Opportunity Title: USDA-ARS SCINet/AI-COE Postdoctoral Fellowship in Machine Learning to Distinguish Pest from Non-Pest Weevils
Opportunity Reference Code: USDA-ARS-SCINet-2023-0224

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-SCINet-2023-0224

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.
  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 4/12/2024 3:00:00 PM Eastern Time Zone

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

ARS Office/Lab and Location: A research opportunity is currently available within the US Department of Agriculture (USDA), Agricultural Research Service (ARS), located in College Station, Texas.

The 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 postdoctoral fellows conduct research within the ARS research enterprise.

Research Project: 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 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 this fellowship 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.

The selected fellow will be part of an interdisciplinary pest weevil team with interests in weevil pest management, genomics, diagnostic tools, and functional testing. The ultimate goal of the project is to develop pipelines that incorporate machine learning algorithms to improve analyses in many systems including those involving large scale comparisons, descriptive analyses, and identification of informative genetic regions for diagnostic and biological experimentation. The fellow will mine existing high quality reference genomes and extensive whole genome population sequence data to identify gene regions and/or single nucleotide polymorphisms (SNPs) that are unique to pest weevils and subsequently, can be used to accurately distinguish pest from non-pest weevil species. The fellow will then focus on the development, training, and testing of machine learning algorithms which can be incorporated into a molecular-based diagnostic tool to accurately distinguish pest weevils from non-pest weevils. Incorporation of these data into a supervised, discriminatory training algorithm will greatly enhance our ability to identify the most informative genetic features of a pest weevil which, in turn, can be used in a molecular-based tool to differentiate the pest weevil from other weevil species.

Learning Objectives: The fellow will learn about a wide range of activities related to weevil biology, genomes, and bioinformatics, through collaboration with a multi-disciplinary research team. The candidate will have opportunities to be involved at all levels of experimentation including hands-on laboratory work, data analysis and management, tool development, and authoring resulting manuscripts. The fellow will be encouraged to engage in machine learning working groups, meetings, and training. The fellow will also have the opportunity to present results at National and International meetings as well as ARS webinars and publish peer-reviewed publications.

Mentor(s): The mentors(s) for this opportunity is Lindsey Perkin (Lindsey.perkin@usda.gov). If you have questions about the nature of the research, please contact the mentor(s).

Anticipated Appointment Start Date: 2023; start date is flexible and will depend on a variety of factors.

Appointment Length: Appointment length will initially be for two years 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. **The current stipend range for this opportunity is $85,000 - $95,000/year plus a supplement to offset a health insurance premium.**

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

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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.

The successful applicant(s) will be required to comply with Environmental, Safety and Health (ES&H) requirements of the hosting facility, including but not limited to, COVID-19 requirements (e.g., facial covering, physical distancing, testing, vaccination).

Questions: Please visit our Program Website. After reading, 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 or be currently pursuing the degree to be received before December 31, 2023.

Preferred Skills:

- Experience using and developing HPC workflows
- Experience developing, testing, and refining machine learning models
- Excellent written and communication skills
- Interest in insect biology and/or pest management
- Knowledge of genome biology and comparative genomics

Eligibility Requirements

- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (6 👁)
  - **Life Health and Medical Sciences** (9 👁)