GENERAL INFORMATION
Program sponsor: Princeton Environmental Institute
Position number: C1ZON
Project title: Wildfire Impacts on Air Quality and Atmospheric Nitrogen
Organization/research group: Atmospheric Chemistry and Composition; Zondlo Group
Primary location(s) of internship: Princeton, NJ; Palmdale, CA; Boise, ID
Additional cities and/or countries to be visited (if applicable): Salina, KS

Note: If this internship is located in a country with an International SOS 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): Mark Zondlo
University Department(s): CEE
E-mail: mzondlo@princeton.edu
Website: zondlo.princeton.edu
Phone: 609-258-5037

INTERNERSHIP/RESEARCH PROJECT INFORMATION
Internship/project description:

This project will help to quantify the emissions of wildfires and prescribed burns to the atmospheric nitrogen budget and associated impacts on air quality and ecosystem deposition through airborne- and satellite-based measurements of ammonia and related compounds. The student intern will work as part of a larger team, both within the group and in the science teams, analyzing field data acquired on the NASA DC-8 research aircraft as part of the NASA/NOAA FIREX-AQ (Fire Influence on Regional to Global Environments and Air Quality) field study in summer 2019. The student will be focusing on ammonia emissions from fires sampled by the aircraft and comparing to satellite measurements of ammonia where available. Ammonia is a critical gas phase precursor species for aerosol particles in the atmosphere and plays large roles in air quality, climate, and ecosystem health. The sources, distributions, and chemical transformations of ammonia are poorly constrained by observations, and this field project offers the most comprehensive suite of measurements to understand these processes. Goals of the project include quantifying the variability of fire emissions to the atmosphere and contribution of fires to aerosol formation over North America.

Student’s role and responsibilities:

The student will be analyzing flight data acquired from the aircraft immediately post flight, conducting initial quality control and assurances on the data, and conducting quick-look analyses that will be used subsequently for future flight planning. The student will synthesize datasets from numerous instruments across the aircraft, graph tracer-tracer correlations to deduce source types, and identify emissions and chemical transformations in the atmosphere in the context of fire intensity, fuel types, and fuel chemistry. The student is expected to participate in a fast-working environment with a team of scientists, both internally with the group and externally with the field campaign.
Internship/project learning objectives:
Students will learn about the chemistry and composition of the atmosphere, the impact of fires on air quality and climate, and processes of atmospheric transport of emissions to troposphere. Students will also become experienced with the syntheses of large datasets in MATLAB and similar analyses programs, write code to analyze and visualize field data in a rapid manner, and learn about the challenges of atmospheric measurements. Students will also learn how large scale, international field studies are conducted, being part of a large scientific team, and the necessity of collaborations across experimental, model, and laboratory teams to achieve large scientific objectives.

**PROGRAM REQUIREMENTS**

**Academic background and any course pre-requisites:**
- Differential equations and/or multivariable calculus required
- CEE 311 Global air pollution and/or CEE 335 Global environmental issues desired

**Technical skills:**
- MATLAB or similar ( Igor, R, Python, IDL)
- Strong communication skills and experience with standard office software (documents, presentations)

**Additional training(s):**
Students will be trained by NASA for safety protocols when working around/in aircraft

**Equipment:**
- Laptop computer is essential for field work

**Physical demands:**
- Working on airport tarmacs in sunny and hot conditions and working at times in loud environments (ear protection provided)

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

**Additional information about the internship/project:**
The student may be invited to fly on the aircraft as part of an undergraduate student outreach activity (NASA's Student Airborne Research Program), and if this happens, the student should be able to fly without being prone to airsickness. Selected students 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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<th>Visa(s) required?</th>
<th>Research permit/pass required?</th>
<th>Immunizations required?</th>
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<td>Yes</td>
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**INTERNSHIP/PROJECT SUPERVISOR(S)**

**Name and title of primary supervisor:** Mark Zondlo

**Email:** mzondlo@princeton.edu **Phone:** 609-258-5037

**Name and title of additional supervisor, if applicable:** Lars Wendt, Short-term professional

**E-mail:** **Phone:**

**PROGRAM DATES AND FUNDING INFORMATION**

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<th>Weekly Stipend:</th>
<th>Number of Positions Available:</th>
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<th>Tentative End Date (mm/dd/yyyy):</th>
<th>Note: PEI funding is for full-time work, 35 hours per week minimum, and for a period of at least 8 continuous weeks.</th>
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**Application Deadline:** January 11, 2019