

Opportunity Title: USDA-ARS Postdoctoral Fellowship in Fish Functional Genomics and Epigenetics

Opportunity Reference Code: USDA-ARS-SCINet-2024-0285

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-SCINet-2024-0285

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
- A copy of an abstract or reprint of an article

All documents must be in English or include an official English translation.

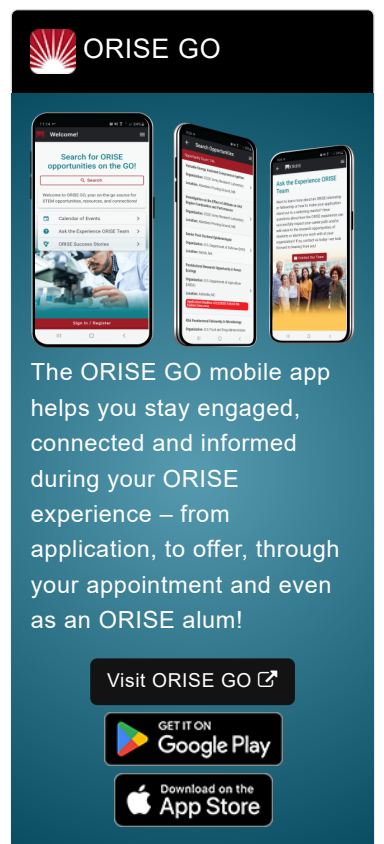
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Application Deadline 10/11/2024 3:00:00 PM Eastern Time Zone

Description **ARS Office/Lab and Location:** A postdoctoral research opportunity is available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Aquatic Animal Health Research Unit (AAHRU), Auburn, Alabama.


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 SCINet/Big Data Research Participation Program of the USDA ARS offers research opportunities to motivated postdoctoral fellows interested in solving agriculture-related problems at a range of spatial and temporal scales, from the genome to the continent, and sub-daily to evolutionary time scales. One of the goals of the SCINet Initiative is to develop and apply new technologies, including artificial intelligence (AI) and machine learning, to help solve complex agricultural problems that also depend on collaboration across scientific disciplines and geographic locations. In addition, many of these technologies rely on the synthesis, integration, and analysis of large, diverse datasets that benefit from high-performance

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computing (HPC) clusters. The objective of these fellowships is to facilitate cross-disciplinary, cross-location research through collaborative research on problems of interest to each applicant and amenable to or requiring the HPC environment. Training will be provided in data science, scientific computing, AI/machine learning, and related topics as needed for the fellow to complete their research.

Research Project: Under the guidance of the mentor, the candidate will utilize a functional genomics and advanced computational approach to examine (epi)genetic factors responsible for reproductive success in fish species, especially channel and blue catfish. As epigenetic marks have been linked to reproduction, and epigenetic remodeling of gametes can occur due to physiological and environmental changes, the successful candidate will characterize the epigenetic landscape of catfish under various culture conditions. The participant will then use descriptive and predictive data mining (machine learning) approaches to define the genetic associations with reproductive performance indices and stratify fish broodstocks into performance groups to maximize reproductive success toward our goal of precision aquaculture.

Additionally, a major research focus of the AAHRU includes the development of tools that will enhance fish and shellfish resistance to infectious bacteria, viruses, and parasites. Therefore, a highly productive candidate will have the opportunity to learn and integrate their skills into other multi-omics research focused on disease states, including modeling host-pathogen interaction dynamics, determining pathogen and host factors that influence virulence and/or disease resistance, validating candidate loci responsible for quantitative and qualitative traits, and/or determining gene/protein functions and causal regulatory elements relevant to fish and shellfish immunology.

Learning Objectives: The participant will learn to apply statistical and machine learning methods to datasets relevant to aquaculture and create innovative tools/models that predict gamete quality to complement selective breeding programs and maximize reproductive success. In addition to advanced computational methodology, this fellowship may include training in the field, the wet lab, and the bench to answer research questions, resulting in a well-rounded functional genomics experience. The participant will have the opportunity to improve scientific communication skills through data presentations as well as publish results in high-quality journals reporting on methodological and biological advances.

This fellowship is supported by the ARS AI Center of Excellence (AI-COE) and the participant will learn to utilize the SCINet high-performance computing (HPC) clusters (scinet.usda.gov) and be provided the opportunity to take on-line courses in various biocomputing topics. Participation in SCINet workshops and working groups will further collaboration and leadership skills.

Mentor: If you have questions about the nature of the research, please contact Dr. Jason Abernathy, USDA-ARS-AAHRU,

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Jason.Abernathy@usda.gov.

Anticipated Appointment Start Date: 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 for a second year upon recommendation of the mentor and ARS.

Level of Participation: The appointment is full-time.

Participant Stipend: The participant(s) will receive a monthly stipend commensurate with educational level and experience. **The current stipend range for this opportunity is \$90,000 - \$100,000/year plus a supplement to offset a health insurance premium.**

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](#). If you have additional questions about the application process please email ORISE.ARS.SCINet@orau.org and include the reference code for this opportunity.

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

Preferred skills:

- Strong research focus in bioinformatics, computational biology, or data sciences
- Proficiency in Linux, R, Perl, and/or Python
- Experience in the analyses of multi-omics datasets
- Experience developing, testing, and refining machine learning models
- Experience developing HPC workflows
- Excellent written and oral communication skills
- Evidence of research productivity through a relevant publication record

Eligibility Requirements

- **Degree:** Doctoral Degree.
- **Discipline(s):**

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- **Computer, Information, and Data Sciences** ([6](#))
- **Earth and Geosciences** ([1](#))
- **Engineering** ([1](#))
- **Environmental and Marine Sciences** ([4](#))
- **Life Health and Medical Sciences** ([13](#))
- **Mathematics and Statistics** ([1](#))

Affirmation I affirm that:

- I am a US Citizen, OR
- I am a non-US citizen currently living in the United States