Opportunity Title: USDA-ARS Malting Barley Research
Opportunity Reference Code: USDA-ARS-2021-0177

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-2021-0177

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. 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 8/30/2021 3:00:00 PM Eastern Time Zone

Description ***Applications may be reviewed on a rolling-basis and this posting could close before the deadline.**

ARS Office/Lab and Location: A research opportunity is currently available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Cereal Crops Research Unit located in Madison, Wisconsin.

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.

Research Project: Water sensitivity will be examined using a few complementarity approaches to better understand the genetic factors contributing to this trait in mature malting barley grains. We planted a population of barley lines that was purposefully selected as an assembly of highly diverse genotypes (iCore) and the participant will assume management of the population in the field including phenotyping, harvest and post harvest experiments. The population is poised for this project since it has already been SNP genotyped using a high density SNP chip. This population will be the experimental subject for this project. General procedures will be based on previous and established methods for measuring water sensitivity in cereal grains. Genotype/phenotype association analysis (GWAS) will be used to highlight genomic regions and genes affecting the trait. Candidate genes may be further DNA sequenced to characterize loss/gain of function mutations as

well as transcription factors contributing to that variation in water sensitivity in different malting barley genotypes. Further experiments may include examination of differential gene expression using qPCR approaches. In addition, microscopic approaches will be used to examine internal and periphery structures of the barley grains that may contribute to water sensitivity in lines with pronounced phenotypes. We have all the necessary equipment for the project including the iCore populations, field space, sample cleaning and processing equipment, equipment for genotypic and molecular analysis, microscopes and a lab well fortified with consumables necessary for this approach.

Learning Objectives:

- Plant physiology and seed structure biology related to water sensitivity and seed germination in barley
- Genomic analysis including DNA sequencing and associating phenotypes with mutations and genotypic patterns
- General laboratory skills related to molecular genetics and plant physiology
- Process of malting cereal grains and factors contributing to overall quality of malted grains
- Plant propagation, maintenance, and harvesting in both a greenhouse and field setting

Mentor(s): The mentor for this opportunity is Jason Walling (Jason.walling@usda.gov). If you have questions about the nature of the research please contact the mentor(s).

Anticipated Appointment Start Date: **mid-late September 2021.** 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.

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 USDA-ARS@orau.org and include the reference code for this opportunity.

Qualifications The qualified candidate should have received a bachelor's or master's degree in one of the

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relevant fields, or be currently pursuing one of the degrees with completion by September 1, 2021. Degree must have been received within the past five years.

Preferred skills:

- Some experience related to the disciplines of Genetics, Genomics and or Molecular biology, preferably in plants
- A background in agriculture and or agronomy
- Skills promoting independent discovery and also ability to work within a team
- Ability to conduct research both in a field/greenhouse setting as well as a research laboratory
- Experience in genotyping (SNP and DNA sequencing), DNA/RNA isolation, qPCR, Genome-wide association studies (GWAS), microscopy and statistics
- Strong organization skills
- Experience with seed germination and/or malting of cereals

Eligibility Requirements

- **Degree:** Bachelor's Degree or Master's Degree received within the last 60 months or anticipated to be received by 9/1/2021 11:59:00 PM.
- **Overall GPA:** 3.00
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (1 👁)
  - **Engineering** (2 👁)
  - **Life Health and Medical Sciences** (15 👁)
- **Veteran Status:** Veterans Preference, degree received within the last 120 month(s).