Opportunity Title: USFS Soil Science Postdoctoral Fellowship
Opportunity Reference Code: USDA-USFS-2020-0191

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-USFS-2020-0191

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 package 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. Selected candidate must provide proof of completion of the degree before the appointment can start. All transcripts must be in English or include an official English translation. Click **Here** for detailed information about acceptable transcripts.
- A current resume/CV
- Two educational or professional recommendations

If you have questions, send an email to USForestService@orise.orau.gov. Please include the reference code for this opportunity in your email.

Application Deadline 12/17/2020 3:00:00 PM Eastern Time Zone

Description ***Applications will be reviewed on a rolling-basis.**

A postdoctoral research opportunity is currently available with the U.S. Department of Agriculture (USDA), U.S. Forest Service (USFS), Office of Sustainability and Climate. The opportunity location is negotiable depending on candidate selection and COVID-19 protocols.

Climate change is already changing precipitation regimes in ways that are increasing both flooding and drought events. Soil moisture is a critical pool linking the hydrologic response to changing precipitation. However, knowledge and monitoring of the spatial and temporal variation of soil moisture is currently lacking, especially for forested lands. The selected participant will gain applied science skills from multidisciplinary research and land management programs coordinated by the Office of Sustainability and Climate, which supports national forests and grasslands with the tools, training, and resources needed to build resiliency into public lands in the face of a changing climate. The fellow will participate in a USDA interagency effort to model soil moisture spatial and temporal variability in two long-term research forested gaged catchments—Coweeta Hydrologic Lab, North Carolina and Hubbard Brook Experimental Forest, New Hampshire and apply this to the Natural Resource Conservation Service (NRCS) efforts to develop a new dynamic soil survey product. These data will ultimately be used to support modeling efforts to predict soil moisture and report dynamic soil properties at a landscape scale in near real-time and at multiple spatial scales. This is a cooperative project that brings together soil moisture and hydrologic modeling across two agencies, NRCS and the Forest Service.

Currently parameters describing forest soils in NRCS soil surveys are static (e.g. hydraulic conductivity, soil carbon, water holding capacity); however, these are known to be dynamic on various spatial and temporal scales. The fellow will gain experience by building spatially explicit models of soil moisture dynamics at watershed scales in two (or more) Forest Service Experimental Forests, including the Coweeta Hydrologic Lab and Hubbard Brook. These models will incorporate long-term hydrometeorologic data and both NRCS and locally developed soil surveys to examine sensitivity in predictions of spatial and temporal dynamics in soil moisture.

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These modeling efforts will inform expanded data collection through a soil moisture monitoring network and inform efforts to implement soil moisture modeling across all federal forest lands. This research is critical for guiding land management options for forest drought responses and mitigation.

The fellow will also gain project management experience by assisting with evaluation of existing precipitation, soil moisture and streamflow data, as well as soil property data to identify data gaps which may need to be filled to advance overall project goals. The fellow will gain communication and coordination experience by facilitating the transfer of data and information across agency boundaries (USDA Forest Service (FS) and Natural Resource Conservation Service (NRCS).

Under the guidance of a mentor, the participant will gain experience through hands-on learning in the following activities:

- Creating a project design with a definition of project area, expected data products, sharing platform and expected results (acceptable techniques) for soil moisture modeling and product development.
- Using data to parameterize, validate, and verify a spatially explicit dynamic hydrologic model to predict variation in soil moisture across the watersheds.
- Identification of data gaps, critical locations and times for data collection, and strategies for the deployment of additional sensors and stations to collect data at both watershed sites.
- Presenting results and recommendations at scientific conferences and to agency principals.
- Modeling various scenarios, such as using static vs. dynamic soil properties in model runs, using dynamic soil survey products/digital soil mapping/high resolution soil property maps, and current vs. future climate regimes to inform design of a dynamic raster-based soil survey.
- Coordinating and developing a collaborative approach to working across different agency boundaries and effectively communicating to partners to enhance understanding and ensure success.

Anticipated Appointment Start Date: Winter 2020-Early 2021

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 USFS. The initial appointment is for one year, but may be renewed upon recommendation of USFS and is contingent on the availability of funds. **The participant will receive an annual stipend of $60,000, which includes a health insurance allowance.** Proof of health insurance is required for participation in this program. The appointment is full-time. Participants do not become employees of USDA, USFS, DOE or the program administrator, and there are no employment-related benefits.

For more information about the USFS Research Participation Program, please visit the **Program Website**.

Qualifications

The candidate should have received a doctoral degree in one of the relevant fields, or be currently pursuing a doctoral degree and will reach completion by the anticipated start date. Degree must have been received within five years of the appointment start date.

Preferred skills:

- Ideal candidates will be highly organized and efficiently skilled at handling and manipulating large data sets
- Experience with distributed watershed hydrologic models such as DHSVM is highly preferred.

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Experience with Linux, C++ and/or Python coding

- Experience with GIS platforms
- Experience with soil physical properties, especially soil hydrology and use of SSURGO/STATSGO2 databases
- Knowledge of using raster-based data sets and data manipulation
- Some knowledge of forest ecohydrology
- Some experience with long-term research
- Excellent writing skills
- Ideal candidates will be able to communicate effectively in a team environment and present information to multiple groups with diverse scientific backgrounds

Eligibility Requirements

- **Degree:** Doctoral Degree received within the last 60 months or anticipated to be received by 1/31/2021 11:59:00 PM.
- **Discipline(s):**
  - **Earth and Geosciences** (2 👁)
  - **Environmental and Marine Sciences** (7 👁)
  - **Life Health and Medical Sciences** (3 👁)