Opportunity Title: USDA-ARS SCINet Postdoctoral Fellowship in Machine Learning for Camera Trap Data
Opportunity Reference Code: USDA-ARS-2022-0157

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-2022-0157

How to Apply ***Connect with ORISE...on the GO!*** Download the new ORISE GO mobile app in the Apple App Store or Google Play Store to help you stay engaged, connected, and informed during your ORISE experience and beyond!

A complete application consists of:

- An application
- Transcript(s) – For this opportunity, an unofficial transcript or copy of the student academic records printed by the applicant or by academic advisors from internal institution systems may be submitted. All transcripts must be in English or include an official English translation. Click here for detailed information about acceptable transcripts.
- A current resume/CV, including academic history, employment history, relevant experiences, and publication list
- Two educational or professional recommendations

All documents must be in English or include an official English translation.

Application Deadline 2/28/2023 4:41:21 PM Eastern Time Zone

Description ***Applications will be reviewed on a rolling-basis and this posting could close before the deadline.**

ARS Office/Lab and Location: A postdoctoral research opportunity is available in the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), with Hailey Wilmer and the Range Sheep Production Efficiency Research Unit located in Dubois, ID, with the opportunity to work from one of multiple labs within the collaborative team.

Research Project: The U.S. Department of Agriculture - Agricultural Research Service (USDA ARS) mission involves problem-solving research in the widely diverse food and agricultural areas encompassing plant production and protection; animal production and protection; natural resources and sustainable agricultural systems; and nutrition; food safety; and quality. The programs are conducted in 46 of the 50 States, Puerto Rico, and the U.S. Virgin Islands. For ARS to maintain its standing as a premier scientific organization, major investments in computing, networking, and storage infrastructure are required. Training in data and information management are integral to the integrity, security, and accessibility of research findings, results, and outcomes within the ARS research enterprise. Nearly 2000 scientists and support staff conduct research within the ARS research enterprise.

The SCINet/Big Data Research Participation Program of the USDA ARS offers research opportunities to motivated postdoctoral fellows interested in collaborating on agricultural-related problems at a range of spatial and temporal scales, from the genome to the continent, and sub-daily to evolutionary time scales. One of the goals of the SCINet Initiative is to develop and apply new technologies, including AI and machine learning, to help solve complex agricultural problems that also depend on collaboration

across scientific disciplines and geographic locations. In addition, many of these technologies rely on the synthesis, integration, and analysis of large, diverse datasets that benefit from high performance computing clusters (HPC). The objective of this fellowship is to facilitate cross-disciplinary, cross-location research through collaborative research on problems of interest to each applicant and amenable to or required by the HPC environment. Training will be provided in specific AI, machine learning, deep learning, and statistical software needed for a fellow to use the HPC to analyze large datasets.

Motion-activated camera ("camera trap") data are becoming increasingly important to understand and manage animal behavior in a number of contexts, including livestock-wildlife conflicts in agroecosystems like rangeland livestock systems. However, machine learning tools are needed to reduce costs for image classification and decision-making. This fellowship focuses on 1) advancing and refining existing machine learning tools and 2) developing new monitoring and classification methods to more efficiently and effectively study and monitor animal behavior in agroecosystems with camera trap data.

Under the guidance of a mentor and a team of interdisciplinary rangeland and wildlife scientists from around the country, the participant will develop skills related to improving the accuracy and geographic scope of machine learning tools for camera trap image classification. This will involve independently and collaboratively conceiving of, developing, testing, and disseminating workflows and repeatable examples for applying machine learning and AI approaches with SCINet resources to existing image datasets to more accurately identify animals, species, and their behavior within images. The participant will also gain experience leading a community of practice around the use of ML/AI to study animal behavior (a SCINet working group), and collaborative and stakeholder-informed research to develop camera trap monitoring and processing workflows in the Intermountain West.

Learning Objectives: The participant will learn HPC computing technologies and will help develop and co-lead ARS-wide workshops, resulting in a community of scientific practice related to using AI/ML technology to understand animal behavior. The participant will have the opportunity to collaborate with multiple USDA ARS, as well as USDA-APHIS and private industry scientists on camera trap monitoring and classification projects, and to lead collaborative scientific papers related to AI/ML tools and workflows to monitor and classify animal behavior. The participant will also have the opportunity to engage with manager stakeholders to improve the useability of these research products for rangeland managers and ranchers.

USDA-ARS Contact: If you have questions about the nature of the research, please contact Hailey Wilmer, Research Rangeland Management Specialist, at (hailey.wilmer@usda.gov).

Anticipated Appointment Start Date: October 2022. Start date is flexible

and will depend on a variety of factors.

Appointment Length: The appointment will initially be for one year, but may be renewed upon recommendation of the mentor and ARS, and is contingent on the availability of funds.

Level of Participation: The appointment is full-time.

Participant Stipend: The participant(s) will receive a monthly stipend commensurate with educational level and experience.

Citizenship Requirements: This opportunity is available to U.S. citizens, Lawful Permanent Residents (LPR), and foreign nationals. Non-U.S. citizen applicants should refer to the Guidelines for Non-U.S. Citizens Details page of the program website for information about the valid immigration statuses that are acceptable for program participation.

ORISE Information: This program, administered by ORAU through its contract with the U.S. Department of Energy (DOE) to manage the Oak Ridge Institute for Science and Education (ORISE), was established through an interagency agreement between DOE and ARS. Participants do not become employees of USDA, ARS, DOE or the program administrator, and there are no employment-related benefits. Proof of health insurance is required for participation in this program. Health insurance can be obtained through ORISE.

Questions: Please visit our Program Website. If you have additional questions about the application process please email USDA-ARS@orau.org and include the reference code for this opportunity.

Qualifications

The qualified candidate should be currently pursuing or have received a doctoral degree in one of the relevant fields (e.g. Information and Data Science, Ecology, Earth Science, Mathematics, Statistics).

Preferred skills:

- Experience developing, testing, and refining machine learning models to identify of classify large image datasets
- Experience developing HPC workflows for image classification
- Some knowledge and/or interest in conservation wildlife, rangeland, livestock, animal behavior, or other ecological fields
- Interest in developing skills for stakeholder engagement, management-science partnerships, and manager-relevant applied research methods
- Excellent written and oral communication skills
- Experience in team and collaborative scientific environments

Eligibility Requirements

- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (17 👁)
  - **Earth and Geosciences** (1 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)

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- **Life Health and Medical Sciences** (13 👁)
- **Mathematics and Statistics** (3 👁)
- **Other Non-Science & Engineering** (1 👁)