POSITION DESCRIPTION
WINTER 2021

NPS UNIT: INVENTORY & MONITORING DIVISION & GREAT LAKES NETWORK	PD #: 2021424

Position Title: Ecology Assistant
Number of positions available: 1
Primary natural resource discipline: Biological Sciences
Position keywords: Artificial Intelligence, Machine Learning, Deep Learning, Computer Vision, sensor ecology
Location: Fort Collins, Colorado
Can this position be fully remote: Yes

COVID-19 NOTICE

As the COVID-19 pandemic continues to change and evolve, 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 SIP Team will work with the park and project mentors to assess the situation and determine the best course of action at that time.

POSITION DESCRIPTION AND WORK PRODUCTS

Position Description: As automated recording sensors (like cameras and microphones) become more powerful and less expensive, they have great utility for natural resource inventory and monitoring purposes. Sensors can provide information at frequent intervals at many survey sites, including those where human travel is difficult or dangerous. This greatly enhances our ability to determine the status and trends for a vast array of species in our parks. However, the data streams from those sensors (e.g. images, video, sound recordings) require processing to extract ecologically meaningful information. At the same time that the sheer volume and scale of the data streams we obtain with these sensors provides enormous value to species investigations, it also makes this work unwieldy and costly in terms of processing time and effort, essentially precluding traditional manual processing of data. Artificial Intelligence (AI) and Machine Learning (including computer vision, deep learning, etc.) are computer algorithms that are being applied to an ever-growing number of human and natural resource management challenges. Artificial Intelligence involves pattern detection. Common applications of AI in natural resources management include species identification, animal behavior classification, and biodiversity estimation in large datasets of remotely recorded images, audio recordings, and videos. Because these tasks are time and labor intensive for individuals to perform, AI is critical for efficiently, rapidly, and reliably implementing these tasks – effectively serving as an effort multiplier allowing one person to extend the scope and quality of their work. The NPS Inventory & Monitoring Division (IMD) is contending with ever-expanding datasets and the directive to report on those datasets in a timely manner. IMD is now beginning to evaluate AI and Machine Learning needs for species inventories and monitoring across the 32 Inventory and Monitoring (I&M) networks. This SIP position would be an integral contributor to understanding the current dispersed IMD AI efforts and how those could be coordinated into tools that may be used service-wide. The position may be structured in several possible ways depending on the specific skillset and interests of the SIP intern, including: (1) Planning – The intern would assist IMD in evaluating what existing protocols and methodologies are currently being employed across the 32 I&M networks and parks (developing lists of instruments being used, type of data being collected, identifying resource management questions being informed, and

requesting example data). The intern will then help to assess which protocols and projects have clear compatibilities to apply AI approaches, and develop flowcharts to help best develop plans to support these project needs with AI in the most efficient manner. (2) Case Study – The intern could engage in a hands-on project to establish a "proof of concept" in applying AI to image or audio data. This project would directly benefit a group of networks with similar data, but would produce a 'pipeline' / SOP for processing similar data from any source. (3) Training Dataset – The intern could engage in collecting and refining image and/or audio data to develop high quality training datasets that will help in developing AI approaches. The paucity of useful training datasets for bioacoustics is a considerable hurdle in applying AI approaches. Developing training data would provide considerable benefits over the long-term by enabling other AI researchers to test their methods with our datasets, and thus enable direct applications of more advanced approaches.

This internship represents an integrated, interdisciplinary approach to allowing NPS to process natural resource data and address questions of pressing conservation concern. In effect, this internship is the first step in helping bring IMD into the modern age in tackling sensor ("Internet of Things") data on species and ecosystems. What is started in this internship is just the beginning of more far-reaching application of these AI approaches, and will help NPS better identify, understand, and track the condition of its resources over the long-term.

This position is offered through the National Park Service's Scientists in Parks (SIP) Program in partnership with Stewards Individual Placement Program (Stewards) and The Geological Society of America (GSA).

Work Products: Some combination of final project report, presentation, SOP, and/or dataset

QUALIFICATIONS

The intern will need to have a strong background in computer programming, machine learning, and artificial intelligence. The intern should be able to use Python, R, or other appropriate software to accomplish the goal. The intern should have some familiarity with wildlife and a strong passion for nature conservation, but a degree in wildlife ecology or natural resources is not required.

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 veterans up to age 35. Prior to starting this position, a government security background clearance will be required.

VEHICLE AND DRIVER LICENSE REQUIREMENTS

Applicant will not need to drive a government vehicle.

A personal vehicle is RECOMMENDED but not required for this position.
If the SIP is required to drive a park vehicle for their position, Stewards will perform a driving records search, and the SIP's ability to drive a park vehicle during work hours will be contingent upon the results. SIPs 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 SIP from driving a park vehicle include: SIP under the age of 21 years old that has been licensed less than three years, DUIs, 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 SIP position. If the SIP is denied coverage by Stewards, they will not be permitted to drive during work hours.

HOUSING

Park housing is NOT available. The intern will be responsible for finding housing in the nearby area. There are a wide range of housing options in Fort Collins, including apartments, houses, and in-home room rentals. Rental costs start around $500/month and increase with size, furnishings, privacy, and amenities. Because it is a college town, there are often students looking for housemates as well. We will do

our best to help connect the intern with housing options. We recommend the applicant exploring housing options before applying for the internship; if selected, we recommend pursuing housing as soon as applicant accepts the position.

NATURAL AND PHYSICAL WORK ENVIRONMENT

If working on-site at the national NPS-IMD central office, the intern will work from Fort Collins, CO which is a city situated at the base of the Rocky Mountain foothills of the northern Front Range, approximately 60 miles (97 km) north of Denver, Colorado, and 45 miles (72 km) south of Cheyenne, Wyoming. Elevation is 4,982 ft (1,519 m) above sea level. For more information on Fort Collins, CO: https://en.wikipedia.org/wiki/Fort_Collins,_Colorado. There is a possible option for the intern to work remotely from a home location (negotiable). Most work will be analytical, computer-based work that will require long periods of sitting or standing while processing data and communicating by phone or video calls with other scientists.

INTERNSHIP DATES

Start Date: 10/10/2021
Number of Weeks: 26
Flexible Start Date: Yes

LIVING ALLOWANCE

26 Weeks ($525/week = $13,650)

RELOCATION ALLOWANCE

$350 (Mainland Only)

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 SIP Program is supported through AmeriCorps by providing a Segal Education Award in addition to the SIP's living stipend and relocation allowance.

Upon successful completion of the SIP position, the SIPs (AmeriCorps members) are eligible for a $1,678 - $6,345 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 SIP or other AmeriCorps positions, they will not be eligible to apply for an additional SIP position.

SUPERVISORS/MENTORS

Primary:	Secondary:
Tom Philippi Principle Scientist tom_philippi@nps.gov	Tracy Ziegler; Thomas Parr; Paula Capece Program Manager tracy-ziegler@nps.gov; thomas_parr@nps.gov; paula_capece@nps.gov