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Opportunity Title: EPA Internship for Role of Climate Change and Photochemistry on the Health Impact of Hazardous Air Pollutants
Opportunity Reference Code: EPA-ORD-CPHEA-PHITD-2022-06

Organization U.S. Environmental Protection Agency (EPA)

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How to Apply ***Connect with ORISE...on the GO!*** Download the new ORISE GO mobile app in the Apple App Store or Google Play Store to help you stay engaged, connected, and informed during your ORISE experience and beyond!

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. Click here for detailed information about recommendations.

All documents must be in English or include an official English translation.

Application Deadline 4/26/2024 3:00:00 PM Eastern Time Zone

Description ***Applications may be reviewed on a rolling-basis and this posting could close before the deadline.** Click **here** for information about the selection process.

EPA Office/Lab and Location: A research opportunity is available at the Environmental Protection Agency (EPA), Office of Research and Development (ORD), Center for Public Health Environmental Assessment (CPHEA), Public Health and Integrated Toxicology Division (PHITD) located in Research Triangle Park, North Carolina.

Research Project: Hazardous air pollutant exposure remains a vexing environmental problem in many parts of the country, and much is unknown about their relative toxicity and carcinogenicity, cumulative risk, and how climate change and atmospheric aging might affect health outcomes from exposure. We have shown that photochemical aging of benzene and toluene increased mutagenic potential above that of the parent compounds, but more work is needed to confirm and expand on these observations. This research project will focus on how photochemical aging (under different temperatures) of volatile hazardous air pollutants (e.g. benzene, toluene, ethylbenzene, xylene; aka BTEX, 1.3 butadiene, VOC components of wildfire smoke) affects the chemistry and resulting toxicity and carcinogenicity of these substances. This will be accomplished with ORD's mobile reaction chamber which is uniquely engineered with defined temperature control. We will develop concentration X time (CxT) paradigms and a temperature gradient of 75, 90 and 105 degrees fahrenheit to investigate the effect of exposure duration and climate on in vivo and in vitro (cell-based) health outcomes.

The results of this product will (1) provide biological plausibility for

photochemical aging resulting in air pollution enhanced disease in various lifestages (2) yield information towards the quantitative risk assessment and prioritization of harmful chemicals in complex air pollution mixtures; and (3) generate systems level data to comprehensively understand the contribution of air toxics exposure in disease susceptibility and impact on resiliency.

With guidance from the mentor and other researchers, the research participant will have the opportunity to conduct research in collaboration with an interdisciplinary team of EPA scientists in the following areas:

- 1. Assessing the role of temperature on photochemical reactions of air toxics
- 2. Designing approaches and support testing methods to assess health effects of complex air pollutants

Learning Objectives: Research learning objectives may include:

- 1. Operating a temperature controlled photochemical reaction chamber and generate novel complex mixtures of "smog"
- 2. Acquiring knowledge and skills related to routine NAAQS monitoring, chemical speciation and subsequent health impact of air pollution mixtures
- 3. Developing knowledge and skills in designing, conducting, analyzing, and synthesizing research for communication to the broader scientific audience.
- 4. Developing skills in presenting research findings at scientific society conferences and interacting with a broad group of scientists at the EPA and elsewhere.

Mentor(s): The mentor for this opportunity is M. Ian Gilmour (gilmour.ian@epa.gov). If you have any questions about the research, please contact the mentor.

Anticipated Appointment Start Date: Winter 2023/Spring 2024. All start dates are flexible and vary depending on numerous factors. Click **here** for detailed information about start dates.

Appointment Length: The appointment will initially be for one year and may be renewed upon EPA recommendation and subject to availability of funding.

Level of Participation: The appointment is full-time.

Participant Stipend: The participant will receive a monthly stipend commensurate with educational level and experience. Click **here** for detailed information about full-time stipends.

EPA Security Clearance: Completion of a successful background investigation by the Office of Personnel Management (OPM) is required for an applicant to be on-boarded at EPA.

ORISE Information: This program, administered by ORAU through its contract with the U.S. Department of Energy (DOE) to manage the Oak

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Ridge Institute for Science and Education (ORISE), was established through an interagency agreement between DOE and EPA. Participants do not become employees of EPA, DOE or the program administrator, and there are no employment-related benefits. Proof of health insurance is required for participation in this program. Health insurance can be obtained through ORISE.

ORISE offers all ORISE EPA graduate students and Postdocs a free 5 year membership to the National Postdoctoral Association (NPA).

The successful applicant(s) will be required to comply with Environmental, Safety and Health (ES&H) requirements of the hosting facility, including but not limited to, COVID-19 requirements (e.g. facial covering, physical distancing, testing, vaccination).

Questions: Please see the FAQ section of our website. After reading, if you have additional questions about the application process please email ORISE.EPA.ORD@orau.org and include the reference code for this opportunity.

Qualifications The qualified candidate should have received a bachelor's, master's, or doctoral (preferred) degree in one of the relevant fields (e.g. Atmospheric Science, Chemistry). Degree must have been received within the past five years.

Preferred skills/experience:

- Experience in operating photochemical reaction (smog) chambers, flow tube reactors etc. with strong knowledge in analytical chemistry are favorable attributes for candidates applying for this opportunity, however it is not necessary for the candidate to have all of these types of experiences.
- Ability to design and implement modifications as needed to perform experiments with a particular emphasis on engineering details such as fluid flow requirements, thermal controls, particle transport efficiencies, electronic monitoring & control (Opto 22), and safety systems.
- Provide routine engineering and technical support for downstream exposure testing (cell exposure and inhalation toxicology).
- Operate, maintain, troubleshoot, and repair standard air-monitoring instrumentation used in laboratory and field experiments, including monitors for NOx, SOx, ozone, and VOCs.
- Operate and maintain analytical instrumentation for the measurement of particulate concentrations, particle size, inorganic composition, and organic/elemental carbon content.
- Perform data analysis, quality assurance, and data compilation/integration.
- Coordinate sampling schedules and data distribution with other laboratory personnel.
- Interphase and coordinate with a broad range of investigators from analytical chemistry, exposure assessment toxicology and public health.
- Provide written reports of laboratory activities, instrument status, system modifications, data summaries, and engineering

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recommendations.
- Present data and results in internal meetings and/or professional conferences.
- Contribute to formal publication of research findings through public reports or journal articles.

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree received within the last 60 month(s).
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (9 👁)
  - **Earth and Geosciences** (2 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (1 👁)
  - **Life Health and Medical Sciences** (10 👁)
  - **Physics** (2 👁)