

Opportunity Title: USDA-ARS Postdoctoral Fellowship in Sustainable Groundwater-Irrigated Agroecosystems

Opportunity Reference Code: USDA-ARS-2021-0147

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-2021-0147

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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. 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 8/31/2021 3:00:00 PM Eastern Time Zone

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

ARS Office/Lab and Location: A research opportunity is available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS) located in Oxford, Mississippi.

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 research will address the feasibility of artificial recharge in the Mississippi River Valley Alluvial Aquifer through a pilot project combining riverbank filtration and aquifer storage to capture surface water for direct injection into the aquifer. Construction of the facility by USDA-ARS is complete and full operation began April 2021. A substantial amount of water-level and water-quality data have been collected during the pre-operation period and will continue to be collected during facility operation. Detailed geologic and geophysical data have been collected by the U.S. Geological Survey (USGS), including airborne electromagnetic data throughout the study area and waterborne resistivity data in major rivers. Research will contribute to developing an understanding of the engineering challenges and technical and economic feasibility of



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subsurface injection as a component of managed aquifer recharge in the region. Hydrologic modeling tools developed in collaboration with USGS and the University of Mississippi (UM) will be used to evaluate the pilot project and support decision making for water resources management in the region.

Under the guidance of a mentor, the participant will collaborate with USDA-ARS, USGS, and UM research scientists to perform the following research activities:

- Participate in all phases of field-based data collection, operation, and evaluation of the pilot project well field;
- Seek out relevant data and review literature for existing knowledge related to riverbank filtration and other artificial recharge technologies and use this information to evaluate hydrogeology of the region and develop operational parameters for sustained managed aquifer recharge; and
- Assist with the development and application of physics-based and data-driven models to evaluate groundwater storage benefits and potential risks for stakeholders.

Learning Objectives: Through successful completion of this appointment the participant will achieve the following learning objectives:

- Collaborate effectively with a multi-agency interdisciplinary research group
- Synthesize and integrate disparate data sources and analyze using modeling techniques
- Write and present research results for publication in peer-reviewed journal articles and presentation at professional conferences

Mentor(s): The mentor for this opportunity is Andy O'Reilly (Andrew.OReilly@usda.gov). If you have questions about the nature of the research please contact the mentor(s).

Anticipated Appointment Start Date: August 2, 2021. 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 full-time.

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

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

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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 USDA-ARS@orau.org 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 with completion by August 31, 2021. Degree must have been received within the past five years.

Preferred skills:

- Use of Programming Languages (e.g. Python, Fortran, Matlab, etc.), Excel, and Geographic Information Systems
- Use of time series analysis methods
- Use of groundwater modeling software (e.g. MODFLOW, HYDRUS 2D/3D, etc.)
- Use of economic methods to optimize the decisions made by agricultural producers
- Collection, identification, preparation, and data analysis of water samples for elemental, trace metal, organic compounds, and stable isotope analyses
- Planning and execution of subsurface hydrologic tracer studies
- Specific knowledge of groundwater dynamics and modeling in the vadose and saturated zones, well hydraulics, and environmental water chemistry
- Broad knowledge of surface and borehole geophysics, agriculture, time series analysis, and statistics
- Additional knowledge of or experience with current methods used in riverbank filtration, aquifer storage and recovery, or other artificial recharge technologies; quantifying river-aquifer hydraulic connection; and hydrologic tracing using artificial or environmental tracers and stable isotopes

- Eligibility Requirements**
- **Citizenship:** U.S. Citizen Only
 - **Degree:** Doctoral Degree received within the last 60 months or anticipated to be received by 8/31/2021 11:59:00 PM.
 - **Discipline(s):**
 - **Chemistry and Materials Sciences** ([1](#))
 - **Earth and Geosciences** ([21](#))
 - **Engineering** ([27](#))
 - **Environmental and Marine Sciences** ([14](#))
 - **Life Health and Medical Sciences** ([3](#))
 - **Mathematics and Statistics** ([1](#))
 - **Physics** ([2](#))
 - **Social and Behavioral Sciences** ([1](#))

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- **Veteran Status:** Veterans Preference, degree received within the last
120 month(s).