The US EPA’s Office of Research and Development, Great Lakes Toxicology and Ecology Division, is seeking applicants for a **post-doctoral training fellowship focused on the use of “new approach methodologies” or “alternative testing” to evaluate ecological toxicity of organic contaminants.**

**Title: EPA Ecological Toxicity of Organic Contaminants Fellowship**

**Reference Code:** EPA-ORD-CCTE-GLTED-2020-06

The opportunity details can be found: [1 position available]


An important aspect of EPA’s mission is to protect human health and the environment from harmful effects of chemicals. Hazards that chemicals pose to humans or wildlife have traditionally been assessed using toxicity tests in which animals are exposed to a chemical of interest for days to weeks and then effects on survival, growth, reproduction, or health outcomes are evaluated. While effective, these approaches are costly and time-consuming, making it impractical to collect toxicity data for tens of thousands of chemicals currently in commerce and present in the environment. In order to address this challenge, there has been a strong interest in employing advances in biotechnology, miniaturization, robotics, and computing to collect chemical safety information in a more rapid and cost-effective manner. This has been termed high throughput toxicology. In recent years a number of pioneering high throughput toxicology programs such as ToxCast and Tox21 have generated data for thousands of chemicals. Additionally, emerging methods in high throughput transcriptomics are providing concentration-response data that may be predictive of longer-term impacts in organisms. However, regulators and environmental decision-makers remain hesitant to employ these new sources of data as a basis for chemical safety decisions.

The postdoctoral fellow will be trained in the design and execution of case studies that explore the value and limitations of these alternative data for estimating chemical toxicity. The participant will also engage in the development of innovative approaches in concentration-response modeling and in vitro to in vivo extrapolation that can reduce uncertainties in the use of data from high throughput toxicity testing methods, with a focus on estimating ecological risks.

With guidance from the mentor, the participant may be involved in any or all of the following training activities:

- Estimating points of departure (e.g., lowest observed effect concentrations, benchmark doses) from high throughput toxicity testing data including ToxCast data and omics data sets.
• Comparing points of departure from alternative methods with those derived from traditional animal testing.

• Applying innovative and cutting edge approaches in in vitro to in vivo extrapolation and reverse toxicokinetics to translate effect concentrations measured in multi-well plates to equivalent blood, tissue, or environmental media concentrations.

• Adapting existing toxicity testing methods with aquatic vertebrates, invertebrates, plants and/or algae to high throughput formats.

• Optimizing assay conditions.

• Developing high throughput approaches for collecting phenotypic data from exposed organisms.

• Developing high throughput techniques for collection, batch processing, and analysis of biofluid and tissue samples suitable for molecular, biochemical, and/or histological analyses.

• Designing workflows and data analysis pipelines for automated and standardized analysis of large data sets.

• Developing and implementing a data archiving and storage system.

• Identifying statistical and performance-based measures of assay and data quality and implementing quality assurance and quality control.

• Use of laboratory automation systems to deliver test chemicals, organisms, culture solutions, etc. to test vessels and/or to aid sample collection and processing.

• Using analytical chemistry methods to verify chemical concentrations, purity, and availability/partitioning in the test vessels.

• Generating samples for transcriptomic and metabolomic analyses and applying statistical and bioinformatic tools to analyze DNA microarray and/or DNA/RNA sequencing results.

• Conducting statistical analyses on experimental data.

• Compiling and synthesizing data from the peer-reviewed literature and on-line data sources and organizing it according to the AOP framework in order to aid interpretation of test results.

• Analyzing gene expression using real-time polymerase chain reaction and developing novel primers, probes, and standards for gene expression analyses.

• Analyzing steroid hormones and plasma proteins using radioimmunoassay (RIAs) and enzyme-linked immunosorbent assays (ELISAs)

• Presenting research results at regional, national, and/or international conferences and workshops.

• Contributing to the preparation of peer-reviewed journal articles and disseminating research results to project partners and stakeholders.
• Conducting field-based research outdoors and/or at remote laboratory locations other than the primary training location, including involvement in planning and logistics associated with remote activities.

The postdoctoral fellow will be integrated into a transdisciplinary research team and engaged in multiple aspects of project planning, communication and coordination, research implementation, and analysis. The participant will be afforded an opportunity to interact with internationally recognized leaders, both within and outside EPA and will publish and contribute to original research. It is expected that this training opportunity will provide an early career scientist with knowledge, skills, and abilities needed to apply new technologies and associated data to regulatory decision-making at the local, national, and/or international scale.

Preferred candidate(s) should have a Ph.D. degree in biology, (eco)toxicology, biochemistry, molecular biology, genetics, bioinformatics, computational biology, computational chemistry, chemistry, biostatistics, or a related field.

Open to all U.S. citizens.

Applicants must be within 5 years of receiving their Ph.D. degree.

Stipend equivalent to a GS-11 federal toxicologist salary.

For additional information contact:

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