

Opportunity Title: USDA-ARS SCINet/AI-COE Postdoctoral Fellowship:

Genomics of High-Consequence Fungal Plant Pathogens

Opportunity Reference Code: USDA-ARS-SCINet-2023-0285

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 1/5/2024 3:00:00 PM Eastern Time Zone

Description *Applications are reviewed on a rolling basis.

ARS Office/Lab and Location: A postdoctoral research opportunity is available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Foreign Disease-Weed Science Research Unit (FDWSRU) in Frederick, Maryland. **Remote participation eligible.**

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 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



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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.

Throughout the course of this research project, the SCINet Postdoctoral Fellow will have the opportunity to analyze genome data from *Hemileia vastatrix* (Hv), the causal agent of coffee leaf rust (CLR)—the most devastating coffee disease in the world. Historically, CLR was effectively managed with resistant coffee varieties. However, during the last decade, growers report that varietal resistance is rapidly breaking down, posing enormous challenges for disease management and the sustainability of one of the world's most traded agricultural products. The Fellow will use newly generated short read and long read sequencing data generated from historical and contemporary Hv isolates to dissect the evolutionary changes in Hv that have contributed to the progressive loss of host resistance. There will be other opportunities for the Fellow to address similar questions in other fungal pathosystems. If interested, the Fellow will also be able to utilize the 10,000 square foot BSL3 containment facility at the FDWSRU to conduct in plant experiments with Hv to test hypotheses that arise during this research.

Learning Objectives: The Fellow will have the opportunity to utilize comparative genomics and machine learning to determine what evolutionary process(es) in this pathogen led to the breakdown of host resistance. There are comparatively few genomic resources available for rust fungi, likely because they have the largest and most complex genomes in all of fungi. Because of this, the Fellow is also well poised to develop first-of-its-kind computational workflows to be used for comparative genomics/pangenomics for species with complex genomes. Under the guidance of a mentor, the Fellow will have the opportunity to participate in organizational and operational planning, training coordination, and science communication activities in support of the BDI and the ARS AI Center of Excellence (AI COE). The Fellow will also have the opportunity to take online and in person courses in bioinformatics, and to learn collaboration and leadership skills through workshop and collaborative group experience.

Mentor(s): The mentor(s) for this opportunity is Rachel Koch Bach (Rachel.kochbach@usda.gov). Please contact the mentor if you have questions about this opportunity.

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

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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 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](#). 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 their doctoral degree in one of the relevant fields or be currently pursuing the degree with completion prior to start of appointment.

Preferred Skills:

- First authorship of scientific manuscripts
- Proficiency with scripting languages (e.g., R, Bash, Perl, Python), open-source bioinformatics tools and Slurm Workload Manager
- Experience developing HPC workflows
- Experience developing, testing, and refining machine learning models
- Experience with comparative and pan-genomics
- Excellent written and oral communication skills
- Experience in team and collaborative scientific environments
- Highly motivated

Eligibility • **Degree:** Doctoral Degree.

Requirements • **Discipline(s):**

- **Communications and Graphics Design** ([6](#) )
- **Computer, Information, and Data Sciences** ([17](#) )
- **Life Health and Medical Sciences** ([15](#) )
- **Mathematics and Statistics** ([1](#) )