Opportunity Title: USDA-ARS SCINet/AI-COE Postdoctoral Fellowship in Artificial Intelligence and Sustainable Agriculture Under Environmental Change
Opportunity Reference Code: USDA-ARS-SCINet-2024-0385

Organization	U.S. Department of Agriculture (USDA)
Reference Code	USDA-ARS-SCINet-2024-0385
How to Apply	***To submit your application, scroll to the bottom of this opportunity and click APPLY.***

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.

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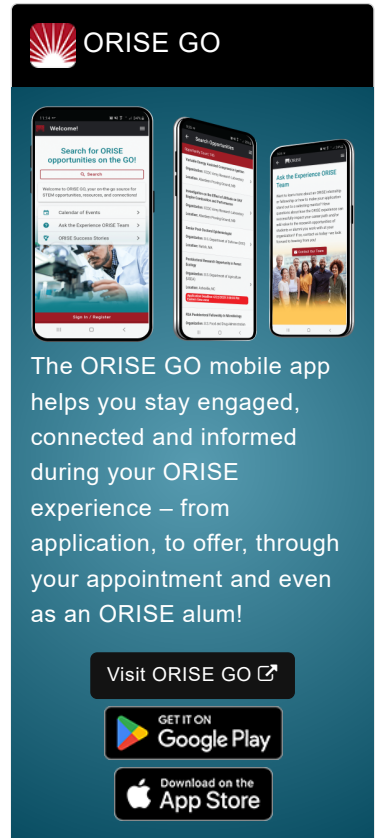
Application Deadline	2/7/2025 3:00:00 PM Eastern Time Zone
Description	**ARS Office/Lab and Location:** A postdoctoral research opportunity is available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Hydrology and Remote Sensing Laboratory and the Macrosystems Ecology Lab at Iowa State University. This opportunity may be in Ames, Iowa or remote.

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 sub-daily to evolutionary time scales. One of the goals of the SCINet Initiative is to develop and apply new technologies, including artificial intelligence (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 (HPC) clusters. The objective of these fellowships 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, AI/machine learning, and related topics as needed for the fellow to complete their research.

Research Project: In collaboration with researchers at USDA-ARS and Iowa State University, the participant will have opportunities to:

![zintellect climb higher]

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- Expand our existing database of cover crops to include more paired experimental data quantifying the impacts of reduced tillage, residue retention and biochar on soil organic carbon (SOC) stocks, nitrous oxide (N2O) emissions, and crop yields;
- Develop a new interpretable data-driven Artificial Intelligence (AI)-empowered tool, leveraging strengths of multiple ML techniques such as random forest, boosted trees, and deep neural networks, to decipher key drivers that regulate the variations in mitigation impacts and crop production;
- Implement the open-source tool to determine changes in SOC, greenhouse gas (GHG) emissions, and crop yields under various mitigation practices; and
- Investigate the implications of individual or stacked practices for crop production, GHG reduction, and environmental co-benefits (e.g., erosion and nutrient loss) across the US.

The outcome from the project is anticipated to advance scientific knowledge to inform sustainable agricultural management under environmental changes.

Learning Objectives:

- Increase understanding of how AI can help understand land surface agricultural parameters.
- Gain knowledge of pertinent remote sensing products for agricultural monitoring.
- Increase knowledge of sustainable agricultural practices.

Mentor(s): The mentor for this opportunity is Michael Cosh, USDA-ARS-Hydrology and Remote Sensing Laboratory, micheal.cosh@usda.gov. If you have questions about the nature of the research, please contact the mentor(s).

Anticipated Appointment Start Date: 2024/2025. 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 for a second year upon recommendation of the mentor and ARS.

Level of Participation: The appointment is full-time.

Participant Stipend: The participant(s) will receive a monthly stipend commensurate with educational level and experience. **The current stipend range for this opportunity is $90,000 - $100,000/year plus a supplement to offset a health insurance premium.**

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. Foreign national candidates may have a mandatory in-person requirement

depending on visa status.

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 [ORISE.ARS.SCINet@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 the one of the relevant fields.

Preferred skills:

- Experience with analysis of large, diverse datasets including field experimental data, geospatial data, and time series data.
- Experience with machine learning and statistical learning.
- Familiarity with various management practices in the US agriculture.
- Proficiency in R, Python, Matlab, or other common programing languages (e.g., C/C++).
- Strong computational skills.
- Strong oral and written communication skills.

Point of Contact	[Shantra]()

Eligibility Requirements	- **Degree:** Doctoral Degree.
	- **Discipline(s):**
	  ○ **Chemistry and Materials Sciences** ([1] 👁)
	  ○ **Computer, Information, and Data Sciences** ([16] 👁)
	  ○ **Earth and Geosciences** ([7] 👁)
	  ○ **Engineering** ([8] 👁)
	  ○ **Environmental and Marine Sciences** ([5] 👁)
	  ○ **Life Health and Medical Sciences** ([6] 👁)
	  ○ **Mathematics and Statistics** ([3] 👁)
	  ○ **Physics** ([2] 👁)

Affirmation	I affirm that: I am a US Citizen, OR; I am a non-US citizen currently living in the United States