Opportunity Title: USDA-ARS SCINet Postdoctoral Fellowship in Evolutionary Genomics of Fungal Plant Pathogens
Opportunity Reference Code: USDA-ARS-2022-0186

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-2022-0186

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 within the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), with Peter Henry at the Crop Improvement and Protection Research Unit in Salinas, CA. **There is the option to work from multiple ARS locations.**

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

Opportunity Title: USDA-ARS SCINet Postdoctoral Fellowship in Evolutionary Genomics of Fungal Plant Pathogens
Opportunity Reference Code: USDA-ARS-2022-0186

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 SCINet Postdoctoral Fellow selected for this position will have the opportunity to make a major contribution to the fields of phytopathology and evolutionary genomics by contributing research on the fungal genus, *Macrophomina*. This genus contains multiple plant pathogenic species of high economic importance, including *Macrophomina phaseolina*. As a major pathogen of soy, sunflower, strawberry, and many other agricultural crops, *M. phaseolina* was historically considered a broad host range pathogen. However, the genomic diversity in this species is relatively unexplored, and recent research suggests there are *M. phaseolina* genotypes with host specificity for strawberry. The extent of genomic diversity in this species and the relationship between genotype and virulence on specific hosts are key knowledge gaps that will be addressed by the SCINet Postdoctoral Fellow.

To accomplish this, The SCINet Postdoctoral Fellow will analyze short-read sequence data (150 bp PE, ~100x coverage) for more than 400 isolates of *Macrophomina spp.* that were collected from 90 plant hosts and 23 countries, and long-read data for selected isolates. These isolates were obtained by an international team of researchers working on *Macrophomina spp.*, with an emphasis on strawberry-derived isolates of *M. phaseolina*, from all major strawberry producing regions worldwide. The specific objectives are to: 1) evaluate the association between host-of-origin and genotype, 2) characterize diversity in the pan-genome of *M. phaseolina*, 3) identify the adaptive potential of this pathogen via historic patterns of recombination and putative horizontal gene transfer events, and 4) identify the global center(s) of origin for *Macrophomina spp.* The Fellow will have the opportunity to collaborate with this group of international researchers and develop a global collaborative group on *Macrophomina spp*. The Fellow will also collaborate with other members of the Henry lab on wet-lab experiments testing key hypotheses that arise during

the analysis of these data.

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 on fungal comparative genomics and the development of tools for pan-genome comparisons. The participant will have the opportunity to collaborate with multiple USDA ARS scientists and researchers at universities around the world on fungal comparative and evolutionary genomics. These projects will result in multiple high impact publications on these topics.

USDA-ARS Contact: If you have questions about the nature of the research, please contact Peter Henry (peter.henry@usda.gov).

Anticipated Appointment Start Date: 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 and travel 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 listed below (e.g. Plant Pathology,

Opportunity Title: USDA-ARS SCINet Postdoctoral Fellowship in Evolutionary Genomics of Fungal Plant Pathogens
Opportunity Reference Code: USDA-ARS-2022-0186

Microbiology, Genomics), or be currently pursuing the degree with completion before the appointment start date.

Preferred skills:

- Experience working with short- and long-read whole genome sequence data
- Experience with genome assembly, annotation, and comparison
- Experience with microbiology and plant pathology
- Proficiency in Linux and computational programming
- Strong oral and written communication skills

Eligibility Requirements

- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (2 👁)
  - **Environmental and Marine Sciences** (3 👁)
  - **Life Health and Medical Sciences** (17 👁)
  - **Mathematics and Statistics** (2 👁)