Opportunity Title: Modeling of Chemical Plumes in Urban Environments
Opportunity Reference Code: ICPD-2023-28

Organization Office of the Director of National Intelligence (ODNI)

Reference Code ICPD-2023-28

How to Apply

Create and release your Profile on Zintellect – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not exceed 2 pages.**

Complete your application – Enter the rest of the information required for the IC Postdoc Program Research Opportunity. The application itself contains detailed instructions for each one of these components: availability, citizenship, transcripts, dissertation abstract, publication and presentation plan, and information about your Research Advisor co-applicant.

Additional information about the IC Postdoctoral Research Fellowship Program is available on the program website located at: https://orise.orau.gov/icpostdoc/index.html.

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

Application Deadline 2/28/2023 6:00:00 PM Eastern Time Zone

Description

Research Topic Description, including Problem Statement:

From an atmospheric modeling perspective, urban environments are exceedingly complex. The movement of materials is driven by multiple non-linear processes with nearly infinite dimensionality. Current models are forced to balance using high order approximations to reduce computing time with loss of accuracy and reproducibility. When all of this is combined with the need for rapid responses to potentially hazardous chemical plumes (chemical attacks, industrial toxins, etc.), the current models fall far short of what is needed.

This solicitation seeks to find an approach for characterizing the key variables and information needed to accurately model plumes in urban environments.

Accurate and rapid modeling of chemical plumes is critical for providing local, national, and global leaders with the information necessary to protect civilians and military personnel from hazardous areas.

Example Approaches:

The focus of this effort is on reducing computational time without sacrificing accuracy of computational models. Approaches can be compared to available experimental data for validation. Relevant data and techniques include computer vision, AI/ML, weather modeling/prediction, traditional plume modeling variables as well as new information streams.

1. Lateb, M., et al. “On the use of numerical modelling for near-field pollutant dispersion in urban environments – a review”, Environmental Pollution 208 (2016) 271-283.

2. Robinson, M., et al. “Variability and Time of Day Dependence on Ozone Photochemistry in Western Wildlife Plumes” Environ. Sci. Technol. 2021, 55, 15.

Relevance to the Intelligence Community (IC):

Develop/enhance capabilities to detect and identify chemical agents, and associated delivery systems. Develop/enhance capabilities to rapidly characterize the release of chemical, biological, radiological, nuclear, and/or related hazardous materials.

Qualifications

Postdoc Eligibility

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- U.S. citizens only
- Ph.D. in a relevant field must be completed before beginning the appointment and within five years of the application deadline
- Proposal must be associated with an accredited U.S. university, college, or U.S. government laboratory
- Eligible candidates may only receive one award from the IC Postdoctoral Research Fellowship Program

Research Advisor Eligibility

- Must be an employee of an accredited U.S. university, college or U.S. government laboratory
- Are not required to be U.S. citizens

Key Words: #Plume Modeling, #Environmental Modeling, #Chemistry, #Chemical Attacks, #CBRNE, #Large Eddy Simulations, #Computational Fluid Dynamics, #Atmospheric Modeling, #Aerosols, #Aerosol Science

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Communications and Graphics Design** (6 👁)
  - **Computer, Information, and Data Sciences** (17 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)
  - **Life Health and Medical Sciences** (48 👁)
  - **Mathematics and Statistics** (11 👁)
  - **Other Non-S&E** (2 👁)
  - **Other Physical Sciences** (12 👁)
  - **Other S&E-Related** (1 👁)
  - **Physics** (16 👁)
  - **Social and Behavioral Sciences** (29 👁)