Opportunity Title: USDA-ARS SCINet Computer Vision and A.I. for Insect Identification Postdoctoral Fellowship
Opportunity Reference Code: USDA-ARS-2022-0152

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-2022-0152

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 7/21/2023 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), Stored Product Insect and Engineering Research Unit, Manhattan, Kansas

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.

Insect infestations in food storage and processing facilities can be destructive and highly disruptive to production. The participant, under the guidance of the mentors, will study and use artificial intelligence (AI) and machine learning (ML) methods for automated insect identification from images in a broad range of food storage environments. It is envisioned this will help lead to the development of practical, remote and autonomous monitoring devices used to detect insect activity, identify species and infestations in food storage facilities and in the products they house. Ultimately this will lead to better response and control times over the manual monitoring methods currently used.

Learning Objectives: The participant will learn HPC computing technologies and will help develop and co-lead ARS-wide workshops, resulting in a community of scientific practice for a focus group using AI and ML in the image processing arena and other areas using AI. The participant will have the opportunity to collaborate with multiple USDA ARS scientists in the development of feature extraction methods from images over a broad range of topics and report these findings.

USDA-ARS Contact: If you have questions about the nature of the research, please contact Paul Armstrong (paul.armstrong@usda.gov).

Anticipated Appointment Start Date: June 1, 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

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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, Engineering, Applied Mathematics).

Preferred skills:

- Proficient programming skills, experience in one or more deep learning libraries, e.g., PyTorch, TensorFlow, etc
- Programming language/OS proficiency in Linux, C/C++/Python etc.
- Experience in image processing methods
- An interest in multidisciplinary scientific collaboration and application of AI to real world problems in agriculture
- Excellent written and oral communication skills

Eligibility Requirements

- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (1)
  - **Engineering** (27)
  - **Life Health and Medical Sciences** (48)
  - **Mathematics and Statistics** (11)