

**Opportunity Title:** USDA-ARS Postdoctoral Environmental Microbiology

Fellowship

**Opportunity Reference Code:** USDA-ARS-SE-2023-0334

**Organization** U.S. Department of Agriculture (USDA)

**Reference Code** USDA-ARS-SE-2023-0334

**How to Apply** *Connect with ORISE...on the GO!* Download the new ORISE GO mobile app in the [Apple App Store](#) 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.

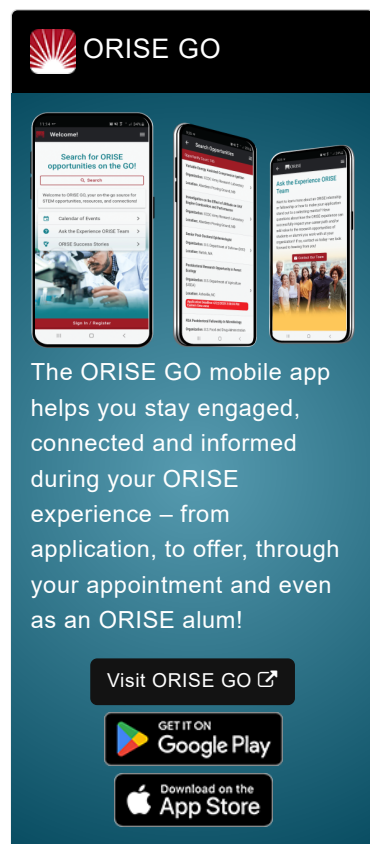
**Application Deadline** 9/29/2023 3:00:00 PM Eastern Time Zone

**Description** **\*Applications may be reviewed on a rolling-basis.**

**ARS Office/Lab and Location:** A research opportunity is available within the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS) at the U.S. National Poultry Research Center located in Athens, Georgia.

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:** The selected applicant will perform field and laboratory research to support food safety research at the **Egg & Poultry Production Safety Research Unit**, located within the USDA-ARS, National Poultry Research Center (USNPRC), Athens, GA. Predictive classification approaches and machine learning algorithms will be developed and optimized to link the (1) multi-omics (e.g. microbiome, metagenome, transcriptomics), (2) management (e.g. use of antibiotics and/or probiotics, litter reuse), (3) environmental (e.g., relative humidity, temperature, litter/soil pH and moisture) variables, and in some cases (4) individual bird performance and behavior (e.g., feed efficiency and water consumption) to foodborne pathogen data (e.g. prevalence, serotype/species, antibiotic resistance profile). This will allow for the identification of preharvest factors that stakeholders can identify, if not change, to increase the likelihood that



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their flock harbors a foodborne pathogen-resilient microbiome while maintaining productivity.

To achieve this goal, the candidate will use the pipeline for the analysis of longitudinal multi-omics data (PALM) that allows the integration of multi-omics data and longitudinal microbiome information through dynamic Bayesian networks. This pipeline accurately identifies known and novel interactions between microbiome taxa, their gene expression profiles, the metabolites they produce and consume, and their impact on host gene expression. Further, the candidate will develop neural networks approaches integrating the management, environmental, and performance data into the PALM analyses. Resulting significant interactions based on the different analyses will be aggregated to produce a list of high target production factors and microbe-gene-environment interactions that can be investigated and validated through further experimentation.

**Learning Objectives:** The selected applicant will gain an understanding of the gut health of broiler chickens and identify environmental, management and chicken behavioral factors that are correlated with a "resilient" or "leaky" gut.

**Mentor:** The mentor for this opportunity is Ade Oladeinde ([ade.oladeinde@usda.gov](mailto:ade.oladeinde@usda.gov)). If you have questions about the nature of the research please contact the mentor.

**Anticipated Appointment Start Date:** August/September 2023. 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 up to 2 years 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. **The stipend rate for this appointment is equal to \$65,000 per year depending on skills and experience, and \$5,400 provided per year for health insurance.**

**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 [ORISE.ARS.Southeast@ornl.gov](mailto:ORISE.ARS.Southeast@ornl.gov) and include the reference code for this opportunity.

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**Qualifications** The qualified candidate should have received a doctoral degree in one of the relevant fields (e.g. bioinformatics, Microbiology). Degree must have been received within the past five years.

Preference for candidates with experience in predictive modeling or application of artificial intelligence and/or machine learning algorithms with microbiological meta-data sets.

Preferred Skills:

- Computer Science focus with field and wet laboratory experience
- Experience in predictive modeling or application of artificial intelligence and/or machine learning algorithms with microbiological meta-data sets
- Knowledge and laboratory skills in microbiology and potentially engineering (general and applied)
- Field experience includes previous environmental and microbiological sampling from poultry environments (hatchery, live production houses/farms, processing facilities), including microbiological processing of environmental (soil, feces, poultry litter) and poultry (organs, swabs, carcass rinses)
- Laboratory experience includes bacterial cultural isolation and characterization, as well as extraction of DNA from bacteria and environmental matrices for downstream multi-omic approaches
- Bioinformatics experience with metagenomics analysis/pipelines, predictive modeling algorithms, and machine learning/artificial intelligence algorithms, ideally with a specific focus on foodborne pathogens

- Eligibility Requirements**
- **Degree:** Doctoral Degree received within the last 60 month(s).
  - **Discipline(s):**
    - **Computer, Information, and Data Sciences** ([4](#) 👁)
    - **Engineering** ([2](#) 👁)
    - **Environmental and Marine Sciences** ([2](#) 👁)
    - **Life Health and Medical Sciences** ([18](#) 👁)
    - **Mathematics and Statistics** ([1](#) 👁)
  - **Veteran Status:** Veterans Preference, degree received within the last 120 month(s).