

Opportunity Title: USDA-ARS Postdoctoral Fellowship in Antimicrobial Resistant Foodborne Bacteria
Opportunity Reference Code: USDA-ARS-2021-0156

Organization U.S. Department of Agriculture (USDA)

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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 7/30/2021 4:00:00 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 available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS) 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 the agency is to provide global leadership in agricultural discoveries through scientific excellence.

Research Project: The participant will perform research pertaining to USDA-ARS Project 6040-32000-079-00D entitled "Alternatives to Antibiotics and Genomics of Antimicrobial Resistance to Control Foodborne Pathogens in Poultry". Objectives of the project include:

1. Identify and determine the presence and contributing factors for antimicrobial resistant foodborne bacteria in poultry and poultry-associated environments.
2. Identify and evaluate biological and chemical intervention products and alternatives to antimicrobials to control or reduce foodborne pathogens in poultry.

Specifically, the activity of the participant will address two sub-objectives of



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the project:

- Sub-objective 1.2: Evaluate the bacterial metagenome of retail poultry.
- Sub-objective 1.3: Identify and evaluate markers (resistance genes, genetic elements, virulence genes) to define outbreak and persistent foodborne bacteria in poultry.

The goal of these sub-objectives is to identify and characterize the resistome of conventional and “No Antibiotics Ever (NAE)” retail poultry products as well as genetic markers that are unique to bacterial isolates from poultry useful for development of rapid screening tests for in-plant testing for outbreak strains or resistant foodborne bacteria on poultry products. A deep analysis of the metagenomes of the two groups of retail poultry products will be performed to study the bacterial community and the “resistome” (antimicrobial, metal, biocide, coccidiostat and ionophore resistance). Metagenomics analysis has the capability of characterizing dominant and sub-dominant populations to understand population dynamics and to provide a comprehensive comparison of microbial communities in different food products. The assessment of antimicrobial, metal, biocide, coccidiostat, and ionophore resistance genes in these metagenomics samples will provide further insight and contributing factors into the whole resistome of the retail poultry environment which may be reflective of poultry production practices or other selective pressures common to both production environments. Genome wide association studies will identify genetic markers which support survival, persistence, and dissemination of foodborne pathogens and commensals, especially those that are resistant to antimicrobials. Mechanisms of gene transfer will include study of mobile genetic elements (i.e. plasmids, transposons, and integrons). Persistent strains of *Enterococcus*, *Staphylococcus*, and *Escherichia* will be compared to identify genes and plasmids common to the strains using sequenced isolates from poultry in order to genetically define persistent strains and predict strains that could establish themselves in this commodity.

Learning Objectives: Extensive training in the biology of Gram-positive bacteria (*Enterococcus* and *Staphylococcus*) and commensal *Escherichia coli* including susceptibility testing with antimicrobials such as antibiotics, biocides, and metals used on animals, or in sanitation on farm and in processing plants will be provided. The participant will also train in other analytical methods including whole-genome sequencing for analysis of multi-drug resistance and mobile genetic elements and machine learning to predict resistance to antimicrobials, biocides, and metals.

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

Anticipated Appointment Start Date: 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 an additional year upon recommendation of ARS and is contingent on the availability of funds.

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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 be currently pursuing or have received a doctoral degree in one of the relevant fields. Degree must have been received within the past five years.

Preferred knowledge/skills:

- Antimicrobial resistance including mechanisms of resistance, resistance genes, and mobile genetic elements
- Experience in whole-genome sequence analysis, bioinformatics and analysis of antimicrobial resistance using bioinformatics tools and databases, and machine learning

- Eligibility Requirements**
- **Degree:** Doctoral Degree received within the last 60 months or currently pursuing.
 - **Discipline(s):**
 - **Chemistry and Materials Sciences** ([1](#) )
 - **Computer, Information, and Data Sciences** ([7](#) )
 - **Environmental and Marine Sciences** ([2](#) )
 - **Life Health and Medical Sciences** ([12](#) )
 - **Veteran Status:** Veterans Preference, degree received within the last 120 month(s).