Opportunity Title: USDA-ARS Post-Doctoral Fellowship in Molecular Plant Pathology/ Computational Biology & AI for Plant Disease Resistance
Opportunity Reference Code: USDA-ARS-HQ-2026-0046

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-HQ-2026-0046

How to Apply ***To submit your application, scroll to the bottom of this opportunity and click APPLY.***

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.

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Application Deadline 3/27/2026 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 Sustainable Perennial Crops Lab in Beltsville Maryland.

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 Beltsville Agricultural Research Center (BARC) is located on 6,615 acres in Beltsville, MD and is the largest location in the USDA ARS Northeast Area, comprising 17 research labs. The Sustainable Perennial Crops Lab (SPCL) conducts research on tropical perennial crops of significance to national and global economies with the goals of improving crop yields with reduced inputs, reducing the impact of crop diseases, and preserving and optimizing the use of crop genetic diversity, thus providing U.S. consumers and industries with safe and stable supplies of these

commodities.

Research Project: This research project focuses on improving disease resistance in cacao (*Theobroma cacao*) using a combination of molecular biology and emerging technologies. The core objectives remain centered on understanding cacao defense mechanisms and applying genetic and molecular tools to enhance resistance against pathogens.

While the primary emphasis will be on molecular approaches—such as gene expression analysis, promoter characterization, and functional validation—the project also offers opportunities to incorporate complementary technologies where appropriate. These may include:

- Genomics and Molecular Biology: Identification and functional analysis of cacao defense genes and promoters.
- Digital Phenotyping: Application of hyperspectral imaging and advanced imaging tools to detect disease traits beyond the visible spectrum.
- AI-Driven Data Analysis: Leveraging machine learning to predict plant responses and accelerate discovery of resistance markers.
- Gene Editing and Validation: Using CRISPR-based approaches to validate candidate genes and pathways.

The fellowship will involve collaboration with plant pathologists, geneticists, and bioinformaticians, and there may be opportunities to contribute to interdisciplinary projects as they align with the lab's goals. While creativity and initiative are encouraged, research directions will be developed in consultation with the mentor to ensure feasibility and alignment with program objectives. The successful candidate will publish research and actively engage with the broader cacao research community.

Learning Objectives: As a result of this training, the participant will gain knowledge and hands-on experience in:

1. Plant Pathology and Disease Resistance – Core methodologies for studying plant–pathogen interactions and screening for disease resistance in tropical perennial crops.
2. Genomic and Molecular Tools – Application and development of molecular techniques for plant breeding, including gene expression analysis and functional validation.
3. Advanced Phenotyping – Exposure to hyperspectral imaging and other digital phenotyping tools to detect subtle disease traits beyond the visible spectrum.
4. Data Analysis and Computational Approaches – Introduction to AI-driven data analysis and machine learning for interpreting genomic and phenotypic datasets.
5. Experimental Design and Germplasm Management – Designing robust experiments and maintaining cacao germplasm collections for research purposes.
6. Growth and Experimentation with Theobroma cacao – Practical experience in cultivating and experimenting with cacao plants under

controlled conditions.

Mentor(s): The mentor for this opportunity is Ezekiel Ahn (ezekiel.ahn@usda.gov). If you have questions about the nature of the research, please contact the mentor(s).

Anticipated Appointment Start Date: Spring 2026. Start date is flexible and will depend on a variety of factors.

Appointment Length: The appointment will be for two years.

Level of Participation: The appointment is full time.

Participant Stipend: The participant will receive a monthly stipend commensurate with educational level and experience. **The anticipated stipend range is $85,447 - $100,000 annually.**

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

Qualifications The qualified candidate should be currently pursuing or have received a doctoral degree in the one of the relevant fields. Degree must have been received within the past four years, or anticipated to be received by 6/1/2026.

Preferred skills:

- Knowledge and experience in molecular genetics and plant pathology.
- Knowledge in molecular biology, DNA and RNA extraction and sequencing and gene expression analysis.
- Knowledge of gene editing and modification: recombinant DNA techniques such as CRISPR/Cas9, vector construction, etc.
- Experience with GMOs and in the methods used in their modifications.
- Ability to communicate scientific findings effectively and collaborate within a multidisciplinary team.
- Ability to effectively communicate scientific finds to the research community.
- Abilities to effectively interact with team members and industry and academia people.

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Stipend $85,447.00 – $100,000.00 Yearly

Point of Contact Janeen

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Minimum Overall GPA:** 3.20
- **Discipline(s):**
  - **Life Health and Medical Sciences** (12 👁)