

Opportunity Title: Signatures of Chemically-Induced Developmental Neurotoxicity

Opportunity Reference Code: EPA-ORD-NHEERL-ISTD-2017-08

Organization U.S. Environmental Protection Agency (EPA)

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How to Apply A complete application consists of:

- An application [Next](#)
- 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.

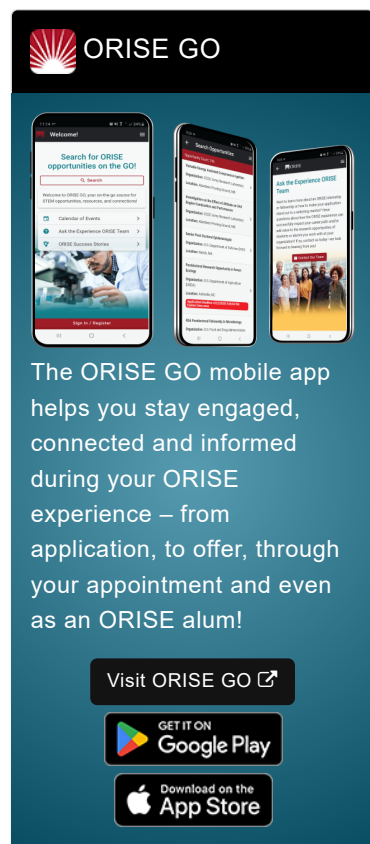
If you have questions, send an email to EPArpp@orau.org. Please include the reference code for this opportunity in your email.

Description A research opportunity is currently available at the U.S. Environmental Protection Agency's (EPA), Office of Research and Development (ORD), National Health and Environmental Effects Research Laboratory (NHEERL). The appointment will be served with the Integrated Systems Toxicology Division (ISTD), in Research Triangle Park, North Carolina.

Of the tens of thousands of chemicals for which toxicity data are lacking, less than 100 environmental chemicals have been tested for developmental neurotoxicity (DNT) in a guideline study. In part, this is due to the high cost of conducting a DNT guideline study and the amount of time it takes to complete the study for just one chemical. Yet, the potential for chemicals to cause DNT remains an Agency and Public concern. Thus, developing alternative screening approaches for DNT is a high research priority. To address this problem, we have developed a DNT screening assay based on the development of network activity in a complex model of brain cortex grown on microelectrode arrays (MEAs), and have tested approximately 200 compounds in this system. This model provides high-content data on the rate and patterns of neural firing that show clear ontogeny during the first 2 weeks in culture. Furthermore, we have developed "Toxicological Tipping Points" for at least 40 of these chemicals.

As a next step in defining the pathways resulting in developmental neurotoxicity, we have recently demonstrated that both metabolomic and transcriptomic responses can be measured from the neural networks grown on the microelectrode arrays. This allows for the determination of pathways associated with functional changes in network development following exposure to environmental chemicals. Further, because both tipping points as well as cytotoxicity information can be measured from the same network, this allows for analysis of which pathways may be associated with the transition from adaptation to altered function, as well as to frank cytotoxicity.

The activities of this research project will include: 1) determining the biological pathways associated with functional changes in network



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development following exposure to developmentally neurotoxic chemicals; 2) comparing those pathways with proposed pathways associated with neurodevelopmental disease pathways in humans and 3) because acute MEA, DNT MEA and ToxCast data are available for the compounds to be tested, using this information to begin developing putative AOPs for neurotoxicity.

The mentor for this project is Tim Shafer (shafer.tim@epa.gov). The anticipated start date is August 1, 2017.

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 EPA. The appointment is full time for one year and may be renewed upon recommendation of EPA and contingent on the availability of funds. The participant will receive a monthly stipend. Funding may be made available to reimburse the participant's travel expenses to present the results of his/her research at scientific conferences. No funding will be made available to cover travel costs for pre-appointment visits, relocation costs, tuition and fees, or participant's health insurance. The participant must show proof of health and medical insurance. **The participant does not become an EPA employee.**

Qualifications Applicants should have completed a doctoral degree in neuroinformatics, bioinformatics, biostatistics, statistics, or a closely related field within five years of the desired start date, or completion of all the requirements for the degree should be expected prior to the starting date. Experience with large data sets to conduct neuroinformatics, bioinformatics, and/or biostatistical analyses is desirable.

- Eligibility Requirements**
- **Degree:** Doctoral Degree received within the last 60 month(s).
 - **Discipline(s):**
 - **Communications and Graphics Design** ([1](#) )
 - **Computer, Information, and Data Sciences** ([2](#) )
 - **Life Health and Medical Sciences** ([7](#) )
 - **Mathematics and Statistics** ([3](#) )