Opportunity Title: Quantifying Environmental Phototransformation of Engineered Nanomaterials, Microplastics & Pathogens
Opportunity Reference Code: EPA-ORD-NERL-EMMD-2019-13

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 7/31/2020 3:00:00 PM Eastern Time Zone

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

A research opportunity is available with the Environmental Protection Agency's (EPA) Office of Research and Development (ORD), National Exposure Research Laboratory (NERL), Exposure Methods & Measurements Division (EMMD) located in Athens, Georgia.

This research opportunity will focus on environmental transformations of nanomaterials, plastics, and inactivation of pathogen indicators. To develop predictive assessments of the impacts of human activities on water quality and ecosystem health, EPA's goal is to understand mechanisms for these transformations and to develop procedures for predicting their rates under differing environmental conditions. Current areas of emphasis include photochemical and microbial dynamics of organic and metallic engineered nanomaterials (ENMs), such as carbon nanomaterials, including graphene-based materials, release of engineered nanomaterials from polymer nanocomposites and other matrices that are commonly used in ENM formulations, and providing parameters and process relationships for modeling exposure to ENMs. The research includes elucidation of reactive oxygen species that mediate photochemical cycling and adverse effects of nanomaterials, UV effects on virulent organisms (bacteria, protozoa, viruses) and bacterial or bacteriophage indicators, and effects of natural organic matter, sediments, and soils on nanomaterial and pathogen transformations in the environment. Equipment, including solar simulators and weathering simulators, irradiance sensors, chromatographs, carbon analyzers, FTIR and UV-visible spectrometers, are available for these studies. Laboratory facilities include the equipment required for these studies with instrumentation to measure nanomaterial and sediment concentrations and size distributions, bacterial and bacteriophage concentrations (including qPCR), spectral properties of nanomaterials (FTIR, UV-visible, excitation-emission matrix fluorometry, and chromatographs), spectrometers for elucidating carbon transformation products. Access to ICP-MS, TEM, and SEM is also available for characterizing ENMs, their composites, and transformation products. Facilities for solar simulation and measurements of quantum yields and action spectra are available for photochemical and photobiological studies.

The research participant will have the opportunity to join a multi-disciplinary research team to provide technical support for the development of tools to predict the release, phototransformation,

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and transport of engineered nanomaterials (ENMs) in environmental systems and the photoinactivation of pathogens in natural and built aquatic systems.

Research activities may include:

- Conducting laboratory studies that provide data for development of procedures for evaluating releases of ENMs from polymer composites by weathering and abrasion
- Participating in obtaining and analyzing data to quantify relationships between the rate and extent of release and phototransformation with environmental conditions such as solar irradiance and temperature
- Obtaining data and developing relationships that can be used to assess the transformation of the nanomaterials and pathogen indicators in water and sediments
- Conducting internet and literature searches to elucidate significant light-induced transformation pathways of ENMs and pathogen indicators in environmental systems
- Compilating and summarizing data and literature references into organized computer files; statistical analysis of data using Excel and/or statistical software packages
- Communicating results via presentation(s) and/or written reports

The mentor for this opportunity is Dr. Richard Zepp (zepp.richard@epa.gov).

Anticipated Appointment Start Date: Spring/Summer 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 in the Athens, Georgia, 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 have received a master's or doctoral degree in one of the relevant fields, or be currently pursuing one of the degrees and will reach completion by June 1, 2020. Degree must have been received within five years of the appointment start date.

Preferred skills:

- Experience using equipment for measuring concentrations of nanomaterials and/or pathogen indicators, such as: liquid chromatography, FTIR, and UV-visible and fluorescence spectroscopy
- Experience with studies of rates and transformation products of nanomaterials and/or microbial photoinactivation in aquatic systems
- Skills with use of photochemical equipment such as solar simulators or merry-go-round apparatus for kinetic studies

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree or Doctoral Degree received within the last 60

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months or anticipated to be received by 6/1/2020 11:59:00 PM.

- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)