## PROJECT DESCRIPTION
### 2020 FALL/WINTER

<table>
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<tr>
<th>NPS UNIT: ALASKA REGIONAL OFFICE</th>
<th>PD #: 2020437</th>
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<tbody>
<tr>
<td><strong>Position Title:</strong> GiS Assistant (1)</td>
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<td><strong>Position Type:</strong> Guest Scientist</td>
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<td><strong>Primary natural resource discipline:</strong> Multidisciplinary</td>
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<tr>
<td><strong>Project keywords:</strong> remote sensing; vegetation; fire; glaciers; landcover classification; change detection; mapping</td>
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<td><strong>Location:</strong> Anchorage, Alaska</td>
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### COVID-19 NOTICE

This project description was developed prior to the onset of the COVID-19 outbreak. Therefore, project timelines and structure remain flexible and it may be necessary to postpone start dates, begin work remotely, or reformulate the project’s description. Should any development in the COVID-19 outbreak impair a project’s timeline or results, the GIP Team will work with the park and project mentors to assess the situation and determine the best course of action at that time.

### PROJECT DESCRIPTION AND WORK PRODUCTS

**Position Description:** The National Park Service manages large protected areas in Alaska and requires high resolution topographic data for modeling environmental and geomorphic responses to potential impacts. Over the last couple of years, the Alaska Region has completed a number of Structure from Motion (SfM) data acquisitions to support long-term monitoring of natural resources in the parks. The high-resolution imagery and digital elevation models (DEMs) that are being generated from these missions will be used in a number of applications, including monitoring changes on the landscape following fire; mapping and monitoring coastal geomorphology and erosion; identifying recent landslide activity in areas of permafrost thaw; classifying salt marsh vegetation; detecting interannual variability in rocky intertidal systems; and monitoring glacial recession.

The Guest Scientist recruited for this project will assist in processing data from the last two years’ acquisitions; developing and/or refining new work flows to classify and analyze the data; and integrating the outputs with other datasets. We seek a candidate with remote-sensing experience, especially with image analysis and landcover classification. Experience conducting SfM collections or analyzing LiDAR/TLS point clouds is also desirable.

The participant will work with a diverse team of natural resources scientists to apply these SfM capabilities to a wide-range of natural resources management issues. The participant will also work with partners from other agencies and university collaborators to further develop tools for processing the SfM data accurately and efficiently. Time and funds permitting, and depending on the interest, the Guest Scientist may also assist with one or more SfM data acquisition projects in 2021, consisting of standard color (RGB) and near-infrared (NIR) collections used to generate detailed digital elevation models (DEMs) and classified imagery.

The results of this work are used by park managers to identify geologic hazards to protect visitors; monitor coastal erosion to prioritize archaeological studies of threatened resources; measure rates of glacier retreat due to climate change; map coastal habitats sensitive to oil spills; monitor landcover changes due to climate change; and provide stunning visualizations that are used to interpret these changes. The NPS Alaska
Region manages more than 60% of the NPS land area nationwide, so this cost-effective tool is useful for a wide-range of projects across the spectrum of disciplines.

This position is offered through the National Park Service’s Geoscientists-in-the-Parks (GIP) Internship Program in partnership with Stewards Individual Placement Program (Stewards) and The Geological Society of America (GSA).

**Work Products:** Deliverables will include orthorectified photos; digital elevation maps (DEM); hillshade maps; metadata; documentation of workflows/manuals, if applicable; and other downstream products including classified images and difference images (change detection, using classified images and/or DEMs). The Guest Scientist will compile a report documenting their work, and may also have the opportunity to collaborate with principal investigator(s) on any manuscripts stemming from the SfM data.

Specific examples of derived products and potential analyses include the following:

- Processing of SfM data to obtain orthophotos and DEMs; e.g. for thaw slumps in several arctic parks, and for coastal meadows in Kenai Fjords.
- Classification & change detection: Classify three years of images collected by UAS in the rocky intertidal in Katmai National Park & Preserve to characterize percent cover using both RGB and MSI; apply change detection to examine change in cover classes. Classify images from a large burn in Yukon-Charley Wild Rivers National Preserve; contingent on 2020 collections, apply change detection to the DEMs to test for changes due to permafrost thaw and active layer release; classify imagery to examine post-fire recovery.
- Classification & upscaling of plot-level data: Use fine-scale CIR imagery of lichen training plots to develop landscape-level lichen cover and composition maps. Classify coastal meadow sites in several parks in southwest Alaska; use plot-level data to refine classification at one or more sites.

**QUALIFICATIONS**

- Completion of an undergraduate degree in the geosciences by the start of the appointment. Graduate level degrees preferred.
- Required coursework: remote sensing and GIS, or demonstrated proficiency
- Surveying or mapping-grade GNSS skills
- Experience in image classification, Python and/or IDL scripting
- Experience using Agisoft Metashape/Photoscan, or similar image processing software
- Ability to work independently, solve problems creatively, and analyze large data sets
- Ability to complete written reports
- Experience with electronics, photographic equipment and computers (optional)
- Required documentation: transcripts (unofficial transcripts acceptable) and two letters of support from professors and/or employers in the geosciences.

The applicant must be a U.S. citizen or U.S. permanent legal resident (“green-card-holder”) between the ages of 18 and 30 years old, inclusive, or veteran up to age 35. Prior to starting this position, a government security background clearance will be required.

**VEHICLE AND DRIVER LICENSE REQUIREMENTS**

**Applicant must have a valid driver license and a good driving record.** The Guest Scientist will be required to drive a government vehicle as part of their duties.

**A personal vehicle is not required for this position.** A personal vehicle is not required for this position. The Alaska Regional Office (AKRO) and local amenities are located within walking, biking or busing distance from downtown and midtown Anchorage.
If the GIP is required to drive a park vehicle for their position, Stewards will perform a driving records search, and the GIP’s ability to drive a park vehicle during work hours will be contingent upon the results. GIPs will have to have had their license for 3 years or be over the age of 21 to be insured as drivers under Stewards insurance policy. Examples of things that will preclude a GIP from driving a park vehicle include: GIP under the age of 21 years old that has been licensed less than three years, DUls, multiple moving vehicle violations, suspended or revoked license, or three or more accidents (regardless of fault) in the last 3 years. If the driver’s search is favorable, Stewards will provide driver’s liability insurance while the intern is driving a NPS vehicle for their GIP position. If the GIP is denied coverage by Stewards, they will not be permitted to drive during work hours.

**HOUSING**

Park housing is NOT available and the intern will be responsible for finding housing in the nearby area. Anchorage is a small city with many housing options available within walking, cycling, or busing distance of downtown, where the NPS office is located. Options range from shared housing to multi-room apartments. See Craigslist for short-term rental prices (https://anchorage.craigslist.org/search/hhh). Note that prices during the summer may exceed those during the fall-spring.

**INTERNSHIP DATES**

Start Date: 9/14/2020  
Number of weeks: 52 weeks  
Flexibility of dates: Yes

**LIVING ALLOWANCE**

52 weeks ($525/week = $27,300)

**RELOCATION ALLOWANCE**

$1000

**AMERICORPS PROGRAM**

AmeriCorps is a program that engages individuals in intensive community service work with the goal of “helping others and meeting critical needs in the community”. The GIP Program is supported through AmeriCorps by providing a Segal Education Award in addition to the GIP's living stipend and relocation allowance.

Upon successful completion of the GIP position, the GIPs (AmeriCorps members) are eligible for a $1,612 - $6,095 pre-tax education award that can be used for paying back student loans or for continuing their education. The amount of the education award is based on the length of the position.

AmeriCorps limits the number of terms an individual can serve to 4 terms. If an applicant has previously completed 4 GIP or other AmeriCorps positions, they will not be eligible to apply for an additional GIP position.

**NATURAL AND PHYSICAL WORK ENVIRONMENT**

**Natural Environment:** The work will be based out of the Alaska Regional Office, located in downtown Anchorage. Anchorage is a city of about 300,000 people, with all typical amenities including hospitals, schools, universities, restaurants, museums, theaters, and airports. The city has great trails for running, road biking, and mountain biking. There are many parks within and just outside the city limits, providing opportunities for hiking, backcountry camping (moose, bears, and sheep are common), and a range of other outdoor activities. Sea kayaking is popular out of the nearby towns of Whittier, Seward, and Homer. Canoeing, kayaking, and rafting opportunities are also available on lakes and rivers within an hour’s drive from town.

The weather in Anchorage is subarctic maritime. Summer temperatures range from approximately 55-78 °F, and winters are dark and cold, typically between 10-20 °F. In the mid-summer, we have nearly 24 hours of light, and with so many recreational activities available, it is difficult to find time to sleep. Anchorage has
over a hundred miles of groomed ski trails, many of which are lighted for night skiing. Off-trail cross-country skiing, hiking, and fat tire biking trails are available in town and the neighboring areas. Two ski resorts, Alyeska and Arctic Valley, are less than an hour out of town. Backcountry skiing opportunities are abundant. Three lakes in town are plowed for ice skating, and wilderness ice skating can be enjoyed throughout the winter.

**Physical Work Environment:** Work will primarily be in an office environment. The Guest Scientist may spend long hours working on a computer processing data, making maps, organizing data, and writing reports. Time permitting, and depending on the applicant’s interest, the participant may also assist with one or more field campaigns, which occur between May-September and are conducted in remote areas across the state. SfM data collection requires flying in small, fixed-wing aircraft, often spending up to 5 hours in the air, monitoring equipment and troubleshooting issues that arise. Motion sickness is common. Field housing may be in park housing, park cabins, hotels, or a tent. Field work consists of long days in remote locations, and due to weather or tidal constraints, the scheduling is irregular, so the participant must be flexible. Field work may require travel in bear country, transport in small boats (skiffs), carrying a heavy pack off-trail through steep terrain, and working in inclement weather.

**MENTORING AND LEARNING GOALS**

**Mentoring:** There are two primary scientists in the Alaska Regional Office involved with the SfM project, the Regional GIS Coordinator and the Regional Coastal and Oceans Coordinator. However, the participant will be working on projects with a broad range of natural resources scientists, including ecologists with the Inventory & Monitoring Program. Training and mentoring for SfM, GNSS, and GIS will be provided. The participant will receive direction and assistance with analyzing data, prioritizing work, and writing reports.

**Learning Goals:** The participant will learn about the natural resources of the Alaska parks and their importance to managers and visitors. They will become familiar with the ecology and geology of large parts of Alaska. They will learn technical skills related to structure from motion (SfM) photogrammetry, which will include photography, data management, GNSS, and GIS, and how these data are applied to natural resource management issues. Time permitting, and depending on the applicant’s interest, they will also learn how to conduct fieldwork in remote environments.

**SUPERVISORS/MENTORS**

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<tr>
<td>Angie Southwould</td>
<td>Tahzay Jones</td>
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<tr>
<td>Regional GIS Coordinator &amp; Lead GIS Data Manager</td>
<td>Coastal Coordinator, Natural Resources Team</td>
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