Opportunity Title: USDA-ARS Integrating AI-Based Gene Expression and Interaction Prediction in Haemaphysalis longicornis
Opportunity Reference Code: USDA-ARS-HQ-2026-0131

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-HQ-2026-0131

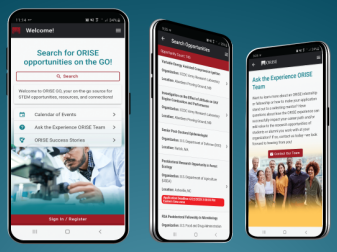
How to Apply ***To submit your application, scroll to the bottom of this opportunity and click APPLY.***

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 11/20/2026 3:00:00 PM Eastern Time Zone

Description ***Applications are reviewed on a rolling-basis.**

ARS Office/Lab and Location: A research opportunity is currently available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), located in Kerrville, Texas.

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 mechanisms of somatic sexual differentiation in ticks, specifically the Asian longhorned tick, (Haemaphysalis longicornis, ALT), remain poorly understood. Understanding the molecular pathways and predicting the gene interactions involved in sex determination is crucial for advancing our knowledge of arthropod development. We are looking for a participant to investigate and integrate large datasets to predict gene interactions to understand biological processes. NATIONAL PROGRAM: NP104 Veterinary, Medical, and Urban Entomology.

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The objective of this research is to integrate AI-based gene expression analysis and long-range interaction prediction to investigate the sex determination mechanisms in ALT. By leveraging computational approaches, we aim to gain insights into the regulatory networks and genetic factors governing sexual differentiation of an invasive ectoparasite.

We will obtain male and female adult ticks of ALT from native and expansion ranges and extract DNA, RNA, and epigenetic data such as chromosome accessibility sequences. We will adapt Enformer, an AI architecture built on Google AI's DeepVariant caller, to integrate DNA, RNA, and complex epigenetic data. Candidate genes and factors known to function in sex-determination will be investigated as potential targets for identifying non-coding factors that influence sex determination. This software will contribute to agricultural research by enabling efficient exploration and interpretation of tick sex determination mechanisms that could lead to innovative genetic control strategies. For example, manipulating non-coding regions could provide ways to control population growth by skewing sex ratios. Once we have developed the algorithm we can then adapt it to broadly apply to a wide range of invasive arthropod and tick species.

Protein-to-DNA alignments and gene prediction will be conducted to identify complete gene structures and associated coding sequences. Gene Ontology and KEGG database annotations will be performed for protein annotation.

Learning Objectives: Under the guidance of a mentor, the participant will gain hands-on experience in advanced molecular genetics techniques, developing the ability to implement and troubleshoot complex experimental workflows. The participant will build expertise in long-read sequencing technologies and learn how to apply these approaches to address genomic research questions. Through this experience, the participant will also develop skills in computational biology, including the use and adaptation of specialized software for genomic data analysis. In addition, the participant will gain practical experience in managing research projects and preparing scientific reports suitable for publication, strengthening their ability to communicate scientific findings effectively.

Mentor(s): The mentor for this opportunity is Perot Saelao (perot.saelao@usda.gov). If you have questions about the nature of the research, please contact the mentor(s).

Anticipated Appointment Start Date: May 1, 2026. Start date is flexible and will depend on a variety of factors.

Appointment Length: The appointment will initially 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**

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stipend range is $6,224 monthly, with a $738.88 insurance supplement.

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 have received a doctoral degree in one of the relevant fields. Degree must have been received within the past four years.

Stipend $6,224.00 Monthly

Point of Contact Janeen

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree received within the last 48 months or currently pursuing.
- **Discipline(s):**
  - **Life Health and Medical Sciences** (5 👁)