

## **POSITION ANNOUNCEMENT:**

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

The National Park Service (NPS) is pleased to announce the *George Melendez Wright Initiative for Young Leaders in Climate Change* (YLCC) to provide a pathway for exemplary students in higher education (graduate students and advanced undergraduate students) 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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### **Assessing Interannual Snowfall and its Impacts on Vegetation Phenology and Forest Health Using Remote Sensing**

Crater Lake National Park  
Crater Lake, OR

Climate change is having significant impacts on montane ecosystems due to reductions in winter snow depth and earlier spring snowmelt. This has been associated with changes in species phenology which is impacting the elevational range, abundance, trophic interactions, and health of vegetation and wildlife. Crater Lake National Park spans the Pacific Crest divide of Oregon's southern Cascade Range, encompassing more than 2,000 feet elevation comprised of landcover types from dry ponderosa pine forest to whitebark pine forest and alpine meadows. Early snowmelt and dry summer conditions due to reduced snowpack may increase the risk of severe damage from mountain pine beetle and other pathogens already impacting forest's throughout the park, Oregon, and the Pacific Northwest and increase the threat of catastrophic forest fire. However, landscape scale dynamics of snowcover, phenology, and forest health have not been examined for the park or the southern Cascades. This project will inform management strategies addressing climate change vulnerability of key park resources and visitors experience.

#### **PROJECT DESCRIPTION**

The goal of the YLCC intern project is to compile and analyze available remote sensing data to assess the relationships between annual winter snowcover, phenological metrics including annual onset of green-up, senescence, and growing season length, and forest health metrics such as tree death. The results of the intern's project will be of global interest to resource managers and scientists in temperate montane protected areas where climate change is impacting snowfall, particularly other National Park units and public lands within the Cascades, and intermountain western U.S. The project will help the park understand how annual winter precipitation will impact natural resources important to both managers and park visitors including vegetation conditions such as spring and summer wildflowers, wildlife distributions and habitat conditions, and forest disturbance patterns. It will also aid in planning the

allocation of management efforts and funding. This knowledge will also be useful for interpretive programs within the park addressing climate change and its impacts on park resources and the visitor experience.

The intern will compile and analyze remote sensing data on snow cover, vegetation phenology and forest condition for the park and surrounding area over the past 12 years (MODIS data available from 2000). Data should include Moderate Resolution Imaging Spectroradiometer (MODIS) Snow Cover Data Products (e.g. MOD10) and MODIS Normalized Difference Vegetation Index (NDVI) data products available from NASA and the USGS. Metrics will include snow-covered area, grain size, and albedo, onset of green-up and senescence, date of peak growing season, growing season length, and area of forest disturbance from fire or pathogens.

Products that the intern will provide will include 1) all GIS layers and data files for future applications, 2) at least one lead-authored manuscript for publication in a relevant peer-reviewed journal, 3) a report and/or poster that concisely interprets key findings of the study for the general public and park visitors to be displayed at the park and/or the park website 4) preferably a presentation at a professional meeting or conference.

## **QUALIFICATIONS**

The ideal candidate will be a current or prospective graduate student with an undergraduate degree in natural resources, geography, ecology or related field with a strong background of coursework and applied project experience in GIS and spatial analysis, or completion of a GIS certificate. Experience processing and analyzing remote sensing data, especially MODIS and NDVI data is highly desired. Students interested in integrating their project at Crater Lake with data from other montane regions as part of a larger research program would be of interest.

Applicants must be willing to live in a relatively remote region of southern Oregon and share housing with other seasonal park staff.

## **LEADERSHIP DEVELOPMENT**

This is a great opportunity for a student to gain applied experience as a leading member of a team using research to address management and conservation concerns within an iconic National Park. The student will be supported by a team of park staff and partners. The student will work closely with Chris Wayne, the GIS Specialist at Crater Lake National Park, and Dr. Jherime Kellermann, Science Coordinator of the Crater Lake National Park Science and Learning Center and Assistant Professor of Natural Sciences at Oregon Tech who have experience in GIS, spatial analysis, park ecology, climate change science, and phenological research.

The student is expected to take a lead role developing the project's analytical approach, design, and implementation. During the project, our team will help direct the intern to create scientific questions, formulate testable hypotheses and predictions, and apply the results from remote sensing analysis to address on-the-ground resource concerns of the National Park. We will provide revision of the manuscript produced by the intern to help ensure acceptance at a high quality peer-reviewed journal. We will also provide guidance in development of interpretive materials that effectively convey results to

park visitors. We will evaluate the intern on their professionalism, effort, attention to detail, organization of materials (e.g. files), and ability to communicate the project and its results to the scientific community and general public.

This project will provide important experience doing applied research in climate change science on key topics and methods in the field. Use of remote sensing and spatial analysis to assess indicators/metrics of climate change at the landscape scale is a desired skill for many positions. Also, experience in applied research aimed at directly informing resource management is vital for careers in federal land-based or research agencies.

### **DATES OF POSITION**

The dates of the position are flexible. Ideally the intern will work 480 hours between June 15 and September 30. However, earlier and later start and end dates can be arranged.

### **COMPENSATION**

This initiative supports one student at \$14 / hour for 12 weeks, or 480 hours.

### **HOUSING**

Shared seasonal housing is available within Crater Lake National Park if desired. Duration and timing of the student's stay at the park is flexible and will depend on the student's specific interests, needs, and work plan developed with their supervisory team.

### **WORK ENVIRONMENT**

Work while at Crater Lake National Park will primarily occur in an office environment located within the park. Shared office space, computers (with the most recent version of ArcMap), and web access will be provided at the park. The student will be required to acquire a Department of Interior Personal Identity Verification Credential in order to utilize and access park service computers and associated drives. Housing within the park is a short walk from the office facilities. Weather can be extremely variable and the intern should be prepared for both hot, dry and cold, wet conditions. Opportunities will exist for participation on field projects at the park with Park staff and visiting scientists depending on the intern's interests.

### **CONTACT INFORMATION**

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