

Postgraduate Research Project Training

U.S. Environmental Protection Agency Research Triangle Park, NC

A postgraduate research project training opportunity is currently available at the U.S. Environmental Protection Agency's National Center for Computational Toxicology (NCCT), in Research Triangle Park, North Carolina.

The NCCT is responsible for developing computational tools and providing analysis for improving environmental risk assessments and regulatory decisions pertaining to chemical safety and sustainability (<http://epa.gov/ncct/>). There are tens of thousands of chemicals that are currently in commerce, with hundreds more introduced every year. Many of these chemicals find their way into the environment and only a small fraction have been adequately assessed for potential risk. The NCCT is working with its partners to revolutionize how we assess chemical toxicity risk to humans and the environment. Systems models encode a mechanistic understanding of how a system (for example, the entire environment or a human body within it) works in order to allow the consequences of different actions to be predicted by computer simulation. Environmental fate and transport models allow estimation of how a chemical released into the environment disperses and how likely is an individual to be exposed as a result of that release. Once exposed, the Virtual Liver project (<http://epa.gov/ncct/vLiver>) allows *in vitro* data to be used to predict chemical effects in living organisms. *In vitro* tests (including the NCCT ToxCast™ project) using isolated cells and biochemical compounds present an opportunity to test for chemical toxicity inexpensively, quickly, and with minimal use of animals. Developing systems models requires statistical analysis of how well current models reflect available data, biologically-motivated revision of these models to better describe data and useful endpoints, and implementation of these analyses and refinements with computer programs. This project is focused on the development, implementation, and evaluation of models for these important systems describing chemicals in our environment. The participant will be mentored by John Wambaugh.

The selected individual will be trained to conduct hypothesis-driven research using computational tools to simulate mathematical models relating to the exposure of humans to chemicals through the environment. The NCCT is a highly integrated research team that offers substantial learning opportunities through interactions on cross-cutting issues across the Virtual Liver, Virtual Embryo, ToxCast, and ExpoCast projects. With guidance from the mentor, the participant may be involved in the following training activities addressing critical environmental protection needs:

- Review evidence from the literature and NCCT databases in order to develop hypotheses and identify datasets for evaluating and revising models
- Modify, analyze, and design models allowing high throughput prediction of human and ecological exposure to compounds released into the environment
- Modify, analyze, and design models allowing simulation of biological processes, including pharmacokinetics and tissue health, in order to anticipate toxicity as supported by available *in vitro* data
- Manage large data sets consisting of physicochemical and biological properties of hundreds to thousands of environmental chemicals
- Design and conduct *in silico* experiments on environmental chemicals that systematically demonstrate the predictive accuracy and assess uncertainty within models

This research will greatly enhance the ability to make to anticipate potentially hazardous chemicals and scenarios that otherwise might go undetected. The selected individual will work collaboratively with a team of scientists in developing, testing, documenting and deploying solutions for the Chemical Safety for Sustainability (CSS) program. The participant could have the opportunity to communicate his/her research via internal and or public presentations and manuscripts.

Qualifications:

Applicants should have received a bachelor's degree in a computational discipline such as computer science, statistics, engineering, bioinformatics, physics, or a related field within five years or the desired starting date, or completion of all requirements for the degree should be expected prior to the starting date.

The program is open to all qualified individuals without regard to race, sex, religion, color, age, physical or mental disability, national origin, or status as a Vietnam era or disabled veteran. U.S. citizenship or lawful permanent resident status is preferred (but can also hold an appropriate visa status, however, an H1B visa is not appropriate). The participant must show proof of health and medical insurance. **The participant does not become an EPA employee.**

The appointment is full-time for one year and may be renewed for up to two additional years upon recommendation of EPA and subject to availability of funds. The participant will receive a monthly stipend. Funding may be available to reimburse the participant's travel expenses to support field studies and to present the results of his/her research at scientific conferences. No funding will be made available to cover travel costs for interviews, relocation costs, costs of tuition/school fees, or health insurance.

How to Apply:

The Research Participation Program for EPA is administered by the Oak Ridge Institute for Science and Education. **Please reference Project # EPA-ORD/NCCT-2011-04 when calling or writing for information.** For additional information and application materials contact: Research Participation Program/EPA-ORD Attn: Betty Bowling, Oak Ridge Institute for Science and Education, P.O. Box 117, Oak Ridge, Tennessee 37831-0117, Phone: (865) 576-8503 FAX: (865) 241-5219 e-mail: betty.bowling@ornl.gov.

An application can be found at http://www.ornl.gov/partform/EPA/EPA_Application.pdf.

DEADLINE: Until the position is filled.

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