. I think my time would be spent most effectively learning about other topics in the field of climatology. Of course, I would be happy to work on any of the projects offered, including that one.

**For more information contact:**

Jean Leote, Leote@ldeo.columbia.edu

**PROGRAM APPLICATION PART B – OPTIONAL, to be filled out by a science teacher**

1. Name of student (First, Last):
2. High School:
3. Teacher Name and contact information:
4. Subject area(s) taught:

Please use the 5-level rating scale to evaluate the student relative to other students with whom you have worked.

*Strongly disagree =1 Disagree=2 Neutral=3 Agree=4 Strongly agree=5*

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| --- | --- |
| Interested in science |  |
| Enjoys solving difficult problems |  |
| Works independently |  |
| Works well in small groups |  |
| Has leadership skills |  |
| Is mature/independent |  |
| Interested in environmental issues |  |

**Brief Statement of support for applicant** (2-3 paragraphs). Please let us know why you think this student is a good fit for this summer internship. Our most successful students have been creative, sociable, independent, mature, focused, and hard-working.