Opportunity Title: FDA Arsenical Synthesis and Characterization Fellowship
Opportunity Reference Code: FDA-ORA-2024-0004

Organization U.S. Food and Drug Administration (FDA)

Reference Code FDA-ORA-2024-0004

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

A complete application consists of:

- An application
- Transcripts – Click here for detailed information about acceptable transcripts
- A current resume/CV, including academic history, employment history, relevant experiences, and publication list
- One educational or professional recommendation. Your application will be considered incomplete, and will not be reviewed until one recommendation is submitted.

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

If you have questions, send an email to ORISE.FDA.OC.other@orau.org. Please include the reference code for this opportunity in your email.

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

FDA Office and Location: A research opportunity is available within the Food and Drug Administration (FDA) in the Office of Regulatory Affairs (ORA) / Forensic Chemistry Center (FCC) in collaboration with the Center for Food Safety and Nutrition (CFSAN), located at Cincinnati, Ohio.

Research Project: The FDA/Office of Regulatory Affairs (ORA) / Forensic Chemistry Center (FCC) in collaboration with the Center for Food Safety and Nutrition (CFSAN) is developing a synthesis mechanism for the newly identified arsenic compound in rice, dimethylarsonyldimethylarsinic acid (DMADMAA). During the synthesis process, various techniques will be used to characterize the resulting compound(s) to ensure the accuracy of the end product. Arsenic has a well-documented history as a toxic substance, with drastically varying toxicity among its chemical species. During the FDA's survey of arsenic species in rice and rice products (early to mid-2010s), several samples exhibited an unknown arsenic compound. Exhaustive attempts were made to identify the compound with a recent publication documenting its eventual identification as DMADMAA.

Previous literature reports have provided the groundwork for various synthesis routes, but DMADMAA's synthesis has never been reported. Pure standards are critical for species-specific identification when using routine arsenic analysis techniques, namely liquid chromatography with inductively coupled plasma mass spectrometry (LC-ICP-MS) detection.

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Having a pure standard offers the most direct and accurate method to quantitate the compound within complex matrices such as rice. Additionally, this standard can be used to help develop and optimize the current FDA regulatory method for arsenic speciation in rice. Activities in which the participant may be involved include, but are not limited to:

- Experiment with various synthesis routes to determine the optimal route considering yield, purity, complexity, and reliability.
- Determine the chemical composition (i.e. molecular formula) of the resulting synthesis products using LC-ICP-MS and LC with mass spectrometric detection (LC-MS).
- Perform structural characterization using Raman and FT-IR spectroscopy.
- Determine the connectivity and stereochemistry using single crystal X-ray crystallography and NMR.
- The above activities will result in the compound being considered fully characterized with unequivocal identification.

Learning Objectives: This fellowship provides the selected research fellow with an excellent learning opportunity to:

- Collaborate with FDA scientists in diverse research laboratories throughout the project
- Learn about synthesis approaches and multiple analytical techniques
- Present research finding at various national and/or international scientific meetings
- Author peer-reviewed journal articles

Ideally these findings and results from the above mentioned research will be presented at scientific meetings and published in a peer-reviewed journal.

Anticipated Appointment Start Date: August 2024. 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 upon recommendation of FDA and is contingent on the availability of funds.

Level of Participation: The appointment is full time.

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.

This program, administered by ORAU through its contract with the U.S. Department of Energy to manage the Oak Ridge Institute for Science and Education, was established through an interagency agreement between DOE and FDA. The participant will receive a monthly stipend

commensurate with educational level and experience. Proof of health insurance is required for participation in this program. Participants do not become employees of FDA, DOE or the program administrator, and there are no employment-related benefits.

Completion of a successful background investigation by the Office of Personnel Management is required for an applicant to be on-boarded at FDA. OPM can complete a background investigation only for individuals, including non-US Citizens, who have resided in the US for a total of three of the past five years.

FDA Ethics Requirements

If an ORISE Fellow, to include their spouse and minor children, reports what is identified as a Significantly Regulated Organization (SRO) or prohibited investment fund financial interest in any amount, or a relationship with an SRO, except for spousal employment with an SRO, and the individual will not voluntarily divest the financial interest or terminate the relationship, then the individual is not placed at FDA. For additional requirements, see FDA Ethics for Nonemployee Scientists.

FDA requires ORISE participants to read and sign their FDA Education and Training Agreement within 30 days of his/her start date, setting forth the conditions and expectations for his/her educational appointment at the agency. This agreement covers such topics as the following:

- Non-employee nature of the ORISE appointment
- Prohibition on ORISE Fellows performing inherently governmental functions
- Obligation of ORISE Fellows to convey all necessary rights to the FDA regarding intellectual property conceived or first reduced to practice during their fellowship
- The fact that research materials and laboratory notebooks are the property of the FDA
- ORISE fellow's obligation to protect and not to further disclose or use non-public information

Qualifications

The qualified candidate should be pursuing or have received an associate's, bachelor's, master's, or doctoral degree in the one of the relevant fields.

Eligibility Requirements

- **Degree:** Associate's Degree, Bachelor's Degree, Master's Degree, or Doctoral Degree.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Engineering** (8 👁)
  - **Life Health and Medical Sciences** (3 👁)
  - **Physics** (3 👁)

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Affirmation I am a U.S. citizen, or I have lived in the United States for at least 36 out of the past 60 months. (36 months do not have to be consecutive.)
and
I have read the FDA Ethics Requirements.