Opportunity Title: USDA-ARS Summer Internship: Host-Pathogen Networks in Barley-Powdery Mildew Interactions
Opportunity Reference Code: USDA-ARS-MW-2024-0080

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-MW-2024-0080

How to Apply ***Connect with ORISE...on the GO!*** Download the new ORISE GO mobile app in the Apple 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 4/26/2024 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 with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), located in Ames, Iowa.

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 Corn Insects and Crop Genetics Research Unit on the campus of Iowa State University (Ames, IA) increases crop productivity by basic and applied research on insects, cereals and legumes. Using fundamental knowledge about how barley plants interact with their most economically important diseases, our project is developing tools breeders can use to develop durable levels of plant resistance.

Research Project: The person in this ORISE position will participate in the development of an integrated protein-protein interaction network of barley-powdery mildew interactions as a framework to dissect immune signaling in cereals. The interaction between the cereal grain crop barley (*Hordeum vulgare* L.), and the powdery mildew fungus, *Blumeria hordei* (*Bh*), is the system by which this challenge will be addressed. As a model for the large-genome Triticeae (barley, wheat, and rye), the intern will focus on the

barley MLA immune receptor, a conserved ancestral protein for immunity, as a trigger to discover novel mechanisms for cereal disease defense. They will collaborate with the scientific team to collect and analyze yeast two-hybrid next-generation protein-protein interaction screens to investigate immune signaling. They will also have the opportunity to engage in scientific writing, presentations and professional development.

Learning Objectives: This will be a valuable learning experience for the participant -- The computational and functional approaches will be instrumental in understanding how crop cellular networks respond to and are re-wired by pathogens, as it is unknown how current results from model species translate to Triticeae grain crops. To maximize public access for cereal scientists and breeders, project data sets will be deposited in the appropriate public databases for long-term use.

Mentor(s): The mentor for this opportunity is Roger Wise (roger.wise@usda.gov). If you have questions about the nature of the research, please contact the mentor(s).

Anticipated Appointment Start Date: May 15, 2024. Start date is flexible and will depend on a variety of factors.

Appointment Length: The appointment will initially be for 13 weeks, 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.

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

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.Midwest@orau.org and include the reference code for this opportunity.

Qualifications The qualified candidate should be currently pursuing bachelor's degree in the one of the relevant fields.

Preferred skills:

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- Skill in basic laboratory techniques:
  - polymerase chain reactions (PCR)
  - gel electrophoresis
  - data collection and documentation via digital photos
  - and recording measurements of plants

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Currently pursuing a Bachelor's Degree.
- **Discipline(s):**
  - **Life Health and Medical Sciences** (1 👁)