

Opportunity Title: Microbial Zebrafish Research Scientist
Opportunity Reference Code: EPA-SSP-0008-20-9-9-2019

Organization U.S. Environmental Protection Agency (EPA)

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Description U.S. EPA Opportunity

The EPA Environmental Research and Business Support Program has an immediate opening for a full-time doctorate level Microbial Zebrafish Research Scientist with the EPA facility in Cincinnati, OH.

What the EPA project is about

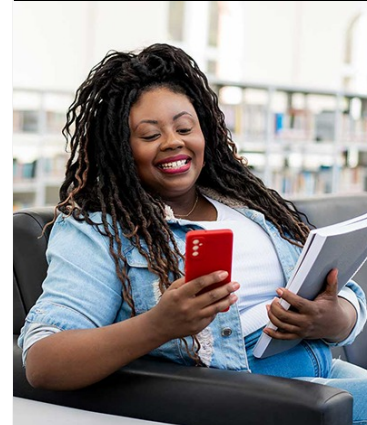
The Office of Research and Development (ORD) functions as the principal scientific component of the U.S. Environmental Protection Agency (EPA).

The National Exposure Research Laboratory (NERL), Office of Research and Development (ORD), Systems Exposure Division (SED), located in Cincinnati, Ohio, is a scientific organization responsible for carrying out EPA's mission to protect human health and the environment by developing and applying innovations in exposure science. Currently a research effort for ORD is developing methods for microbial contaminants of emerging concern (CECs) for whom we lack data. Species of *Legionella* and *Mycobacterium* are drinking water microbial CECs and are on the US EPA's Office of Water's Contaminant Candidate List 4 (<https://www.epa.gov/ccl/contaminant-candidate-list-4-ccl-4-0>). Several studies have described the occurrence of *Legionella* and *mycobacteria* in drinking water, but the lack of genetic virulence determinants and absence of in vivo animal models limit our understanding of the infectivity of environmental isolates and their subsequent risk towards humans. Zebrafish embryos possess innate immunity, which is the same component of the immune system that *Legionella* and *mycobacteria* disable in humans. In addition, fluorescent-transgenic zebrafish lines are commercially available that provide the ability to follow the infectious process in real-time. Zebrafish embryos have successfully been used to characterize the role of the innate immune system in dissemination of *M. tuberculosis* infection (doi: 10.1016/j.cell.2008.11.014) and to establish the virulence of *M. abscessus* isolates from cystic fibrosis patients (doi/10.1073/pnas.1321390111). While these limited studies have characterized the virulence of human isolates, it is not known if environmental isolates exhibit virulence in vivo. Key objectives for this research effort are:


- Establish the zebrafish embryo as a model for measuring virulence of



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relevant species of Legionella and mycobacteria and

- Estimate in vivo virulence of drinking water isolates of mycobacteria and Legionella to better understand their risk to human health.

Legionella have been identified as a high priority research area in Office of Water's Research Priorities Document (2018). In addition, this research will provide critical data in support of EPA's Strategic Plan, Objective 3.3, to "support safe drinking water by focusing research on assessing the distribution, composition, remediation, and health impacts of known and emerging chemical and biological contaminants."

What you will be doing

As a team member, you will assist the ORD NERL Methods for Microbial CECs research team with the research and administrative duties required to fulfill its commitments to methods development for environmental microbial CECs in support of Office of Water's Contaminant Candidate List 5 (CCL5) and Unregulated Contaminant Monitoring Rule (UCMR).

Required skills

- Demonstrated laboratory experience in growth of bacteria and preparation of inocula for microinjection.
- Demonstrated laboratory experience maintaining fish cultures using Standard Operating Procedures. Experience with breeding, collection of embryos, and preparation of embryos for microinjection.
- Advanced proficiency with Microsoft Office applications (i.e., Excel, PowerPoint, Word, Outlook, Access).
- Highly organized; experienced in administration support functions (i.e., recordkeeping, meeting organization) and managing records (electronic and paper).
- Strong communication skills (written and oral).

Desired skills

- Experience in fluorescent microscopy.

How you will apply your skills

Research responsibilities include:

- Performing general assistance in the laboratory, including the preparation of microbiological media, maintenance of cultures, processing water samples for DNA extraction and qPCR analysis;
- Growing and preparing bacterial suspensions for microinjection into zebrafish embryos;
- Using standard protocols to produce zebrafish embryos from established fish stocks;
- Preparing zebrafish embryos for microinjection with bacterial suspensions;
- Using stereomicroscopy for visualizing the infection process in zebrafish embryos;

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- Performing data management activities;
- Documenting methods and quality assurance/quality control procedures employed in a laboratory notebook; and
- Drafting written material (including text, tables and figures) to describe the methods and results of the scientific process undertaken to address key research questions related to virulence of environmental bacteria.

Management and Administrative responsibilities include:

- Gathering information and developing tables, spreadsheets, presentations, and graphics in response to needs of the research team;
- Assisting the mentor in addressing a variety of research team needs using expertise and ability to collaborate with colleagues and other researchers in a professional environment;
- Establishing and maintaining a variety of electronic files and laboratory notebooks; and
- Taking and documenting all required training courses, including laboratory safety, Quality Assurance/Quality Control, and EPA mandatory training courses.

Communication related responsibilities include:

- Assisting in responding to requests of various nature that require short turn-around times and attention to detail;
- Working with the research team to gather information when required, perform a variety of analyses using computer programs, and communicate results clearly to staff; and
- Attending meetings, providing requested feedback on data calls, and communicating with ORD NERL management and the research team.

Location: This job will be located EPA's Cincinnati, OH facility.

Salary: Selected applicant will become a temporary employee of ORAU and will receive an hourly wage of \$41.95 for hours worked.

Hours: Full-time

Travel: Occasional overnight travel may be required.

Expected start date: The position is full time and expected to begin October 2019. The initial project is through May 14, 2020, with potential optional periods.

Qualifications



- Be at least 18 years of age and
- Have earned a PhD in biology, microbiology, environmental sciences, or a closely related field of study from an accredited university or college within the last 24 months and
- Be a citizen of the United States of America or a Legal Permanent Resident.

EPA ORD employees, their spouses, and children are not eligible to

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participate in this program.

- Eligibility Requirements**
- **Citizenship:** LPR or U.S. Citizen
 - **Degree:** Doctoral Degree received within the last 24 month(s).
 - **Discipline(s):**
 - **Environmental and Marine Sciences** ([13](#) )
 - **Life Health and Medical Sciences** ([45](#) )

Affirmation I certify that I am at least 18 years of age; have earned a PhD in biology, microbiology, environmental sciences, or a closely related field of study from an accredited university or college within the last 24 months; a citizen or a Legal Permanent Resident of the United States of America; and not a current employee of EPA ORD or the spouse or child of an EPA ORD employee.

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