Opportunity Title: USDA-ARS SCINet Postdoctoral Fellowship in Predicting Novel Host-Virus Protein-Protein Interactions
Opportunity Reference Code: USDA-ARS-SCINet-2023-0159

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 6/23/2023 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 currently available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), within the Foreign Animal Disease Research Unit (FADRU) at the Plum Island Animal Disease Center located in Orient, New York. **This appointment will be 100% remote.**

The mission of the Foreign Animal Disease Research Unit (FADRU) is to protect the U.S. from foreign animal pathogens through the performance of basic and applied research. FADRU's research comprises understanding viral genomics, disease pathogenesis and disease ecology and the application this knowledge to the rational development of effective countermeasures (e.g., biotherapeutics, vaccines, diagnostics) and implementation strategies for prevention, control and recovery from foreign animal diseases.

The SCINet/Big Data Research Participation Program of the USDA ARS offers research opportunities to motivated postdoctoral fellows interested in conducting research on agricultural- and natural resource-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 computers (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 the HPC.

Research Project: The selected candidate will create algorithms and software that will contribute to our team's efforts to better understand the molecular mechanisms of virulence of African swine fever, a devastating viral hemorrhagic disease of domestic and wild swine that can result in 100% mortality. The genome of the causative agent, African swine fever virus (ASFV), encodes between 150 and 167 open reading frames and many of these proteins have no known function. Currently, there are no tools that can predict protein-protein interactions between swine and virus. Accordingly, the candidate, under the guidance of a mentor, will be involved in the following tasks:

- Utilizing preexisting software and developing algorithms to predict host-viral protein-protein interactions that occur during infection in swine. Results of this analysis will be compared with experimental data collected by yeast-two hybrid screens on over 30 of the proteins encoded by ASFV.
- Further responsibilities may include assembly and annotation of ASFV genome sequences; phylogenetics; modifying current workflows and pipeline development; data analysis and visualization; protein structural prediction; and routine database and file management.

The development of this algorithm will lead to a better understanding of protein-protein interactions during African swine fever and, ideally, will be expanded to other emerging poxviruses.

Learning Objectives: As a result of this training the participant will improve their skills in protein structure prediction, genome annotations, analysis of big data, scripting, and the development bioinformatic pipelines.

Mentor(s): The mentor(s) for this opportunity is Manuel Borca (manuel.borca@usda.gov). Please contact the mentor if you have questions about this opportunity.

Anticipated Appointment Start Date: June 2023. 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 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 only.

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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 June 1, 2023. Degree must have been received within five years of the appointment start date.

Preferred Skills:

- Experience in protein bioinformatics and/or computational protein structure analysis
- Experience in big data analysis
- Proficiency in Linux, R, and Python
- Strong oral and written communication skills
- Experience in creating Docker containers is a plus

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree received within the last 60 months or currently pursuing.
- **Discipline(s):**
  - **Communications and Graphics Design** (1)
  - **Computer, Information, and Data Sciences** (17)
  - **Life Health and Medical Sciences** (48)
- **Veteran Status:** Veterans Preference, degree received within the last 120 month(s).