

Opportunity Title: Modeling Chemical Manufacturing, Processing, and Use to Estimate Releases for Exposure Assessments

Opportunity Reference Code: EPA-ORD-NRMRL-LMMD-2019-02



Organization U.S. Environmental Protection Agency (EPA)

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How to Apply A complete application consists of:

- An application
- Transcript(s) – For this opportunity, an unofficial transcript or copy of the student academic records printed by the applicant or by academic advisors from internal institution systems may be submitted. All transcripts must be in English or include an official English translation. 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 recommendations

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.

Application Deadline 1/31/2020 3:00:00 PM Eastern Time Zone

Description ***Applications will be reviewed on a rolling-basis.**

This research project will develop methods to rapidly estimate chemical releases for exposure and risk assessment applications, including manufacturing, processing, and use of a chemical through models known as Generic Scenarios. A Generic Scenario is an EPA Office of Pollution Prevention and Toxics term for a model that describes the release of a chemical during a well-defined industrial activity or set of activities. These activities, in such systems as manufacturing, processing, and use of chemicals, are described by process flow diagrams, process models, stream tables, etc. with mass and energy balance and transfer equations. The rapid estimation of chemical releases expands the system of interest beyond the equipment to worker exposure and ambient environments. The research project answers questions about what amount and concentration of a chemical is predicted to be in environmental exposure pathways such as water releases, indoor air, on surfaces, etc.

The research project involves manufacturing process modeling, chemical use modeling, mass transfer modeling, model input estimation, uncertainty analysis, data source identification and data collection, statistics, computer programming, artificial intelligence, machine learning, knowledge discovery and data mining, and prediction of chemical releases and concentrations for exposure and risk assessment purposes. Modeling involves engineering approximations to equipment operation and release processes, estimating model inputs, and determining relationships between inputs and result uncertainty. Methods of collecting data, for source identification, from EPA databases, and through automated data scraping, will be developed based on model needs. Computer-based statistical methods will be applied as fit for purpose, including machine learning techniques for clustering, classification, and regression. Prediction will be used as appropriate to extrapolate beyond the specific chemicals and circumstances studied in equation-based modeling. The research participant will interact with a team to develop methods and computer tools and to publish appropriate methodology and case study results.

Through engagement with engineering, chemistry, and chemical safety experts the research participant will learn innovative methods and tools in process and fate & transport modeling, data mining, and related disciplines. The research participant will learn about procedures for generating and managing high quality scientific data and models for exposure and risk assessment purposes in the context of a Government research laboratory. Increased experience and knowledge will be obtained on procedures for writing and publishing in peer-reviewing journals. The research participant will learn about topics related to the research areas of chemical releases, exposures, and risk assessment.

Anticipated Appointment Start Date: January 6, 2020

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 at EPA in the Cincinnati, Ohio, area. Participants do not become employees of EPA, DOE or the program administrator,

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and there are no employment-related benefits.

Completion of a successful background investigation by the Office of Personnel Management (OPM) is required for an applicant to be on-boarded at EPA. OPM can complete a background investigation only for individuals, including non-US Citizens, who have resided in the US for the past three years.

Qualifications

The qualified candidate should be currently pursuing or have received a doctoral degree in one of the relevant fields. Degree must have been received within five years of the appointment start date.

A background and/or experience in process and fate & transport modeling, chemical industrial/occupational hygiene, data mining, statistics, machine learning, computer programming, or mathematics is desired.

Eligibility Requirements

- **Degree:** Doctoral Degree received within the last 60 months or currently pursuing.
- **Discipline(s):**
 - **Engineering** (3 👁)
 - **Environmental and Marine Sciences** (2 👁)
 - **Life Health and Medical Sciences** (1 👁)

Affirmation

I certify that I have lived in the United States for the past three years.