

Opportunity Title: EPA Atmospheric Chemical Modeling Fellowship

Opportunity Reference Code: EPA-ORD-CEMM-AESMD-2020-12

Organization U.S. Environmental Protection Agency (EPA)

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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 12/18/2020 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 Environmental Measurement and Modeling (CEMM), Atmospheric and Environmental Systems Modeling Division (AESMD), Atmospheric Chemistry and Aerosols Branch (ACAB) located in Research Triangle Park, North Carolina.

Research Project: The focus of this research project is to study anthropogenic activity that releases chemicals into the air that can directly affect human health or react and transform into secondary products with health impacts. EPA develops tools in support of clean air and chemical safety regulation to mitigate human health impacts of emissions to air. Specifically, EPA's Office of Research and Development develops the state-of-the-science Community Multiscale Air Quality (CMAQ) model (<https://www.epa.gov/cmaq>). This chemical transport model represents the lifecycle of organic and inorganic compounds from release into the atmosphere, through chemical and physical processing, to removal by deposition. This framework allows for predictions of ambient concentrations of criteria pollutants such as ozone and fine particles (PM2.5) as well as hazardous air pollutants (HAPs) and chemicals of concern such as those from



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volatile chemical products. A critical component of any air quality model is the representation of atmospheric chemistry in the chemical mechanism. A chemical mechanism uses surrogate compounds to parameterize the full complexity of tropospheric chemistry. Mechanisms are expected to perform well in predicting ozone and PM_{2.5} under a variety of conditions including urban and remote, near surface and free troposphere, and winter and summer. Mechanisms were traditionally designed to capture ozone formation and species of emerging concern or important for secondary organic aerosol (SOA) are often neglected (e.g. Qin et al., 2020) or treated in a way that is disconnected from the gas phase. New approaches to mechanism development as well as updated mechanisms are needed, and EPA has recently funded work to inform chemical mechanism development (<https://www.epa.gov/research-grants/chemical-mechanisms-address-new-challenges-air-quality-modeling>). Current chemical mechanisms used in the CMAQ model, for example, neglect autoxidation which is important for PM_{2.5} formation (Pye et al., 2019). In addition, recent work highlights the need to understand organic nitrates for their role in both secondary organic aerosol (SOA) formation and through mediating odd nitrogen (Zare et al., 2019).

Under the guidance of a mentor, the research participant may be involved in the following research activities:

- Determination of chemical reaction products
- Box modeling
- Emission inventory analysis
- Regional chemical transport modeling with CMAQ
- Interpretation of field and laboratory data

Learning Objectives: The research participant will develop scientific hypotheses and perform data analysis to investigate how organic compounds as well as their oxidation products evolve in the atmosphere and the degree to which these processes are captured in current chemical transport models. This project has the potential to inform chemical transport model methodologies and to identify priority areas for development of mechanisms. The research participant will learn how information flows from emission inventories to chemical transport models to policy analysis. They will also collaborate with a team of internal and external researchers and balance detail and computational efficiency in algorithm development.

Mentor(s): The mentor for this opportunity is Havala Pye (pye.havala@epa.gov). If you have questions about the nature of the research please contact the mentor(s).

Anticipated Appointment Start Date: ~August 2021. 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

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year and may be renewed up to three to four additional years 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 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.

Questions: Please see the [FAQ section](#) of our website. After reading, if you have additional questions about the application process please email EPArpp@ornl.gov and include the reference code for this opportunity.

Qualifications

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

Preferred skills:

- Knowledge of a data processing/data analysis language (MATLAB, R, Fortran, Python, etc.)
- Familiarity with chemical transport modeling
- Familiarity with atmospheric chemistry fundamentals or computational methods

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree or Doctoral Degree received within the last 60 months or currently pursuing.
- **Discipline(s):**
 - **Chemistry and Materials Sciences** (12 )
 - **Computer, Information, and Data Sciences** (17 )
 - **Earth and Geosciences** (21 )
 - **Engineering** (27 )
 - **Environmental and Marine Sciences** (14 )
 - **Life Health and Medical Sciences** (46 )
 - **Mathematics and Statistics** (10 )
 - **Physics** (16 )
- **Veteran Status:** Veterans Preference, degree received

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within the last 120 month(s).