**GENERAL INFORMATION**

**Program sponsor:** Princeton Environmental Institute  
**Position number:** C1ZHA3  
**Project title:** Tracking Microbial Metabolism with Isotopes  
**Organization/research group:** Zhang Lab  
**Primary location(s) of internship:** Princeton University, Guyot Hall  
**Additional cities and/or countries to be visited (if applicable):** n/a  

*Note:* If this internship is located in a country with an [International SOS](https://www.internationalsos.com) risk rating of High or Extreme, final candidates must participate in a travel review process overseen by the Travel Oversight Group (TOG), and obtain safety guidance prior to departure. The University reserves the right to revoke support and funding for travel at any time there has been a significant deterioration in the safety and security conditions surrounding travel arrangements, or in the sector of the country, or countries, where travel is to occur.

**FACULTY SPONSOR(s)/HOST INFORMATION**

**Name(s):** Xinning Zhang  
**University Department(s):** GEO  
**E-mail:** xinningz@princeton.edu  
**Phone:** (609) 258-2489  
**Website:** [https://scholar.princeton.edu/xinningz/home](https://scholar.princeton.edu/xinningz/home)

**INTERNESHIP/RESEARCH PROJECT INFORMATION**

**Internship/project description:**

Metabolically flexible microbes are exciting models for testing the effects of metabolism on important markers in environmental geochemistry such as carbon, nitrogen, and hydrogen isotopes. In particular, baker’s yeast (Saccharomyces cerevisiae) is an ideal organism to work with since it is capable of overflow metabolism, a seemingly wasteful preference for fermentation (over respiration) when fed certain substrates. The intern will test the influence of substrate, and therefore central metabolism, on the isotopic fractionation between biomass and substrate. This work will help elucidate how metabolism in heterotrophic eukaryotes sets the isotopic composition of molecular fossils.

**Student's role and responsibilities:**

The student will inoculate, maintain, sample, and harvest cultures of microbes, prepare and analyze samples for bulk carbon and nitrogen isotopes, and learn how to extract and purify microbial lipids for quantification and identification.
**Internship/project learning objectives:**
The student will learn sterile culture techniques, sample preparation for bulk and compound-specific isotope analysis, and running instrumentation including elemental analyzer isotope ratio mass spectrometer (EA-IRMS), gas chromatography mass spectrometry (GCMS), and gas chromatography flame ionization detection (GCFID).

**PROGRAM REQUIREMENTS**

**Academic background and any course pre-requisites:**
No specific background is required, but an interest in chemistry, biology, or environmental science is encouraged

**Technical skills:**
All skills will be taught during the internship.

**Additional training(s):**
n/a

**Equipment:**
n/a

**Physical demands:**
There is a lot of standing and walking in the lab spaces

**Language abilities/competencies (if applicable):** n/a

**Additional information about the internship/project:**
Selected student will be required to participate in lab safety and workplace safety trainings prior to the start of the internship.

**INTERNATIONAL TRAVEL REQUIREMENTS (if applicable)**

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<thead>
<tr>
<th>Visa(s) required?</th>
<th>Research permit/pass required?</th>
<th>Immunizations required?</th>
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<tbody>
<tr>
<td>Yes [ ]</td>
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</tbody>
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**INTERNERSHIP/PROJECT SUPERVISOR(S)**

**Name and title of primary supervisor:** Ashley Maloney, postdoctoral fellow

**Email:** amaloney@princeton.edu  
**Phone:** 303-478-4228

**Name and title of additional supervisor, if applicable:** n/a

**E-mail:** Phone:

**PROGRAM DATES AND FUNDING INFORMATION**

<table>
<thead>
<tr>
<th>Weekly Stipend: $500</th>
<th>Number of Positions Available: 1</th>
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<tbody>
<tr>
<td>Tentative Start Date (mm/dd/yyyy): 06/10/2019</td>
<td>Number of Weeks: 10</td>
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<tr>
<td>Tentative End Date (mm/dd/yyyy): 08/16/2019</td>
<td><strong>Note:</strong> PEI funding is for full-time work, 35 hours per week minimum, and for a period of at least 8 continuous weeks.</td>
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**Application Deadline:** January 11, 2019