

Opportunity Title: Wildland Fire Smoke Sensor Specialist

Opportunity Reference Code: EPA-ORD-NRMRL-AEMD-2018-05

Organization U.S. Environmental Protection Agency (EPA)

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How to Apply A complete application consists of:

- An application
- Transcripts – [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 references

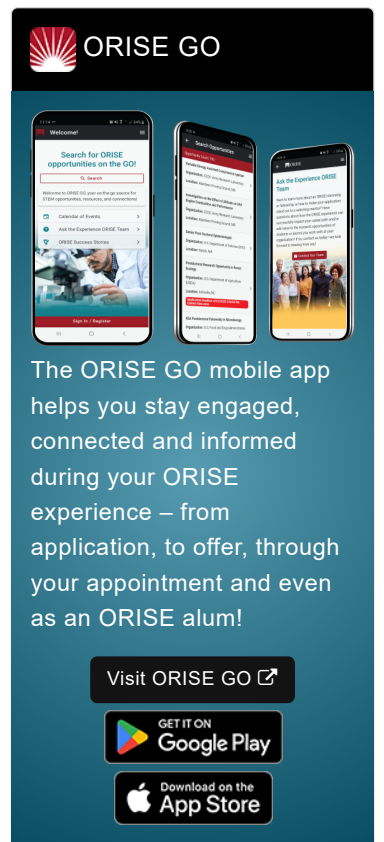
All documents must be in English or include an official English translation.

If you have questions, send an email to EPArpp@orau.org. Please include the reference code for this opportunity in your email.

Description Recent increases in the frequency and severity of wildfires have led to greater risk of smoke exposure to communities nearby and hundreds of miles downwind. Air quality monitoring stations are often sparsely situated and cannot capture the complex spatial variation of smoke dispersion in complex topographies. Temporary smoke monitoring stations supplied by the U.S. Forest Service fill some of the spatial gaps, but are still limited in number. Accurate information on smoke concentrations near fires are needed to inform potential health risk in impacted communities as well as improve air quality models of fire emissions.

The objective of this research project is to develop and evaluate next-generation low-cost, light-weight sensor systems for measuring smoke. Multiple low-cost, portable sensor packages can be deployed in a dense spatial network to provide unprecedented spatial and temporal resolution of smoke concentrations near fires. The research participant will assist in the design of sensor packages and the validation of these packages with more traditional emissions sampling equipment. The research participant will have the opportunity to evaluate the sensors in a laboratory environment as well as in communities impacted by wildfires or downwind of prescribed fire operations.

The research participant will gain skills in the development of low-cost air quality sensors, including designing data communication hardware and software, battery and solar power systems, and data processing, analysis, and visualization. The research participant will have the opportunity to evaluate their design through both field and laboratory experiences. The research participant will receive training in advanced particle measurement technology and more traditional filter-based measurements to interpret sensor response. Additionally, the research participant will have the opportunity to gain experience making measurements at various field sites within the U.S and using online data visualization tools to map smoke concentrations in realtime. The research participant will have the opportunity to present their results at scientific conferences or through peer-reviewed manuscripts. The research participant will have freedom to

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carry out independent research commensurate with their level of training.

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 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.

The mentor for this project is Amara Holder (holder.amara@epa.gov). The anticipated start date for the appointment is October 15, 2018.

Qualifications This postgraduate research opportunity is available to applicants that have received a bachelor's or master's degree. The degree must be received within five years of the appointment start date. The best candidate for this position will have a background in engineering and/or the environmental or physical sciences and experience with data analysis and visualization. Further, the position will be best suited for someone with hands-on experience with air quality sensors hardware and software acquired either during their degree program or through job-related experience post-graduation. Additional experience with aerosol measurements in a field or laboratory setting is a bonus.

The following is a list of skills/and or experience that would be considered favorable for an interested candidate:

1. Understanding of air quality sensor operation/design including optical particle counters, metal oxide sensors, and/or electrochemical sensors
2. Experience with or understanding of sensor related hardware, software, and wireless data transmission (e.g. Arduino, Raspberry Pi, etc.)
3. Familiarity with common data analysis packages (e.g. R, Matlab, etc.)
4. Familiarity with geospatial data visualization packages (e.g. ArcGIS)
5. Strong verbal/written communication and organizational skills necessary to support field sampling and laboratory analysis
6. General understanding of air pollutants from fires, e.g. CO₂, CO, NO_x, and PM_{2.5}

Eligibility Requirements

- **Degree:** Master's Degree received within the last 60 month(s).
- **Academic Level(s):** Post-Bachelor's or Post-Master's.
- **Discipline(s):**
 - **Chemistry and Materials Sciences** ([12](#))
 - **Earth and Geosciences** ([2](#))
 - **Engineering** ([5](#))
 - **Environmental and Marine Sciences** ([2](#))
 - **Physics** ([16](#))

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