Opportunity Title: Evaluation of Predictive Approaches to Species Extrapolation
Opportunity Reference Code: EPA-OCSPP-OSCP-2018-03

Organization	U.S. Environmental Protection Agency (EPA)
Reference Code	EPA-OCSPP-OSCP-2018-03
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	Understanding the taxonomic relevance of chemical toxicity data generated with model organisms is essential to EPA's mission in protecting both human health and wildlife. Tools for addressing such challenges in cross-species extrapolation are needed to support research objectives in the Office of Research and Development (ORD) and the Endocrine Disruptor Screening Program (EDSP). The participant will be involved in the development, testing, and application of bioinformatics tools to inform predictions of cross-species chemical susceptibility (e.g., homology modeling, molecular docking). Laboratory studies, using molecular techniques, will focus on the evaluation of protein sequence and structural similarities and differences across species that impact chemical binding or activation of chemical targets (e.g., site-directed mutagenesis, receptor binding assays, and reporter gene assays). Additionally, literature review will be conducted to capture cross-species biological pathway information linking mechanisms of chemical perturbation to adverse effects with the potential to experimentally evaluate identified pathways. The research participant will be trained in predictive toxicology aimed at characterizing the similarities and differences across species that drive chemical sensitivity and can be used in the context of extrapolating toxicity data/knowledge across species. With guidance from the mentor, the research participant may be involved in any or all of the following training activities: • Explore and operate molecular modeling/docking programs

to support research.

- Design various program scripts for carrying out large scale data mining of protein sequence/structural data.
- Use data collection and modeling to analyze biological data.
- Automate data collection and collation processes.
- Propose solutions and strategies to improve existing web-based U.S. EPA tools.
- Extend existing software programs, web-based interactive tools, or database queries as analysis needs evolve.
- Test computational applications to identify bugs and recommend fixes.
- Document all database changes, modifications, or problems.
- Develop custom algorithms to apply to data sets.
- Develop or apply data mining and machine learning algorithms.
- Conduct large scale literature review, integrating computational methodology to expedite knowledge synthesis.
- Develop adverse outcome pathways to support risk assessments.
- Analyzing gene expression using real-time polymerase chain reaction and developing novel primers, probes, and standards for gene expression analyses.
- Conduct in vitro bioassays with immortalized recombinant cell lines and/or primary tissues collected from exposed and non-exposed test organisms.
- Conduct comparative (in vitro/in vivo) toxicology experiments with aquatic vertebrates/invertebrates.
- Present research results at regional, national, and/or international conferences and workshops.
- Contribute to the preparation of peer-reviewed journal articles and disseminating research results to project partners and stakeholders.

The research participant will be afforded an opportunity to interact with internationally recognized leaders, both within and outside EPA, in the area of applying adverse outcome pathway knowledge to the practice of chemical risk assessment with a particular focus on evaluating cross-species differences in

chemical sensitivity. The participant will have the opportunity to contribute to and/or publish original research on cross species extrapolation of toxicology knowledge relevant to the EDSP. 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 and to pursue a professional career in life sciences research.

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 Duluth, Minnesota area. Participants do not become employees of EPA, DOE or the program administrator, and there are no employment-related benefits.

Qualifications

Preferred candidate(s) should have a doctoral degree in bioinformatics, computational biology, genetics, molecular biology, toxicology, or a related field. The degree have been received within five years of the appointment start date.

The ideal candidate will have:

- Course work or experience in bioinformatics
- Demonstrated computer programming capabilities (e.g., Java)
- Familiarity with database systems (e.g., MySQL)
- Previous experience in graphical user interface (GUI) development
- Previous research experience in molecular biology, beyond lab-oriented course work alone
- Experience with basic molecular biology techniques used for analysis of proteins and nucleic acids (e.g., gel electrophoresis, PCR, quantitative real-time PCR, use of thermocyclers and/or bioanalyzers, etc.)
- Experience with site-directed mutagenesis methodology
- Experience developing or running reporter gene assays
- Cell culture experience (e.g., plating, maintaining, freezing

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animal cells using aseptic technique).

Eligibility Requirements

- **Degree:** Doctoral Degree received within the last 60 month(s).
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (10 👁)
  - **Environmental and Marine Sciences** (1 👁)
  - **Life Health and Medical Sciences** (10 👁)
  - **Mathematics and Statistics** (1 👁)