Opportunity Title: Determining Attribution—A Chemometric Study of Energetic Materials
Opportunity Reference Code: ICPD-2021-51

Organization Office of the Director of National Intelligence (ODNI)

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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 2/26/2021 6:00:00 PM Eastern Time Zone

Description

Research Topic Description, including Problem Statement:

Threat actors have a continued desire to manufacture hazardous materials, including improvised energetic materials to undertake attacks. The materials used may be improvised using domestically available precursors or may require specific laboratory setups.

The analysis of these recovered materials in operational situations can provide evidence and intelligence to aid in understanding the capabilities of, and tracing and identifying, a perpetrator. However, the ability to chemically link a material to particular environmental conditions, similar recovered material (of the same batch), or particular starting materials is not routinely available.

Chemometrics—the application of a suite of statistical tools to fundamental characterization data, such as chromatographs—will allow analysts to provide probability judgements on the origin and synthesis route of a material.

Example Approaches:

A number of available analytical techniques, such as spectroscopy and chromatography, are routinely used in the characterization of chemical compounds and mixtures. Different precursors or synthesis methods may lead to characteristic signatures in the final material, which could be mapped to identify the likely precursors and recipe used for manufacture.

A diverse data set, taking into consideration the use of widely available, domestic precursor sources, should be generated using these techniques.

The outputs of these existing methods should be analyzed using chemometrics to

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seek correlations that could be used for the attribution of improvised materials.

Alternative, novel methods should also be explored that may be more appropriate to these materials.

Relevance to the Intelligence Community:

The ability to chemically link hazardous materials to a particular source would help build a more comprehensive threat picture and provide significant additional intelligence to investigations. This information may provide the missing piece in a complex investigation, allowing links between attacks or recovered samples to be identified and, therefore, more rapidly resolved.

Key Words: Explosives, Chemometrics, Principal Component Analysis, Attribution

Qualifications

Postdoc Eligibility

- 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

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Communications and Graphics Design** (2 👁)
  - **Computer, Information, and Data Sciences** (16 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)
  - **Life Health and Medical Sciences** (45 👁)
  - **Mathematics and Statistics** (10 👁)
  - **Other Non-Science & Engineering** (2 👁)
  - **Physics** (16 👁)
  - **Science & Engineering-related** (1 👁)
  - **Social and Behavioral Sciences** (27 👁)