Opportunity Title: Development of Long-Term Emission Inventories for use in Ecosystem and Human Health Studies
Opportunity Reference Code: EPA-ORD-NERL-CED-2019-10

Organization	U.S. Environmental Protection Agency (EPA)
Reference Code	EPA-ORD-NERL-CED-2019-10
How to Apply	A complete application consists of:

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- 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.

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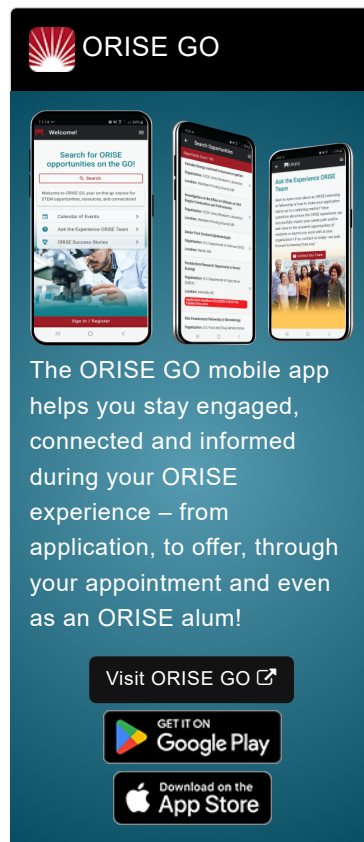|	
Application Deadline	10/29/2019 3:00:00 PM Eastern Time Zone
Description	***Applications will be reviewed on a rolling-basis.**

A research opportunity is currently available at the Environmental Protection Agency (EPA), Office of Research and Development (ORD), National Exposure Research Laboratory (NERL), Computational Exposure Division (CED) located in Research Triangle Park, North Carolina.

The Community Multiscale Air Quality modeling system (CMAQ; https://www.epa.gov/cmaq) estimates atmospheric concentrations and deposition for numerous chemicals, including ozone, PM2.5 and its constituents, and deposition of important nitrogen and sulfur species CMAQ deposition values are used by EPA's EnviroAtlas and Critical Loads Data Mapper, NADP's Total Deposition maps, and to support many nutrient assessments included those for the Chesapeake Bay, Mississippi River Basin, Tampa Bay, and the Nooksack Fraser Transboundary region. Concentration values from CMAQ are also widely used to assess the benefits of emission reductions on human health (https://www.cdc.gov/nceh/tracking/phase.htm). Several multi-year simulations using the CMAQ model have been generated incrementally over the past several years using the best models and input data available at the time, Zhang et al. 2019. As a result, these decadal runs are comprised of simulations made with differing model versions, input data and methodologies. EPA is in the process of updating these simulations for 2002 – 2018 and has a need to develop consistent emissions inventories across years and for all sectors (e.g., stationary and non-stationary, on-road/off-road vehicles, wildland and prescribed fires, biogenic sources, dust).

The focus of this research opportunity will be on particular emission sectors or methodologies, and to participate with a team of scientists and regulators, to offer a broad perspective of environmental management.

This project leverages the state-of-the-art components of the Sparse Matrix Operator Kernel Emissions (SMOKE), and Community Multiscale Air Quality (CMAQ) modeling systems to develop a consistent set of methodologies to estimate US emissions over a period of large reductions, from 2002 to 2018, for use in CMAQ model simulations at multiple scales. This research will leverage

recent developments in the latest National Emissions Inventory (NIE https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei) to develop emissions from 2002 to 2018 using historical activity, satellite and observational data.

There will be opportunities to develop methodology for historical or projected emission sectors, e.g. wild land fires, agricultural, etc., depending on the candidate's experience and interest.

Under the guidance of a mentor, the participant will be involved in the following research activites:

- collaborating with an extensive team of atmospheric science and air quality experts
- developing skills for evaluating and making improvements to critical emissions and air quality models
- publishing novel environmental science research on a topic of high interest to the U.S. EPA and the wider environmental community

The research participant will learn how to run, analyze, and interpret highly detailed emissions and air quality model data, and may, as their interest dictates, gain experience with other analysis tools (e.g. the Remote Sensing Information Gateway; RSIG; https://www.epa.gov/hesc/remote-sensing-information-gateway).

Zhang, Y., Foley, K.M., Schwede, D.B., Bash, J.O., Pinto, J.P., Dennis, R.L., 2019, A measurement-model fusion approach for improved wet deposition maps and trends, J. Geophys. Res. Atmospheres., 124, 4237-4251, https://doi.org/10.1029/2018JD029051

Zhang, Y., Mathur, R., Bash, J. O., Hogrefe, C., Xing, J., and Roselle, S. J., 2018, Long-term trends in total inorganic nitrogen and sulfur deposition in the US from 1990 to 2010, Atmos. Chem. Phys., 18, 9091-9106, https://doi.org/10.5194/acp-18-9091-2018

Foley, K. M., Roselle, S. J., Appel, K. W., Bhave, P. V., Pleim, J. E., Otte, T. L., Mathur, R., Sarwar, G., Young, J. O., Gilliam, R. C., Nolte, C. G., Kelly, J. T., Gilliland, A. B., and Bash, J. O., 2010, Incremental testing of the Community Multiscale Air Quality (CMAQ) modeling system version 4.7, Geosci. Model Dev., 3, 205-226, https://doi.org/10.5194/gmd-3-205-2010

The mentor for this opportunity is Jesse Bash (bash.jesse@epa.gov).

Anticipated Appointment Start Date: October 2019

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 Research Triangle Park, North Carolina, area. Participants do not become employees of EPA, DOE or the program administrator, 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 bachelor's, master's or doctoral degree in one of the relevant fields. Degree must have been received within five years

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of the appointment start date.

Preferred skills:

- Familiarity with Linux-type computational tools (e.g. Python, MATLAB, R, etc.)
- Experience with Fortran programming language

Eligibility Requirements

- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree received within the last 60 months or currently pursuing.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (2 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (13 👁)
  - **Mathematics and Statistics** (1 👁)
  - **Physics** (2 👁)

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