Opportunity Title: Evaluation of Developmental Neurotoxicity Screening Assays using Bioinformatic Approaches
Opportunity Reference Code: EPA-ORD-NHEERL-ISTD-2018-12

Organization U.S. Environmental Protection Agency (EPA)

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How to 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
- Two educational or professional references

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

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

Description Humans are exposed to thousands of compounds that have not been characterized for their potential hazard to the developing brain. Under the Lautenberg Chemical Safety Act, the US EPA is required to develop new approach methodologies to test chemicals for potential hazard, including developmental neurotoxicity (DNT). The National Health and Environmental Effects Research Laboratory (NHEERL) has developed, and is collaborating with others, to develop assays that evaluate the potential for chemicals to disrupt nervous system development. In addition, large sets of chemicals are being tested in these in vitro assays.

Under the guidance of a mentor, the research participant will apply novel analysis approaches to maximize the value of information that can be extracted from these assays. This includes developing applications that determine how to best prioritize compounds for additional “second tier” tests, and development of predictive models that can inform the development of Adverse Outcome Pathways for developmental neurotoxicity. The research participant will be involved in collating data from multiple different types of in vitro and alternative assay models, leading the concentration-response analysis of data generated by the project, and evaluating assay performance. The research participant will have the opportunity to explore the data to provide novel and useful analyses, for example, generating tipping points for in vitro effects where possible, extracting “signatures” of compound actions from assays and comparing hazard for DNT to other toxicities based on in vitro data. In addition, there is opportunity for the candidate to conduct In vitro to in vivo extrapolations of the data from the DNT assays.

The goals of this research project are to: 1) develop novel approaches to analyze data from in vitro DNT assays; and 2) find novel mathematical approaches to establish relationships between endpoints, relationships between chemicals in terms of potency and efficacy, and how data from in vitro assays relate to in vivo results.

The research participant will collaborate with a team of scientists that include experts in neurotoxicology, toxicology and cell biology to achieve these goals. The research participant will be involved in data analysis and is expected to use approaches such as Mutual Information Analysis, principle components analysis, regression analysis and other approaches to help to intepret the data. The research participant will learn about a variety of in vitro neurotoxicity assays by being involved in the analysis of data from those assays as well as learning to handle large datastreams and apply multiple types of analysis to those data. The research participant will present their data using informative visuals as well as through contributing to writing manuscripts. Thus, the research participant will enhance both analysis and presentation skills.

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The mentor for this opportunity is Tim Shafer (shafer.tim@epa.gov).

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. The initial appointment is for one year, but may be renewed upon recommendation of EPA and is contingent on the availability of funds. The participant will receive a monthly stipend commensurate with educational level and experience. Proof of health insurance is required for participation in this program. The appointment is full-time in the Research Triangle Park, North Carolina area. Participants do not become employees of EPA, DOE or the program administrator, and there are no employment-related benefits.

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

Qualifications

The qualified candidate should be currently pursuing or have received a doctoral degree in data analytics, statistics, bioinformatics or a closely related field. Degree must have been received within five years of the appointment start date.

Preferred skills:

- Strong data analysis skills and the ability to find creative and informative approaches to data analysis
- Experience with R-programming and other programming languages is **highly desired**

Eligibility Requirements

- **Degree:** Doctoral Degree received within the last 60 months or currently pursuing.
- **Discipline(s):**
  - **Communications and Graphics Design** (1 👁)
  - **Computer, Information, and Data Sciences** (3 👁)
  - **Engineering** (1 👁)
  - **Life Health and Medical Sciences** (6 👁)
  - **Mathematics and Statistics** (3 👁)

Affirmation

I certify that I have lived in the United States for the past three years.