Opportunity Title: Human Health Risk Assessment - PBPK Modeling
Opportunity Reference Code: EPA-ORD-NCEA-DC-2018-03

Organization U.S. Environmental Protection Agency (EPA)

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How to Apply A complete application consists of:

- An applicationNext
- 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 The National Center for Environmental Assessment (NCEA), part of the Office of Research and Development at the U.S. Environmental Protection Agency (EPA), is responsible for scientific assessment activities related to the health effects of chemical pollutants in the IRIS (Integrated Risk Information System) program. These assessments provide key scientific support for EPA policy and regulatory decisions. This research participation opportunity is to analyze, evaluate, and integrate scientific evidence for the development of scientific assessments that support EPA policy and regulatory decisions. The Quantitative Risk Methods Group is a branch of the Washington Division of NCEA. It is a multidisciplinary science group focused on improving quantitative methods and tools for applications in environmental and human health risk assessment. The group provides a central focus within NCEA for application, guidance, and research on state of the art approaches for quantitative assessment of risks to human health.

A postdoctoral research opportunity is currently available with the overall objective of developing a generalizable physiologically based pharmacokinetic (PBPK) model code or “template” that can be used to implement a number of existing models by setting parameters appropriately. Since the single set of code could be used for multiple models, it would reduce the effort required to perform quality assurance (QA) checks on each model. Depending on the time available, interest, and skills of the research participant, the research project may include programming additional tools to further streamline model evaluation and QA, such as the ability to automatically apply parameters from a QA data file.

PBPK models have now been applied in a number of EPA assessments, but the QA effort (i.e., checking that the model code is correct, model parameter values match those listed in a publication or report, and that all pharmacokinetic (PK) data have been accurately transcribed from other sources) is substantial. A PBPK model template and automation of aspects of model QA will facilitate the process of model evaluation and deployment, allowing the U.S. EPA to more efficiently achieve its objective of using the

best available science. However, the hypothesis that a single model code can accurately reproduce many existing models must first be tested with specific examples that cover a range of model structures. Testing the template using specific models may lead to further refinement of the template.

The resarch participant will have the opportunity to learn about and evaluate existing methods. The research participant will collaborate with scientists across disciplines to participate in original interdisciplinary scientific research and will present research results in peer reviewed journal articles, EPA reports, and/or at scientific conferences. Furthermore, the research participant will have the opportunity to apply specific PK/PBPK models to human health risk assessment for chemical toxicants. The research participant will have latitude to exercise independent initiative and judgment in the research commensurate with the level of training.

This research project will provide the participant with the opportunity to receive training in the development of emergent approaches in PK/PBPK modeling and possibly in methods for characterizing uncertainty in model predictions and variability among exposed populations. The research participant will gain an understanding of how PK/PBPK models and scientific evidence are used to inform decisions in the development of EPA chemical assessments and will have the opportunity to learn and conduct quantitative analyses that contribute to EPA scientific chemical health assessments and potentially lead to peer-reviewed publications. These highly influential science assessments form key scientific support for EPA regulatory decisions and typically have significant implications for national and international environmental policy development and implementation. The research participant may also participate in research projects with other NCEA divisions including the IRIS Program and potentially scientists from other EPA Labs, Centers,or Offices in the evaluation of evidence related to the health effects of environmental agents. Such collaborations provide opportunities to learn and develop new scientific approaches that advance research in chemical risk assessment.

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

Qualifications Applicants must have received a doctoral degree within five years of the desired start date. Appropriate disciplines include Applied Mathematics, Computational Biology, Biostatistics, Chemical or Biochemical Engineering,

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Pharmacokinetics, Statistics, or Toxicology with a focus on quantitative (computational) methods. Experience in PBPK modeling or other mechanism-based modeling is highly desired. Programming experience in R or a similar language is preferred.

Eligibility Requirements

- **Degree:** Doctoral Degree received within the last 60 month(s).
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (1)
  - **Computer, Information, and Data Sciences** (16)
  - **Engineering** (2)
  - **Life Health and Medical Sciences** (5)
  - **Mathematics and Statistics** (3)