Opportunity Title: USDA-ARS SCINet Postdoctoral Fellowship in Optimization of AI-based Microscope Image Analysis
Opportunity Reference Code: USDA-ARS-2022-0163

Organization	U.S. Department of Agriculture (USDA)
Reference Code	USDA-ARS-2022-0163
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 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.

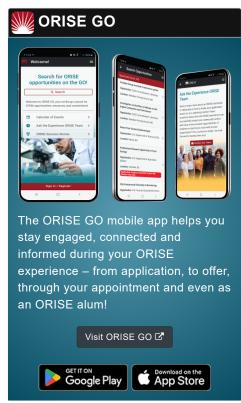|	
Application Deadline	2/28/2023 3:00:00 PM Eastern Time Zone
Description	***Applications will be reviewed on a rolling-basis and this posting could close before the deadline.**

ARS Office/Lab and Location: A postdoctoral research opportunity is available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Grape Genetics Research Unit, located in Geneva, NY.

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 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 support staff conduct research within the ARS research enterprise.

The SCINet/Big Data Research Participation Program of the USDA ARS offers research opportunities to motivated postdoctoral fellows interested in collaborating on agricultural-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 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 clusters (HPC). 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 required by the HPC environment. Training will be provided in specific AI, machine learning, deep learning, and statistical software needed for a fellow to use the HPC to analyze large datasets.

The project that the participant will be involved with will focus on the development and optimization of deep learning-based pipelines for microscopic image analysis. Target datasets will be primarily collected using the Blackbird imaging robot. The development of the self-supervised learning system aims to provide a scalable, reliable, and affordable solution for measuring phenotypic traits in diverse and large image datasets with limited human annotation efforts. The pipeline optimization includes coordination with domain experts for data annotation, model training and fine-tuning for trait measurement, and implementation of mature pipelines for the partnering research programs. The goal will be to deploy a set of analytical pipelines for Blackbird (and other microscopy computer vision platforms) at SCINet, in preparation for expanded use of Blackbird across ARS.

Learning Objectives: The participant will work closely with Cornell University's Cyber-Agricultural Intelligence and Robotics Laboratory (CAIR) to learn HPC computing technologies and will help develop and co-lead ARS-wide workshops, resulting in a community of scientific practice for the Phenotyping Working Group run in coordination with Breeding Insight, to enable long-term support for potential ARS users. The participant will have the opportunity to collaborate with multiple USDA ARS scientists on advanced AI algorithms, theories, and skills, and to translate the learned knowledge into practical learning systems that can be applied to real world problems in agriculture and life science research. Additionally, the participant will learn substantial domain knowledge from various biological research partners to enhance their understanding and vision in high throughput phenotyping and digital biology.

USDA-ARS Contact: If you have questions about the nature of the research, please contact Lance Cadle-Davidson (lance.cadledavidson@usda.gov) and Yu Jiang (yujiang@cornell.edu).

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Anticipated Appointment Start Date: May 2022. 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 the mentor and ARS, and is contingent on the availability of funds.

Level of Participation: The appointment is full-time.

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

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.

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 have received a doctoral degree in one of the relevant fields (e.g. Computer Science, Computer Engineering, Agricultural Engineering, Information Science, Data Science, Mathematics, Statistics), or be currently pursuing the degree with completion by September 30, 2022.

Applications are encouraged from candidates already having a Ph.D. or soon defending their Ph.D. in the relevant fields.

Preferred skills include:

- Strong background in statistical learning
- Deep understanding of machine learning and deep learning
- Extensive experiences in learning-based image analysis
- Proficiency in at least one deep learning library (e.g., PyTorch)

Eligibility

- **Degree:** Doctoral Degree.

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Requirements	• **Discipline(s):**
	○ **Computer, Information, and Data Sciences** (6 👁)
	○ **Engineering** (8 👁)
	○ **Mathematics and Statistics** (2 👁)