Opportunity Title: Postdoctoral Research Opportunity in Plant Genetics
Opportunity Reference Code: USDA-ARS-2020-0123

Organization	U.S. Department of Agriculture (USDA)
Reference Code	USDA-ARS-2020-0123
How to Apply	A complete application consists of:

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- An application
- Transcripts – <u>Click here for detailed information about acceptable transcripts</u>
- 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.

If you have questions, send an email to USDA-ARS@orau.org. Please include the reference code for this opportunity in your email.

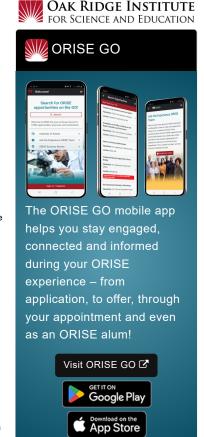|	
Application Deadline	7/15/2020 3:00:00 PM Eastern Time Zone
Description	***Applications will be reviewed on a rolling-basis.**

A postdoctoral research opportunity is currently available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Edward T. Schafer Agricultural Research Center, Cereal Crops Research Unit located in Fargo, North Dakota.

The mission of the Cereal Crops Research Unit is to advance small grains research. The selected participant will join the ARS Fargo Regional Small Grains Genotyping Laboratory, and will have access to state-of-the-art equipment for plant molecular biology, high-throughput genotyping, data analysis, and plant cultivation.

Spring wheat is a major small grain crop in the Northern Great Plains. Breeding a new cultivar with high yield potential, disease resistance, and excellent end-use quality is a challenging task that takes a lot of resources and a decade of effort. The ability to predict phenotypes and overall plant performance would decrease the amount of time and resources needed to develop future variety releases. To do this, a better understanding of how the wheat genome responds to environmental cues and influences traits is needed. Along with DNA polymorphisms, epigenetic variation and RNA abundance/function regulate the proteins that function to influence the phenotypes. This project will focus on investigating the interactions of these three levels of variation (DNA, epi-DNA, RNA) and build better models to understand disease resistance, end-use quality, and yield. The project will be tailored to the skills and interests of the individual but will largely focus on the needs of the regional wheat breeding community. We plan to utilize an existing field trial of spring wheat cultivars by periodically sampling epi-alleles/RNA expression levels during development and using these as predictors to explain variation in yield and baking quality. Additionally, a large sequencing effort is underway to build genomic resources of fusarium head blight resistance germplasm. We plan to identify epi-alleles and RNA expression levels that influence disease resistance in the lines with complete sequence information. We expect to identify new predictors that can be used alone and/or within comprehensive models to understand more about the biology of breeding traits. Important predictors or networks will be converted into high-throughput assays for rapid deployment to accelerate breeding efforts.

Under the guidance of a mentor, the participant will be involved with all aspects of these projects from plant growth, phenotype screening, DNA/RNA extraction, library preparation, and sequence processing. Building predictive models with multidimensional regulation data will require advanced

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statistical modeling. Machine learning and artificial intelligence programs will be utilized to identify cryptic patterns from the data. For sequence processing, and model building, the participant will utilize various command-line tools and pipelines on the ARS SCINet high-performance computing infrastructure.

The participant will acquire extensive training in breeding trait evaluation, DNA/RNA extraction, bioinformatics, statistical modeling, and genomics. Results will be published in peer-reviewed journals and presented at scientific conferences. In addition, the USDA Genotyping Laboratories are connected to numerous breeding programs around the globe and findings have the potential to make immediate impacts to germplasm development.

Anticipated Appointment Start Date: July 1, 2020

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. The initial appointment is for one year, but may be renewed upon recommendation of ARS and is contingent on the availability of funds. The participant will receive a monthly stipend commensurate with educational level and experience. **The annual stipend rate will be $50,000 and a health insurance allowance of up to $11,358 will also be provided. A travel budget of $3,000 will be included to attend a national meeting. No relocation or other travel/training allowance will be provided.** Proof of health insurance is required for participation in this program. The appointment is full-time at ARS in the Fargo, North Dakota, area. Participants do not become employees of USDA, ARS, DOE or the program administrator, and there are no employment-related benefits.

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.

For more information about the ARS Research Participation Program, please visit the **Program Website**.

Qualifications	The qualified candidate should have received a doctoral degree in one of the relevant fields.

Preferred skills:

- Plant genetics/pathology and molecular biology experience with disease screening, genotyping or trait analysis
- Excellent written and oral communication skills, including a strong publication record in quality peer-reviewed journals
- Experience in plant DNA/RNA extractions, library preparation, genotype analysis, bioinformatics, and statistical modeling

Eligibility Requirements	- **Degree:** Doctoral Degree.
	- **Discipline(s):**
	  - **Computer, Information, and Data Sciences** (1 👁)
	  - **Life Health and Medical Sciences** (5 👁)