

## **POSITION ANNOUNCEMENT:**

### **GEORGE MELENDEZ WRIGHT INITIATIVE FOR YOUNG LEADERS IN CLIMATE CHANGE**

The National Park Service (NPS) is pleased to announce the 2017 *George Melendez Wright Initiative for Young Leaders in Climate Change* (YLCC) to provide a pathway for exemplary students in higher education (graduate students, advanced undergraduate students, and recent graduates) to apply their skills and ideas to park-based challenges and solutions. The Initiative offers 12-week paid internships which allow students to gain valuable work experience, explore career options, and develop leadership skills through mentorship and guidance while helping to advance the NPS response to climate change. Successful students may be eligible for non-competitive hire into federal positions for which they qualify following completion of all academic requirements.

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### **WHAT'S BLOOMING IN THE COLD AIR POOL?**

Devils Postpile National Monument  
Mammoth Lakes, CA

Expand your knowledge of climate change impacts in the mountains, focused on cold air pooling and how it influences plant phenology, by working in Devils Postpile National Monument this summer. Work with monument staff, citizen scientists and climatologists to develop climate change adaptation strategies based on this study to protect this ecologically rich area.

### **INTERNSHIP PROJECT BACKGROUND**

This project will expand ongoing climate change research focusing on temperature dynamics of cold air pooling at Devils Postpile National Monument (DEPO) to include plant phenology monitoring. Cold air pools (CAPs) are temperature inversions where cold, dense air becomes trapped and concentrated and are typically cooler and moister than the surrounding, often higher elevation, area. Climate scientists are investigating the potential importance of CAPs in ameliorating warming temperatures and providing an important physical factor for climate change refugia (areas that are buffered from climate change extremes relative to other areas). Alternatively, warmer temperatures could decrease the frequency or intensity of CAPs leaving these areas subject to more dramatic temperature shifts. While the CAPs themselves do not constitute refugia, the conditions that they provide (e.g., cooler and moister habitats) may help to maintain refugia components such as wet meadows and riparian habitats. Phenology has been identified as a key indicator for monitoring climate change because it is affected by temperature. Linking phenology monitoring to the CAP monitoring can provide information that is vital for the development of climate change adaptation strategies at DEPO.

Monument staff, in partnership with Scripps Institution of Oceanography (SIO), United States Geological Survey (USGS) and University of San Diego (UCSD), have been investigating the physical dynamics of cold air pooling since 2008. While we are beginning to have a solid understanding of the physical conditions of cold air pooling, an understanding of the biological effect is lacking. We would like to determine if the plants established in areas subject to cold air pooling exhibit a significant shift in phenology compared to their counterparts outside the cold air pool.

Monument staff started a pilot Citizen Science phenology monitoring program in 2016. We focused on monitoring six plant species which occur in and out of the CAP. This project will refine this program to focus on individual plants and tie phenological phase to temperature.

## **INTERNSHIP PROJECT DESCRIPTION**

Through this internship, the candidate will have an opportunity to work closely with the monument's natural resource program manager, citizen scientists, research partners and other monument staff. The Superintendent of DEPO is committed to managing the monument as a potential climate change refugia. At this point, our knowledge of the refugial attributes of the area beyond cold air pooling is limited and the products completed by this intern will provide valuable information. For example, if the correlation between temperature and phenology supports our assumption that phenology is affected by cold air pooling, we can establish a way to monitor a biological response and understand this in terms of adaptation.

### **Internship Tasks**

- Assist in developing, coordinating and participating in the Citizen Science Phenology monitoring program
- Identify individual plants to monitor in and out of the CAP
- Monitor phenology of 4 individuals of six species (24) at several different locations weekly
- Manage species lists, location information and raw data on the Natures Notebook website
- Install thermochrons (ibuttons) in select phenology monitoring locations (if needed)
- Download, quality check and analyze temperature data
- Analyze temperature data in relation to phenological phase of particular species
- Complete a literature search for published papers on CAPs, mountain climate, climate change refugia, and plant phenology; incorporate findings into project design and final presentation
- Provide recommendations to refine phenological monitoring such as focusing on a particular species or individual showing a high correlation between phenological phase and temperature
- Present powerpoint discussing findings to monument staff and partners
- Prepare a fact sheet for the monument website about the project and climate change trends and impacts
- Prepare a poster to present at the annual Yosemite National Park Hydroclimate workshop or other venue

### **Internship Products**

The intern will expand the pilot Citizen Science monitoring program to focus on plants in and out of the CAP. The program will include the following:

- Monitoring protocol and recommendations for streamlining data collection efforts and future monitoring
- Maps of monitoring locations
- Photos of individual plants to be monitored and directions on how to find them
- Updated group site on Nature's Notebook website
- Outreach material including instructions, species specific information on phenological phases, how to get involved etc. This material would be used internally as well as public venues such as the monument website, Facebook page and visitor center.

In addition, the intern will produce several items useful for management in developing climate change adaptation strategies and outreach information:

- Fact sheet on the project; CAPs, phenology, climate change impacts and trends, and climate change refugia
- Powerpoint presentation for monument managers and partners translating results from the project into climate change adaptation strategies for managing the monument as a climate change refugia
- Poster presenting a summary of the temperature and phenological data collected in 2016 and 2017, any correlations between temperature and phenological phase, and potential climate change adaptation strategies for managing the monument as a climate change refugia.

## **QUALIFICATIONS**

Applicants must have the following:

- Experience in data collection, data management and some data analysis.
- Experience or coursework in Geographic Information System (GIS)
- Experience in fieldwork including working in adverse conditions
- Experience in using software programs such as Access, Excel, Word and various applications
- Knowledge of botany is desirable but not required.
- Self-motivation and ability to work independently
- Completion of at least six upper level STEM courses
- Completion of at least one climate course
- Completion of at least one ecology course
- Physical fitness: required to hike up to 8 miles a day at relatively high elevations (8,000 feet)

## **LEADERSHIP DEVELOPMENT**

The natural resource program manager will mentor and evaluate the intern. The intern will also communicate with partners for assistance in analyzing temperature data. The pilot citizen science program was developed in partnership with a local non-profit group, Friends of the Inyo (FIO). The intern would work with natural resources, interpretation and FIO staff to improve the training, data quality and outreach material.

This project provides an opportunity for managing existing data, collecting new data, learning about cold air pooling, learning about phenology, refining protocols, participating in and improving a citizen science program, developing outreach material, and producing a presentation to recommend climate change adaptation strategies for managing the monument as a climate change refugia based on data summaries and preliminary analyses. Each component requires strong leadership skills, critical thinking, problem solving, project management and creativity.

## **DATES OF POSITION**

June 12 – September 4, 2017. Dates are flexible within two weeks but may be contingent on snowpack and access to the monument.

## **COMPENSATION**

This initiative supports one student at \$15/hour for 12 weeks, or 480 hours.

## **HOUSING**

Tent cabins are available at the monument. These units are shared with one other person and have a communal kitchen, bathroom, and showers located in another building nearby.

Housing may also be available in the town of Mammoth Lakes through the Mammoth Mountain Ski Area. These three bedroom units house six people with a shared kitchen, bathroom and living area. If housing is provided in the town of Mammoth Lakes, transportation to DEPO would be provided.

## **WORK ENVIRONMENT**

The intern would work in both the office (40%) and field (60%). Office space is provided at the monument as well as in the town of Mammoth Lakes. Office space is shared with other natural resource staff. Computers, tablets, software and needed equipment will be provided to the intern.

Field work is both on and off trail in rugged terrain. The elevation of the monument ranges from 7500-8500 feet so weather can be very unpredictable with afternoon thunderstorms. Heat, cold, wind, rain, snow, insects, uneven terrain, loose footing and prickly plants may be encountered when working in the field. No overnight travel is required.

The monument will provide an overview of Operational Leadership as well as daily safety briefings and job hazard analyses (JHAs).

## **CONTACT INFORMATION**

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