

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 EPA Virtual Liver (<http://www.epa.gov/ncct/v-liver>) project is part of the broader Virtual Tissues (VT) program, which is aimed at delivering *in silico* decision support tools to evaluate the chronic effects of environmentally-relevant exposures in humans. The Virtual Liver (v-Liver) team is developing a multi-scale agent-based model that reconstructs the cellular architecture of the human hepatic lobule in order to simulate normal functions, and to investigate chemical-induced perturbations that lead to a breakdown in homeostasis, resulting in toxicity. The modular components of the v-Liver system link chemical exposure and liver micro-dosimetry; perturbations in molecular pathways and their impact on cellular functions; and the consequences of heterogeneous cellular actions on the emergence of histological effects. The team is also developing the Virtual Tissues Knowledge-base (VT-KB) to synthesize published information about the mechanistic relationships between molecular and cellular functions, and phenotypic outcomes, in order to generate hypotheses that can be evaluated quantitatively by v-Liver. As proof of concept, v-Liver is being used to study nuclear receptor (NR) regulated pathways involved in non-cancer and cancer effects, using published data, high-throughput screening data from ToxCast™, and novel multi-resolution molecular, cellular and histological data from *in vivo* specimens. This project is being conducted as collaboration between NCCT, NHEERL and EPA program offices, other federal agencies, and EPA-funded STAR Centers. The participant will be mentored by Dr. Imran Shah.

The research participant will become part of a multi-disciplinary research team and will be involved in computer programming and data analysis for v-Liver. The participant will be involved in implementing new components of the VT-KB, and curating published evidence into the VT-KB. The NCCT is a highly integrated research team that offers substantial learning opportunities through interactions on cross-cutting issues across the Virtual Embryo, ToxCast, and ExpoCast projects. With guidance from the mentor, the participant will be involved in the following training activities.

- Writing custom queries to access information from VT-KB
- Developing web-based interactive tools to disseminate information stored in VT-KB
- Analyzing published articles using in-house text-mining tools, reviewing the output of these tools and manually curating information into the KB
- Writing custom code to convert formatted text files into OWL/RDF to load into the KB

The participant will have latitude in exercising independent initiative and judgment in the activities commensurate with the level of training. EPA will review completed papers for adherence to scientific principles and policies, quality, and soundness of conclusions.

Qualifications:

The applicant must be an undergraduate or graduate student pursuing a degree at an accredited college or university in either: (a) computer sciences or a related field with

course-work in toxicology or biological sciences, or (b) toxicology or other biological sciences with course-work in computer science and programming experience.

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-2011-06 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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