

#### Opportunity Reference Code: USDA-ARS-SCINet-2023-0293

Urganization U.S. Department of Agriculture (USDA)

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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. 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 1/4/2024 3:00:00 PM Eastern Time Zone

#### Description \*Applications are reviewed on a rolling basis.

**ARS Office/Lab and Location:** A postdoctoral research opportunity is available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Forage and Range Research Laboratory, Logan Utah.

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 postdoctoral fellows conduct research within the ARS research enterprise.

**Research Project**: The SCINet/Big Data Research Participation Program of the USDA ARS offers research opportunities to motivated postdoctoral fellows interested in solving agriculture-related problems at a range of spatial and temporal scales, from the genome to the continent, and subdaily 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

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computing (HPC) clusters. 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 requiring the HPC environment. Training will be provided in data science, scientific computing, Al/machine learning, and related topics as needed for the fellow to complete their research.

Throughout the course of this research project, the participant will have the opportunity to gain experience in assessing how different types of restoration initiatives affect the dynamics of soil moisture at different spatial scales (i.e., plot, stands and landscapes) in sensitive rangelands of the intermountain western USA, and successfully use high performance computing resources for this type of scientific research. In this particular project the participant will learn how to (1) develop large geospatial datasets that describe sites that have experienced disturbances such as fires and that have been reseeded for restoration purposes, (2) locally calibrate time series of satellite-derived soil moisture with field data and multispectral sensors onboard unmanned aerial systems (UAVs), and (3) combine the geospatial datasets with the calibrated regionwide soil moisture time series to expose feedbacks and the success rate of different restoration efforts on the dynamics of soil moisture in delicate semiarid lands.

Learning Objectives: The participant will be exposed to multiple training opportunities as well as topic-specific workshops related with the highthroughput phenotyping project (HTTP) that is being actively implemented at the Forage and Range Research Lab. This project is actively testing how field observational data can be used with multispectral imagery to obtain reliable estimates of plant traits that can be used for genetic selections in forage and turf grasses. The participant will also have the opportunity to take in-person and on-line courses in scientific topics such as planning unmanned aerial vehicles flights, extraction of feature of interest from drone-imagery, using cloud-based archives and geoprocessing platforms. Active exposure to statistical learning algorithms and data analytics using R, Python and SQL will benefit the participant as well.

<u>Mentor(s)</u>: The mentors(s) for this opportunity is Alexander Hernandez (<u>alexander.hernandez@usda.gov</u>). If you have questions about the nature of the research, please contact the mentor(s).

<u>Anticipated Appointment Start Date</u>: Start date is flexible and will depend on a variety of factors.

**<u>Appointment Length</u>**: Appointment length will initially be for one year but may be renewed upon recommendation of ARS and is contingent on the availability of funds.

Level of Participation: The appointment is full-time.

**Participant Stipend:** The participant will receive a monthly stipend commensurate with educational level and experience. **The current stipend** range for this opportunity is \$85,000 - \$95,000/year plus a supplement to offset a health insurance premium.



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<u>Citizenship Requirements</u>: This opportunity is available to U.S. citizens, Lawful Permanent Residents (LPR), and foreign nationals. Non-U.S. citizen applicants should refer to the <u>Guidelines for Non-U.S. Citizens Details</u> 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.

The successful applicant(s) will be required to comply with Environmental, Safety and Health (ES&H) requirements of the hosting facility, including but not limited to, COVID-19 requirements (e.g., facial covering, physical distancing, testing, vaccination).

**Questions:** Please visit our <u>Program Website</u>. After reading, if you have additional questions about the application process, please email <u>ORISE.ARS.SCINet@orau.org</u> and include the reference code for this opportunity.

**Qualifications** The qualified candidate should have received a doctoral degree in one of the relevant fields or be currently pursuing the degree to be received before January 4, 2024.

Preferred Skills:

- Experience creating, modifying and analyzing geospatial datasets in both vector and raster formats
- Experience with satellite remote sensing time (passive and / or active) series such as Landsat, MODIS, Sentinel
- Experience developing, testing, and refining machine learning models
- Experience developing geospatial data analytics workflows using R, Python or QSL
- Excellent written and oral communication skills.
- · Experience in team and collaborative scientific environments.
- Eligibility Degree: Doctoral Degree.

## Requirements • Discipline(s):

- Earth and Geosciences (4.)
- Engineering (<u>1</u><</li>
- Environmental and Marine Sciences (7\_)
- Life Health and Medical Sciences (10.
- Mathematics and Statistics (4. (2. (4. (2. ))))))))))
- Social and Behavioral Sciences (1. )



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