

Opportunity Title: USDA-ARS Postdoctoral Fellowship in Yeast Genetics and Metabolic Engineering

Opportunity Reference Code: USDA-ARS-MW-2023-0069

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-MW-2023-0069

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 7/7/2023 3:00:00 PM Eastern Time Zone

Description ***Applications will be 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), Bioenergy ([BER](#)) Research Unit at the National Center for Agricultural Utilization Research ([NCAUR](#)) located in Peoria, Illinois.

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: Agricultural residues, or lignocellulosic biomass, are a desirable, readily abundant feedstock for production of renewable fuels and value-added chemicals. Unfortunately, pretreatment technologies to release simple sugars from lignocellulosic materials commonly generate byproducts that are inhibitory to microorganisms. Brewer's yeast, *Saccharomyces cerevisiae*, is the most widely used organism in industrial fermentation processes and is a preferred organism for lignocellulosic feedstock utilization. However, *S. cerevisiae* does not natively ferment xylose and demonstrates a significant lag in growth due to the impact of the lignocellulosic inhibitors. Haploid strains isolated through sporulation of an environmental *Saccharomyces* strain with good inhibitor tolerance demonstrate varied tolerance to inhibitors. Identifying the genetic basis for



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the differences in inhibitor tolerance and xylose fermentation within these haploid strains is the basis of this research. Haploid strains isolated from *Saccharomyces* sp. strains demonstrating good inhibitor tolerance will be used for targeted mating experiments. The participant will obtain haploid spores from *Saccharomyces* strains and test for inhibitor tolerance in growth assays. Further, the participant will perform mating assays followed by additional inhibitor tolerance testing. Strains with strong inhibitor tolerance will be further characterized using genomics and transcriptomics to uncover genetic determinants leading to greater inhibitor tolerance in *Saccharomyces*.

Learning Objectives: The participant will expand their scientific repertoire and combine this with previous knowledge in genetics and bioinformatics to understand and solve the longstanding issues of inhibitors limiting the use of lignocellulosic biomass. They will gain expertise in the genetic and biochemical basis of xylose fermentation and lignocellulosic inhibitor tolerance in yeast. They will learn and become familiar with numerous skills, including using sterile technique, microbial cultivation, yeast sporulation and tetrad dissection, PCR and qPCR assays, gel electrophoresis, DNA extraction, DNA sequencing, and bioinformatics. The objective of this learning experience is to prepare the participant to be a competitive candidate with the necessary independent and collaborative skills to successfully contribute to the next generation of research scientists.

Mentor(s): The mentor for this opportunity is [Ron Hector](#) (ronald.hector@usda.gov). If you have questions about the nature of the research please contact the mentor.

Anticipated Appointment Start Date: Spring 2023. Start date is flexible and will depend on a variety of factors.

Appointment Length: The appointment is funded until 9/30/2024, but may be renewed an additional year 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 an annual stipend of \$69,107 to \$82,830, depending on education level and experience. A health insurance allowance and an allowance for travel to scientific meeting to present research results will also be provided. Some relocation expenses may be reimbursed.

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

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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@ornl.gov 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 with completion by May 31, 2023.

- Eligibility Requirements**

- **Degree:** Doctoral Degree.
 - **Overall GPA:** 3.00
 - **Discipline(s):**
 - **Engineering** ([2](#) )
 - **Life Health and Medical Sciences** ([6](#) )