

Opportunity Title: USDA-ARS Agricultural Watershed Modeling

Opportunity Reference Code: USDA-ARS-NEA-2026-0297

Organization U.S. Department of Agriculture (USDA)

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How to Apply *To submit your application, scroll to the bottom of this opportunity and click **APPLY**.*

A complete application consists of:

- An application
- Statement of Research Interests
- 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.

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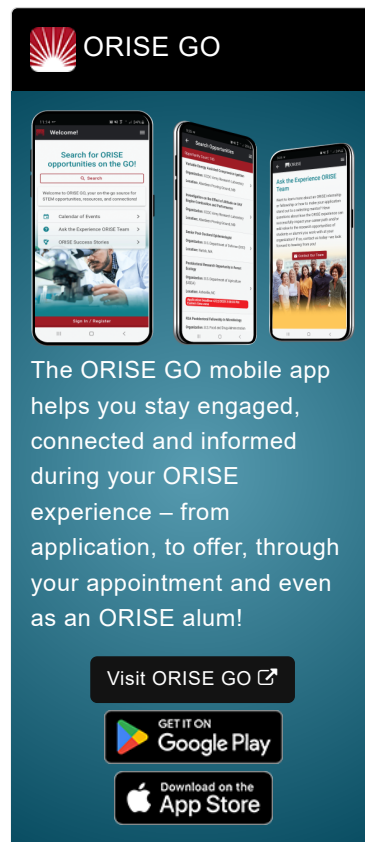
Application Deadline 9/25/2026 3:00:00 PM Eastern Time Zone

Description ***Applications are reviewed on a rolling-basis.**

ARS Office/Lab and Location: Multiple opportunities are available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Hydrology and Remote Sensing Laboratory located in Beltsville, Maryland or Ames, Iowa. Applicable offsite university laboratories may be utilized. Faculty participants may conduct research during the academic year at their academic institution. In these cases, the faculty participant and the mentor must develop a communication/mentoring plan to ensure that program objectives are met.

The Agricultural Research Service (ARS) is the U.S. Department of Agriculture's chief scientific in-house research agency with a mission to find solutions to agricultural problems that affect Americans every day from field to table. ARS will deliver cutting-edge, scientific tools and innovative solutions for American farmers, producers, industry, and communities to support the nourishment and well-being of all people; sustain our nation's agroecosystems and natural resources; and ensure the economic competitiveness and excellence of our agriculture. The vision of the agency is to provide global leadership in agricultural discoveries through scientific excellence.

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



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premier scientific organization, major investments in computing, networking, and storage infrastructure are required. Training in data and information management are important 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.

USDA-ARS is seeking a fellow to gain skills and experience on advanced watershed models by assisting with:

1. Improving numerical representations of key hydrological processes, such as evapotranspiration and groundwater movement.
2. Integrating remote sensing–derived agricultural management data (e.g., cover crops, conservation tillage) and hydrological and water-quality variables (e.g., soil moisture, nutrient concentrations in water bodies) to drive and evaluate watershed model performance.
3. Combining process-based watershed models with Artificial Intelligence (AI) methods to enhance model interpretability, accuracy, and predictive power.

You will also have opportunities to contribute to multidisciplinary, multi-institution collaborative research focused on hydrological and biogeochemical cycles in agricultural landscapes. Outcomes from this are expected to advance the scientific understanding and decision-support tools needed to design regenerative agricultural practices that promote soil health, conserve natural resources, and support long-term crop productivity and agricultural profitability. You will collaborate with ARS scientists to enhance open-source watershed models widely used in agricultural research and management. The new data products, methods, and model improvements developed through this collaboration will be shared with stakeholders and the scientific community through peer-reviewed publications, conference presentations, and practical, user-focused tools.

Learning Objectives: During the appointment, you will;

- Learn advanced watershed modeling approaches used to study hydrological and biogeochemical processes in agricultural systems.
- Gain training in improving numerical representations of key hydrological processes including evapotranspiration and groundwater movement.
- Develop experience integrating remote sensing–derived agricultural management data such as cover crops and conservation tillage into environmental models.
- Learn methods for analyzing hydrological and water-quality datasets including soil moisture and nutrient concentrations in water bodies.
- Build skills combining process-based watershed models with Artificial Intelligence (AI) techniques to improve model performance and predictive capability.
- Gain exposure to multidisciplinary and collaborative agricultural research environments involving hydrology, soil science, environmental modeling, and data science.

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- Learn to research with open-source watershed modeling tools widely used in agricultural research and management applications.
- Develop scientific computing, data management, and quantitative analysis skills applicable to environmental and agricultural research.
- Gain experience communicating scientific findings through publications, presentations, and stakeholder-focused decision-support tools.
- Learn how modeling and data-driven research can support regenerative agricultural practices, soil health, and natural resource conservation.

Mentor(s): The mentor for this opportunity is to Xuesong Zhang (xuesong.zhang@usda.gov). If you have questions about the nature of the research, please contact the mentor(s).

Anticipated Appointment Start Date: 2026. 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 ARS and is contingent on the availability of funds.

Level of Participation: The appointment is part time. Sabbatical appointment and appointments during the academic year are possible. The participant can still act as full-time faculty at a university and participate part-time in the ORISE program if the ORISE research project is not part of their university work.

Citizenship Requirements: This opportunity is available to U.S. citizens only.

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](#). After reading, if you have additional questions about the application process, please email ORISE.ARS.Northeast@orau.org and include the reference code for this opportunity.

Qualifications The qualified candidate should have received a doctoral degree in any of the disciplines listed in the opportunity's eligibility criteria and be a current faculty member at an accredited U.S. institution of higher education.

Preferred skills:

- Experience with process-based agricultural watershed modeling

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- Experience with analysis of geospatial data and time series data
- Experience with machine learning and statistical learning
- Experience with large, diverse datasets
- Familiarity with statistical modeling (ideally Bayesian statistics)
- Proficiency in Fortran, C/C++/R, Python, and Matlab.
- Strong computational skills
- Strong oral and written communication skills

Stipend \$5,000.00 – \$18,000.00 Monthly

Point of Contact [Janeen](#)

Eligibility • **Citizenship:** U.S. Citizen Only

Requirements • **Degree:** Doctoral Degree.

• **Discipline(s):**

- **Chemistry and Materials Sciences** ([1](#) )
- **Computer, Information, and Data Sciences** ([7](#) )
- **Earth and Geosciences** ([21](#) )
- **Engineering** ([9](#) )
- **Environmental and Marine Sciences** ([14](#) )
- **Life Health and Medical Sciences** ([9](#) )
- **Mathematics and Statistics** ([11](#) )
- **Physics** ([2](#) )
- **Social and Behavioral Sciences** ([2](#) )