### GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Program sponsor:</th>
<th>Princeton Environmental Institute</th>
</tr>
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<tbody>
<tr>
<td>Position number:</td>
<td>C1KEL</td>
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<tr>
<td>Project title:</td>
<td>Environmental effects of the Columbia River Volcanic eruptions during the middle Miocene</td>
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<td>Organization/research group:</td>
<td>Keller Group</td>
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<td>Primary location(s) of internship:</td>
<td>Princeton University, Guyot Hall</td>
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<tr>
<td>Additional cities and/or countries to be visited (if applicable):</td>
<td>Oregon and Washington</td>
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**Note:** If this internship is located in a country with an [International SOS](https://www.internations.org) 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): | Gerta Keller |
| University Department(s): | Geosciences |
| E-mail: | gkeller@princeton.edu |
| Phone: | 8-4117 |
| Website: | [http://gkeller.princeton.edu/](http://gkeller.princeton.edu/) |

### INTERNSHIP/RESEARCH PROJECT INFORMATION

**Internship/project description:**

Columbia River volcanic eruptions of Oregon and Washington resulted in major climate warming, which resulted in a major faunal turnover in planktic foraminifera of the global oceans. Today these volcanic eruptions are dated by high-precision U-Pb dating in Geosciences at Princeton (Prof. Blair Schoene and students) potentially yielding a record dating eruptions flow-by-flow. Basalt flows are frequently separated by some time during which red clays form known as Red Boles, which are now being studied by Geosciences Prof. Satish Myneni. The current internship project aims at integrating the age control and geochemical characteristics of red boles into a comprehensive environmental history revealing the effects of volcanism on climate, extinctions and evolution. We plan to do this by various analyses in deep sea sediments for the middle Miocene, including oxygen isotopes, faunal turnovers of planktic foraminifera, and mercury as indicator of the rate and intensity of volcanic eruptions.

**Student’s role and responsibilities:**

Two students would be potentially working on this project - one analyzing microfossils and picking species for stable isotope analysis, and the second concentrating on mercury analysis. Analysis will be done in the Keller Lab in Guyot Hall. Both interns will participate in field work of the Columbia River red boles and coeval sequences elsewhere. The summer internship students will likely continue to work with these projects for their Junior and Senior theses.
Internship/project learning objectives:
The students will learn the basic methods of science, including planning the project, collecting the samples, processing samples in the laboratory, analyzing samples, interpreting the results and write a report. They will gain a basic understanding of how science is done.

PROGRAM REQUIREMENTS

Academic background and any course pre-requisites:
Geosciences and Environmental studies background preferred.
Rising sophomores, juniors and seniors are welcome.

Technical skills:
Students will learn the necessary technical skills during their internship; graphics skills are a plus.

Additional training(s):
not necessary

Equipment:
Students will need to bring their own laptop

Physical demands:
Hiking, climbing, weather extremes

Language abilities/competencies (if applicable): not applicable

Additional information about the internship/project:
Students should have a love of science and knowledge, and the mind of a science detective to uncover history of the past. Students will need to complete lab safety training prior to the start of the internship.

INTERNATIONAL TRAVEL REQUIREMENTS (if applicable)

<table>
<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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INTERNSHIP/PROJECT SUPERVISOR(S)

Name and title of primary supervisor: Gerta Keller

Email: gkeller@princeton.edu
Phone:

Name and title of additional supervisors: Satish Myneni and Blair Schoene

E-mail: Phone:

PROGRAM DATES AND FUNDING INFORMATION

Weekly Stipend: $500
Number of Positions Available: 2
Tentative Start Date (mm/dd/yyyy): 06/15/2019
Number of Weeks: 8-10
Tentative End Date (mm/dd/yyyy): 08/15/2019

Note: PEI funding is for full-time work, 35 hours per week minimum, and for a period of at least 8 continuous weeks.

Deadline: January 11, 2019