

## **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 emergent management issues. 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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### **THE CHANGING RELATIONSHIP BETWEEN SAGUAROS AND THEIR PLANT COMMUNITY**

Saguaro National Park  
Tucson, AZ

#### **INTERNSHIP BLURB**

Analyze data from citizen science projects on the relationship between growth and age structure of the saguaro cactus and its associated Sonoran Desert plant community, and co-write a scientific paper. Work with student interns and volunteers to fill in a major knowledge gap with saguaros and associated plants across the wide range of saguaro habitat in Saguaro National Park, suggest improvements to long-term citizen science projects at the park, and assist interpretive staff and social media interns in communicating recent scientific findings to the public.

#### **INTERNSHIP PROJECT BACKGROUND**

Saguaro National Park is deeply engaged both in long-term research on its namesake plant, the iconic saguaro cactus, and in assessing how the park's plant and animal communities are changing. The park was established to protect, study, and interpret saguaros, which are long-lived cacti that depend upon "nurse trees" such as foothills palo verde that protect seedlings from summer heat and winter cold and provide necessary soil moisture conditions when plants are young (Drezner 2006). Following a successful NPS Centennial citizen science project focused on how saguaro establishment has changed in response to changing temperature and precipitation regimes in 2016 (Swann et al. 2017), we have created new citizen science programs to the relationship between climate and saguaro growth rates, flowering phenology, and nurse trees. Because of the large elevational range of Saguaro National Park, there is also potential to link saguaro dynamics with those of plants at higher elevations.

This project addresses an important emerging NPS management issue – how to protect a single, high-profile species within a dynamic plant community that appears to be changing due to changing temperature and precipitation regimes. Previous research (Orum et al. 2016) suggests that weather-related changes in the community of plants associated with saguaros can affect saguaros, but no studies have directly addressed the dynamics of saguaro survival and plant communities on a landscape scale. This project has a wide application within NPS as park managers struggle with the question of how (and whether) to preserve single species such as saguaros in the context of long-term ecological change associated with increasing temperatures in the desert Southwest.

## **INTERNSHIP PROJECT DESCRIPTION**

The intern's role will be to critically evaluate data from the citizen science growth and nurse tree studies, analyze the data to date, and suggest improvements to this long-term project. A second, more significant role will be to analyze age structure and growth data to create a peer-reviewed scientific paper. This paper will address the broader relationship between precipitation, temperature, and growth and survival of saguaros and will complement our recent published work on saguaro establishment.

### **Internship Tasks**

- work with Citizen Scientists to collect data on saguaros and nurse trees;
- analyze data collected for the growth rate and nurse tree studies during 2017-2018 and suggest changes to the study design;
- assist in preparation of a peer-reviewed scientific paper based on a comprehensive analysis of data collected during the study of 2015-2016. The goal of this paper will be to address how aspects of saguaro ecology and associated plant communities in Saguaro National Park have responded to increased average temperatures during the past 3 decades.
- assist interpretive staff and social media interns in communicating recent scientific findings at the park to the public.

### **Internship Products**

- a revised study design for the nurse tree Citizen Science project;
- a draft paper on saguaro growth and survival related to weather parameters; and
- a talk on saguaros and environmental changes presented to a regional or national scientific or management meeting.

## **QUALIFICATIONS**

The ideal candidate will be a graduate student or exceptional undergraduate with previous experience in desert ecology. He or she must have strong scientific inquiry and analytical skills (proficient in R and current statistical approaches) and proven ability to produce high-quality scientific writing. Strong field skills and science communication skills are a definite plus.

## LEADERSHIP DEVELOPMENT

The success of this project will depend a great deal upon successful development and use of leadership skills in the areas of:

- **Collaborative science.** The intern will have the opportunity to engage in field-based science in a collaborative framework. She or he will work directly with the biologist at Saguaro National Park who coordinates the park's science program and is a co-author on a number of peer-reviewed papers related to desert ecology and saguaros. All of the park's science projects are in partnership with other organizations and the intern will have the opportunity to interact with biologists from the Sonoran Desert network and University of Arizona.
- **Natural resource and NPS management.** The intern will be working with a variety of people in many different settings including park managers, restoration ecologists, university staff and academics, volunteers, and environmental education staff. He or she will have the opportunity to cross-train in other natural resource management and other park divisions, especially Interpretation.
- **Safety and Wilderness training.** Saguaro National Park is 78% designated wilderness, so a special emphasis will be on wilderness character and the importance of science in wilderness management. The intern will have also be trained in wilderness safety and have the opportunity to take CPR and Wilderness First Aid.
- **Science communication.** An important focus of this internship is on science communication. In addition to developing science writing skills the intern will have the opportunity to assist interpretive staff and social media interns in communicating recent scientific findings at the park to the public, to managers, and to other scientists.

## DATES OF POSITION

The preferred starting date is May 15, 2016, however dates of the position are flexible, depending upon availability. Ideally the intern will work 480 hours between May 15 and August 15.

## COMPENSATION

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

## HOUSING

Shared government housing will be provided at the Rincon Mountain District of the park. The intern will share a kitchen and common living space, but have their own bedroom. The park sits on the edge of large city, and many stores are within a short drive. There is no public transportation to the park, so a car is strongly recommended. If park housing is not available, a housing subsidy may be available to the intern for rental housing.

## **WORK ENVIRONMENT**

The park is adjacent to Tucson, a city of nearly one million people. Southern Arizona is very hot in the summer, with daily averages near 100 degrees F. We anticipate that up to 50% of the work will be in the field, with the rest in the office or home office. Field work is physically demanding in that there are spiny plants, dangerous animals such as rattlesnakes, in addition to the intense heat. We will have extensive safety training before we start field work and safety is the highest priority. However, it's important that applicants realize that they must have the capacity, in advance, for the intense physical difficulty involved.

## **CONTACT INFORMATION**

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