Opportunity Title: USDA-ARS Postdoctoral Fellowship in Using AI to Address Host-Microbe Interactions in Pollinating Bee Species
Opportunity Reference Code: USDA-ARS-SCINet-2023-0488

Organization U.S. Department of Agriculture (USDA)

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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 2/16/2024 11:59:00 PM Eastern Time Zone

Description **ARS Office/Lab and Location:** A postdoctoral research opportunity is currently available within the US Department of Agriculture (USDA), Agricultural Research Service (ARS), in the Bee Research Laboratory, Beltsville, Maryland.

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.

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: The Evans laboratory is a part of the USDA-ARS Bee Research Laboratory, Beltsville, MD, studying the impacts of disease in honeybees and other pollinators. As part of the Beenome100 effort to sequence, annotate, and utilize reference genomes for 100+ bee species, we are interested in immune-related genes across the bees, and developing insights into bee-microbe interactions. This postdoctoral fellow will deploy artificial intelligence (AI) and statistical modeling techniques to investigate 1) gene family expansion and retraction for immune-related proteins across the bees, and 2) signatures of selection in immune-related proteins. They will also use AI approaches and evolving microbial resources to assess parasite and pathogen pressures across a diversity of bee species and collaborate with the Beenome100 team to improve curated microbial databases across bees as a whole. This research will produce testable hypotheses for the impacts of climate, habitat, social structure, and nutrition on bee disease threats.

Learning Objectives: The fellow will have opportunities to develop skills in insect immunity, genetics, molecular biology, bioinformatics, and metagenomics. The fellow will have opportunities to research alongside several collaborators, present their research at professional conferences, publish their findings, and participate in AI and other trainings hosted by USDA-ARS SCINet.

Mentor(s): The mentor for this opportunity is Jay Evans (jay.evans@usda.gov). If you have questions about the nature of the research, please contact the mentor.

Anticipated Appointment Start Date: 2024; 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 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, 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

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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 be currently pursuing or have received a doctoral degree in the one of the relevant fields. Degree must have been received within the past five years or expected to be received prior to start of appointment.

Preferred Skills:

- Evolutionary genetics.
- Bioinformatics and statistics.
- Computational modeling.
- Molecular biology and genetics.
- Microbiology.
- Experience developing high-performance computing (HPC) workflows.
- Excellent written and oral communication skills.
- Experience in team and collaborative scientific environments.

Eligibility Requirements

- **Degree:** Doctoral Degree received within the last 60 months or currently pursuing.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (4 👁)
  - **Life Health and Medical Sciences** (10 👁)
- **Veteran Status:** Veterans Preference, degree received within the last 120 month(s).