

Opportunity Title: USDA-ARS Postdoctoral Fellowship for Foot-and-Mouth Disease Virus Like Particle and Antigen Production
Opportunity Reference Code: USDA-ARS-P-2023-0278

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. 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 8/18/2023 3:17:13 PM Eastern Time Zone

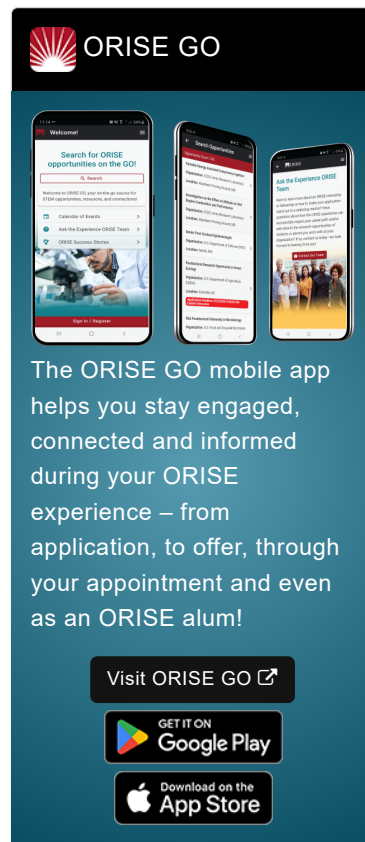
Description *Applications may be reviewed on a rolling-basis.

ARS Office/Lab and Location: A research opportunity is currently available with the Biologics Development Module (BDM) within the National Bio and Agro-Defense Facility (NBAF) of the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS) located in Manhattan, KS.

The Biologics Development Module (BDM) is a unit within the [National Bio and Agro-Defense Facility \(NBAF\)](#) whose mission is to support and accelerate technology transfer of vaccines, diagnostics, biotherapeutics, and other veterinary medical countermeasures to commercial veterinary biologic manufacturers. It does this through collaborative projects with industry partners in which both materials and personnel are shared throughout the course of the project.

In support of this mission the BDM has entered into a partnership with [BioStone Animal Health LLC](#) a Dallas, TX based biotechnology company that provides innovative solutions for animal health. BioStone Animal Health LLC supports animal health through developing diagnostics, vaccines, and animal health products. These include developing and commercializing diagnostic reagents for Classical Swine Fever (CSF), African Swine Fever (ASF), Foot and Mouth Disease (FMD), and Avian Influenza Virus (AIV) through collaborations with academic and government laboratories.

Research Project: Foot-and-mouth disease virus (FMDV) is one of the most feared pathogens of cloven-hoofed livestock in the world with significant economic, social, and environmental impacts. FMD has been eradicated from many developed countries, into which a reintroduction of



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FMD from regions where the virus is endemic could have devastating social, environmental, and economic impact. There are seven endemic pools of FMDV: pools 1-3 in Asia, pools 4-6 in Africa, and pool 7 in South America (source: FAO/OIE 2016 report) and hundreds of millions of animals are vaccinated every year worldwide with vaccines produced with chemically inactivated FMDV antigen formulated with an adjuvant. Antigenic variation results from changes to the viral capsid because of the high mutation rate of the virus. The outer capsid proteins are directly involved in antigenicity seeing as 30-50% of their residues are exposed on the virion surface (on VP1, VP2, VP3) many of which constitute neutralizing epitopes. Screening of numerous FMDV strains or virus-like particle producing (in terms of antigen mass) vaccine strains is a difficult, time consuming and expensive process utilizing sucrose density gradients, ELISA or HPLC; newer technologies for monitoring vaccine production, and diagnostics are still needed urgently.

The participant will use tissue culture/cell-based expression systems, such as yeast and E. coli, to produce recombinant FMD antigens. Specifically, they will optimize conditions in which an FMD virus like particle (VLP) is produced by the expression system. They will conduct experiments to evaluate the quality and quantity of the VLP antigens. They will conduct and optimize VLP purification protocols, and they may use different strategies to maximize the yield and purity of VLP antigens. They will use different VLPs in downstream applications for ELISA development. They will conduct research to optimize the ELISA, by evaluating different ELISA conditions in which the ELISA achieves maximum diagnostic sensitivity and specificity to detect FMD antibodies. If an optimal ELISA is developed, they will also learn how to scale-up ELISA manufacturing by using industry equipment to prepare a production lot, which will be used for inter-laboratory evaluation.

Learning Objectives: The participant will learn skills and concepts related to cell biology, biochemistry, and immunology. Specifically, they will learn how to employ yeast expression systems, and alternative expression systems as needed, to produce antigens of interest. They will learn how to optimize recombinant protein expression, antigen/protein/VLP purification, and ELISA performance through conducting literature searches and R&D experiments. They will learn how to use ELISA data processing and evaluation to develop troubleshooting strategies for immunoassay optimization. They are expected to learn how to analyze data from immunoassays, communicate results and summaries, and devise a plan of action for moving projects towards the next milestone.

The participant will gain professional development through collaborating on R&D team projects, which are conducted in a biotechnology/industry environment. Their research will contribute to essential parts of the product development pipeline, which will require building professional communication skills for cross-team interactions with management, senior and junior scientists, and the manufacturing teams. They will also build experience employing manufacturing standards for biologics.

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Mentor(s): The mentor for this opportunity is Michael Puckette (michael.puckette@usda.gov). If you have questions about the nature of the research, please contact the mentor(s).

Anticipated Appointment Start Date: August 2023. Start date is flexible and will depend on a variety of factors.

Appointment Length: The appointment will initially be for up to three years, but may be renewed 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.

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.Plains@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 or be currently pursuing the degree to be received before August 30, 2023. Degree must have been received within the past three years.

Preferred, but not required, qualifications include experience with molecular cloning, protein expression systems, protein purification, ELISA, and/or assay development.

Point of Contact [Janeen](#)

- Eligibility Requirements**
- **Citizenship:** U.S. Citizen Only
 - **Degree:** Doctoral Degree received within the last 36 months or anticipated to be received by 8/30/2023 12:00:00 AM.
 - **Discipline(s):**
 - **Chemistry and Materials Sciences** ([2](#) )
 - **Life Health and Medical Sciences** ([11](#) )