

**Opportunity Title:** EPA Fellowship in Trace Metal and Nanomaterial Analysis and Characterization

**Opportunity Reference Code:** EPA-ORD-CESER-LRTD-2022-07

**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 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.

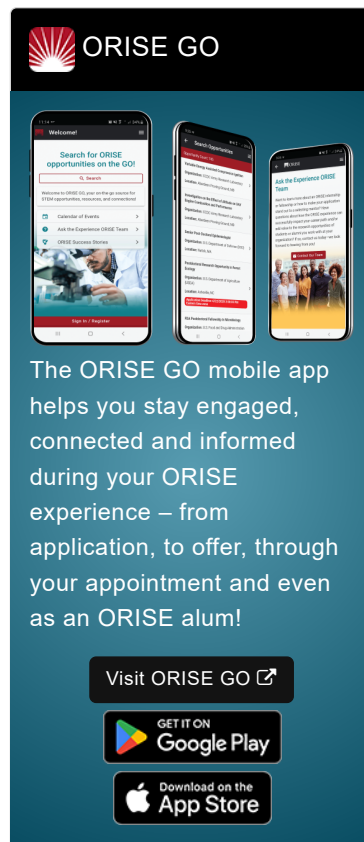
All documents must be in English or include an official English translation.

**Application Deadline** 1/23/2023 3:00:00 PM Eastern Time Zone

**Description** \*Applications may be reviewed on a rolling-basis. Click [here](#) for information about the selection process.


**EPA Office/Lab and Location:** A research opportunity is currently available at the Environmental Protection Agency (EPA), Office of Research and Development (ORD), Center for Environmental Solutions and Emergency Response (CESER), Land Remediation and Technology Division (LRTD) located in Cincinnati, Ohio.


**Research Project:** Trace metal detection, quantification, and speciation is an integral part of assessing exposure to unsafe levels in the environment. The total elemental abundance present in a sample is useful it provides very little data for estimating the potential for exposure, which includes fate/transport, transformation, and bioaccessibility. Additional tools are required to further characterize samples to determine the potential more completely for exposure. ORD has developed several tools and techniques that employ spectroscopic techniques to probe the chemical speciation of metals, metalloids, and non-metals in environmental samples at low concentrations (mg/L, mg/kg) with the largest effort involving the use of XAS measurements. More recently ORD efforts have focused on utilizing ICP-MS and hyphenated ICP-MS techniques for characterizing the chemical speciation of the less than 1 micron fraction present in surface waters, sediments/soils, and aerosols. Currently, ORD is utilizing single particle ICP-MS (SP-ICP-MS) and asymmetric field flow fractionation multiangle light scattering ICP-MS (AFFF-MALS-ICP-MS) techniques for characterization of the chemical composition, concentration, size, and chemical associations present. The complexity of varying chemical properties of the less than 1 micron size fraction additional research is needed to identify to further develop these methods and to understand the


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key properties of the sample, instrument, and analytical method that will ensure optimal performance and analysis.

The research participant's time will be split between the laboratory and desktop research. The research participant will be involve the development of SP-ICP-MS and AFFF-MALS-ICP-MS for quantifying the composition, concentration, chemical association, and size of particle less than 1 micron in size found in surface waters, sediments/soils, and aerosols. This effort will include: identifying previously published methods and practices for analysis of environmental samples using the two hyphenated ICP-MS techniques, creating analytical methods and parameters for specific sample types (surface water, sediment, aerosol), identifying appropriate QA/QC criteria, and developing post processing techniques for sample analysis and quantification. The research participant will conduct laboratory research to generate specific samples for evaluating optimal analytical practices. The research participant may travel to collect samples from contaminated sites where there is active and going research. The research participant may contribute to the development of reports and manuscripts documenting research results and conclusions.

**Learning Objectives:** The research participant will maintain careful and accurate records in a laboratory notebook, following the requirements of an approved quality assurance project plan (QAPP), document electronic file contents and locations, and will make entries as necessary into permanent laboratory instrument logbooks. These notebooks and all other data produced under this order will be the property of the U.S. Environmental Protection Agency. The research participant will receive training on basic safety requirements at GCRD prior to their beginning their research in the laboratory. The research participant will receive hands-on laboratory and field research experience that includes but is not limited to:

- 1. Benchtop laboratory practices
- 2. Operation of and method development for ICP-MS, SP-ICP-MS, and AFFF-MALS-ICP-MS instrumentation
- 3. Literature review of analytical practices and methods
- 4. Field trip preparation and sample collection
- 5. Developing, managing, and maintaining systems and databases to track lab and field scientific research
- 6. Developing graphs and presentation materials, prepare spreadsheets, charts, and narrative information, as well as science interpretation.

**Mentor(s):** The mentor(s) for this opportunity is Todd Luxton ([luxton.todd@epa.gov](mailto:luxton.todd@epa.gov)). If you have questions about the nature of the research please contact the mentor(s).

**Anticipated Appointment Start Date: December 1, 2022.** 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

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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 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](mailto:ORISE.EPA.ORD@orau.org) and include the reference code for this opportunity.

**Qualifications** The qualified candidate should have received a master's or doctoral degree in one of the relevant fields (e.g. Analytical Chemistry, Environmental Chemistry, Environmental Science, Soil Science, Environmental Engineering, Nanotechnology, Materials Science). Degree must have been received within five years of the appointment start date.

Candidates with experience in a laboratory setting and a background that includes a strong background in analytical chemistry and environmental chemistry are encouraged to apply.

Preferred Skills:

- Strong background in analytical chemistry, specifically with Inductively coupled plasma mass spectrometry (ICP-MS) and ICP-MS hyphenated techniques (Field Flow Fractionation and Single Particle) for characterizing and quantifying nano and colloidal materials in solution from a variety of different environments.
- A working knowledge of inorganic environmental chemistry, familiarity with colloidal/nano chemistry/characterization techniques, and an

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analytical chemistry background

- Demonstrated experience with the operation and use of an ICP-MS
  - Familiarity with single particle and/or asymmetric field flow fractionation ICP-MS techniques
  - Experience in keeping and managing laboratory records
  - Proficient in the use of general laboratory procedures and techniques such as standard curve preparation, pipetting, and dilution preparation
  - Experience with searching scientific journals and other resources for technical information
  - Proficient with Microsoft Excel for managing, analyzing, and graphing data
  - Demonstrated ability to work independently
  - Proficient in oral and written communication in English Desired
- Knowledge, Skills, Work Experience, and Education
- Expert level knowledge and experience with ICP-MS practices
  - Previous experience collecting data using SP-ICP-MS and/or AFFF-MALS-ICP-MS methods

**Eligibility Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree or Doctoral Degree received within the last 60 month(s).
- **Academic Level(s):** Postdoctoral or Post-Master's.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** ([6](#))
  - **Earth and Geosciences** ([21](#))
  - **Engineering** ([4](#))
  - **Environmental and Marine Sciences** ([2](#))
  - **Life Health and Medical Sciences** ([6](#))
  - **Science & Engineering-related** ([1](#))