

Opportunity Title: EPA Fellowship on Modeling Stormwater Microbial Quality

Opportunity Reference Code: EPA-ORD-CESER-WID-2023-05

Organization U.S. Environmental Protection Agency (EPA)

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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. Click [here](#) for detailed information about recommendations.

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

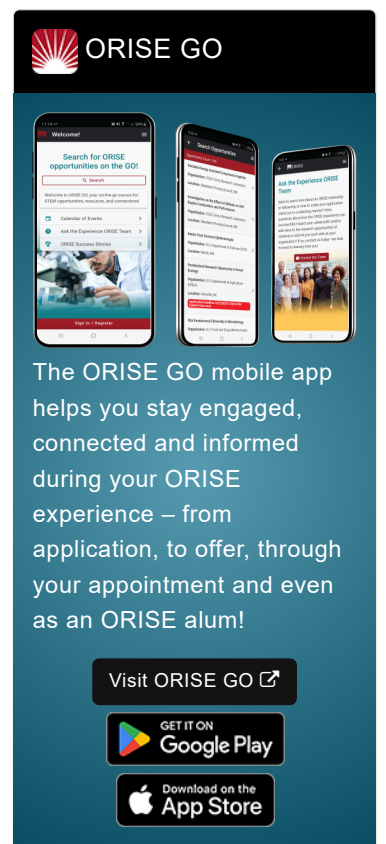
Application Deadline 2/2/2024 3:00:00 PM Eastern Time Zone


Description *Applications may be reviewed on a rolling-basis and this posting could close before the deadline. Click [here](#) for information about the selection process.

EPA Office/Lab and Location: A research opportunity is available at the Environmental Protection Agency (EPA), Office of Research and Development (ORD), Center for Environmental Solutions and Emergency Response (CESER), Water Infrastructure Division (WID) located in Cincinnati, Ohio.


Research Project: There is a need for original models and new ways of thinking about microbial stormwater quality for a variety of applications, including risk characterization to inform appropriate treatment during stormwater capture and use (SCU) and exposure assessment of urban storm- and floodwaters that can present microbial risks to the public and emergency responders. Previous research has observed substantial variance in microbial stormwater quality, especially in urban locations, with poorly defined predictor variables. Current stormwater quality models [e.g., the EPA's Stormwater Management Model (SWMM) and National Stormwater Calculator (SWC) have been primarily designed for nutrient responses and generally do not perform well for microbial contaminants. Furthermore, quantitative molecular markers (i.e., PCR measurements) can help to quantify microbial risks from fecal contamination, pathogens, or antimicrobial resistance, yet no current stormwater models have been developed for these responses. The theme of this appointment is therefore to review literature and synthesize data to develop enhanced stormwater quality models and appropriate modeling inputs that improve their characterization of microbial stormwater quality. The research participant will learn about environmental and stormwater microbiology. The research


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participant will learn about hydrological and spatial statistical modeling. The research participant will have the opportunity to interact with different Centers and staff in the EPA Office of Research and Development to learn about EPA's research activities around water reuse, climate change implications to stormwater modeling, and flood risk mitigation.

Under the guidance of a mentor, research activities may include:

- Reviewing the statistical links of microbial responses in stormwater with temporal (e.g., meteorological, climate-driven) and spatial variables (e.g., density or proximity of sources, imperviousness)
- Assessing empirical models to predict the impact of natural processes (e.g., biological growth/decay, adsorption, absorption, desorption, dispersion) on microbial stormwater quality
- Summarizing current deterministic and stochastic stormwater models and their handling of microbial stormwater quality
- Supporting model development and input parameterization for integration of microbial contaminants within EPA's SWMM and SWC
- Analyzing molecular data from storm- and floodwater studies to develop predictive microbial water quality models and conduct quantitative microbial risk assessment (QMRA) of potential exposures
- Developing QMRA models to inform fit-for-purpose treatment guidance for different SCU applications (e.g., onsite non-potable reuse, aquifer recharge)
- Using global climate models to understand the impacts and implications of climate change on microbial stormwater quality
- Collaborating with different EPA Offices and Regions on relevant stormwater quality issues and application of modeling approaches to address them
- Participating in stakeholder meetings to inform research activities and communicate results
- Preparing guidance documents and scientific journal manuscripts

Learning Objectives: Learning objectives for this opportunity include:

- Applying critical-thinking and analysis skills to complex environmental systems
- Developing translational modeling approaches for real-world applications
- Gaining experience in public service and government research environments

Mentor(s): The mentor for this opportunity is Michael Jahne (jahne.michael@epa.gov). If you have questions about the nature of the research please contact the mentor(s).

Anticipated Appointment Start Date: January 4, 2024 All start dates are flexible and vary depending on numerous factors. Click [here](#) for detailed information about start dates.

Appointment Length: The appointment will initially be for one year and may be renewed three to four additional years upon EPA recommendation and subject to availability of funding.

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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. Click [here](#) for detailed information about full-time stipends.

EPA Security Clearance: Completion of a successful background investigation by the Office of Personnel Management (OPM) is required for an applicant to be on-boarded at EPA.

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 EPA. Participants do not become employees of EPA, 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 see the [FAQ section](#) of our website. After reading, if you have additional questions about the application process please email ORISE.EPA.ORD@orau.org and include the reference code for this opportunity.

Qualifications The qualified candidate should have received a master's or doctoral degree in one of the relevant fields, or be currently pursuing the degree with completion before the appointment start date. Degree must have been received within two years of the appointment start date.

Preferred skills/experience:

- Coursework and/or experience related to water quality modeling, stormwater hydrology, microbial risk assessment, or wastewater management
- Demonstrated proficiency in scientific literature review, data analysis, applied modeling, and science communication

Eligibility Requirements

- **Degree:** Master's Degree or Doctoral Degree received within the last 24 months or currently pursuing.
- **Discipline(s):**
 - **Chemistry and Materials Sciences** ([12](#) )
 - **Computer, Information, and Data Sciences** ([17](#) )
 - **Earth and Geosciences** ([21](#) )
 - **Engineering** ([27](#) )
 - **Environmental and Marine Sciences** ([14](#) )
 - **Life Health and Medical Sciences** ([48](#) )
 - **Mathematics and Statistics** ([11](#) )