

POSITION ANNOUNCEMENT:

FUTURE PARK LEADERS of EMERGING CHANGE

The National Park Service (NPS) is pleased to support the *Future Park Leaders of Emerging Change* (FPL) program as a pathway for exemplary students in higher education (advanced undergraduate students, graduate 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 NPS efforts on emerging management issues. Successful students may be eligible for non-competitive hire into federal positions for which they qualify following completion of all academic requirements.

MONITORING LANDSCAPE CHANGE FROM SPACE: IMPLEMENTING A NASA DEVELOP-DERIVED SATELLITE REMOTE SENSING DATA COLLECTION, PROCESSING AND ANALYSIS WORKFLOW FOR ECOFORCASTING AND EROSION STUDIES AT NAVAJO NATIONAL MONUMENT

Navajo National Monument
Shonto, AZ

INTERNSHIP BLURB

The intern will implement a satellite data landscape monitoring program at Navajo National Monument for tracking climate induced landscape changes that are threatening archeological sites and natural resources in the monument's remote canyons. The intern will be working with tools, methods and models created by a NASA-DEVELOP team in early 2018.

INTERNSHIP PROJECT BACKGROUND

Global trends of higher temperatures, lower precipitation, and heavier rain events have increased the rate of erosion at Navajo National Monument. Arroyo incising, both vertically and laterally, in the monument's canyons are resulting in the destruction of archeological deposits and the loss of access to alcove archeological sites. The monument and its partners have been monitoring and analyzing patterns of change in the region and monument. The trajectory of global climate change both threatens monument resources and poses significant challenges for resource management.

NAVA is comprised of three small, non-contiguous units within the Navajo Nation reservation separated by 6 to 19 miles of rugged, mainly roadless, reservation land spanning two Arizona counties falling within two distinct canyon systems. Current monitoring of canyon erosion in the monument includes temporal aerial photography analysis, repeat photography, and the collection of terrestrial Lidar data. These data sources can be limited in coverage, difficult to collect, and costly.

Monument resource staff are exploring a new data source for monitoring canyon erosion – satellite remotely sensed data that can be collected, processed, and analyzed on a near continuous basis. Between January-April 2018, a NASA DEVELOP team will work on a project at Navajo National Monument formulating a data collection, processing, and analysis workflow to monitor and document landscape change using remotely sensed optical and radar data. The FPL intern will implement the NASA-DEVELOP team's remotely sensed data erosion monitoring workflow.

INTERNSHIP PROJECT DESCRIPTION

The intern will initiate the implementation of a long-term NPS monitoring effort that will integrate with the current ongoing inter-agency erosion research aimed at best managing monument resources. Documenting environmental processes and changes can be extremely challenging in remote, backcountry settings. Using the products of satellite technologies to monitor and understand these changes opens up new resource management avenues that can be implemented by small remote parks. The intern will play a critical role in actualizing NAVA's resource management goals while building a desirable technical skillset for future resource managers.

Internship Tasks

- Implementation of the NASA-DEVELOP team's remotely data acquisition workflow focusing on Nitsin Canyon where archeological deposits and sites face the greatest threat as a result of increased erosion related to global climate change.
- Downloading, processing and conversion of raw satellite data into useable formats.
- Hiking and camping in the monument backcountry to field check acquired remotely sensed data.
- Analysis of the processed data focusing on an independent research project developed in consultation with their internship supervisor and the monument erosion partners.
- Presentation of research results to monument administration, resource staff, partners, and key stakeholders.

Internship Products

- Documentation of the data collection and processing procedures developed by the NASA team and implemented at the monument given our hardware and bandwidth capabilities.
- A manual for the continued data collection, processing, and analysis by monument staff after the internship completion.
- An independent research report based on their selected focus area related to erosion in NAVA.

QUALIFICATIONS

- Minimum requirements include a student working towards a bachelor's degree with preference towards a graduate-level or prospective graduate-level student with instruction in geography, archeology, geology, hydrology or other earth science fields that broadly relate to understanding landscape characteristics and change using remotely sensed data.
- Sixteen (16) college hours in a science-related field **or** experience and a demonstrated ability to understand and communicate scientific principles.
- Proficiency in the use of ArcMap Geographi Information Systems (GIS) software.

- Familiarity with satellite acquired data, both optical and radar, is required.
- Applicant will be required to pass a NPS background check to obtain computer network access.
- Applicants must be willing to share housing with other seasonal park staff.

LEADERSHIP DEVELOPMENT

The proposed internship provides an exciting opportunity for the student to develop cutting edge analytical skills that can be applied to national parks and monuments throughout the United States and its territories. The intern will be expected to assume significant responsibilities for implementing and customizing the NASA developed products and procedures at the monument. The intern will be integrated into presentations to stakeholders and the public to present the results of their independent research project. The intern will play a critical role in establishing a successful, efficient erosion monitoring program at the monument that will help guide future management planning and mitigation efforts at NAVA.

DATES OF POSITION

The preferred starting date is May 29, 2018, however dates of the position are flexible, depending upon availability. Ideally the intern will work 480 hours over 12 contiguous weeks between April 1 and September 1.

COMPENSATION

This initiative supports one student at \$16/hour for 12 weeks, or 480 hours.

HOUSING

The intern will have a private room in a shared government 3 bedroom-2 bathroom house at the monument. The house includes a furnished living room, dining room, and kitchen. There is a laundry room with a washer-dryer. The house will be shared with an archeological intern and a seasonal NPS archeological technician. The closest supermarket is located in Kayenta about 30 miles away.

Page is the closest off-reservation, full-service town and located 90 miles away. Flagstaff has numerous entertainment and shopping options and is located 150 miles away. There is no public transportation on the Navajo reservation so a personal vehicle is highly recommended. FedEx and UPS deliver to the monument. USPS mail is delivered to a PO Box in Shonto and picked up by park staff. The landscape around the monument is stunning and life is quiet and peaceful. There are numerous outdoor recreation opportunities within a 2-4 hour drive of the monument. Mobile phone reception is ok depending on the carrier. Internet is available on the intern's work station.

WORK ENVIRONMENT

The project will require the intern to spend a majority of their internship in the office on a computer work station. However, there will be numerous opportunities to accompany the resource staff into the backcountry to gain an understanding of the monument landscape and erosion conditions. Additionally, ground-truth checking of remotely sensed satellite data will require the intern to accompany the resource staff on over-night camping trips into the monument backcountry. Camping equipment will be supplied; however, the intern should bring quality, water-resistant hiking boots and outdoor field clothing. The rugged terrain, high temperatures and monsoon thunderstorms are the greatest threat to personal safety in the backcountry. The intern should be comfortable hiking over rugged terrain.

CONTACT INFORMATION

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