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Opportunity Title: Identifying Hazardous Materials Using Spectroscopic or Quantum Sensing Techniques
Opportunity Reference Code: ICPD-2025-14

Organization	Office of the Director of National Intelligence (ODNI)
Reference Code	ICPD-2025-14
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 3 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.

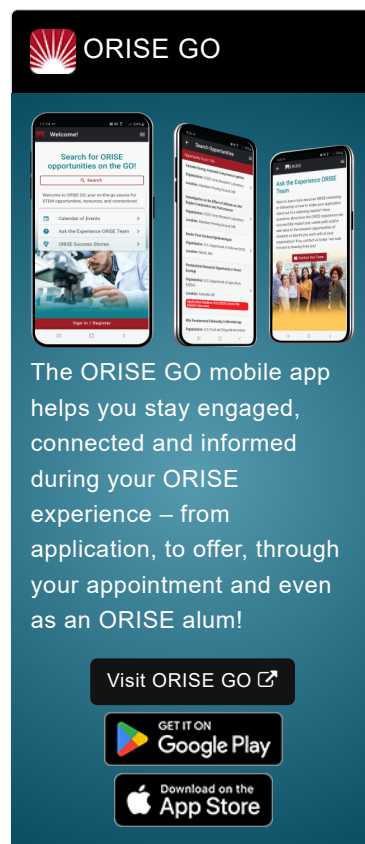|	
Application Deadline	2/28/2025 6:00:00 PM Eastern Time Zone
Description	**Research Topic Description, including Problem Statement:**

The defense and security community have a need to detect materials of concern at a stand-off distances, at low parts per million, and enable a method to locate the source. For example, law enforcement, Home Office, Border Force and military applications users have the need to detect illegal narcotics, organic materials, hazardous chemical and biological items of concern.

There exist many methods to detect explosive materials for example, this research question is focused on emerging technology that can detect very low quantities at stand-off distances, tuned to certain materials.

Example Approaches:

Classical and quantum technologies could be used to explore this work.

- Classical spectroscopic techniques could be used for detection through creating fixed wavebands and utilizing characterization techniques such as those used with Raman spectroscopy systems. Methods such as producing stimuli responsive luminescent particles that respond by fluorescing when exposed to certain pre-defined compounds.
- One possible route to research this involves colloidal quantum dots tuned to different optical wavelengths. The wavelengths would be tuned depending on the organic material of interest, but also the number of optical wavelengths which can be characterized at one time. Considerations would include how an array of dots could be utilized and deployed, tuning the spectral range to gain the necessary spectral resolution, and choosing the illumination method will be needed to ensure the right level of excitation of organic matter for characterization.

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Key Words: Quantum, Spectroscopy, Chemistry, Physics, Imaging, Organic materials, Detection

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 appointment start date
- 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

Point of Contact [Keri Tarwater](#)

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Communications and Graphics Design** (3 👁)
  - **Computer, Information, and Data Sciences** (17 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)
  - **Life Health and Medical Sciences** (45 👁)
  - **Mathematics and Statistics** (11 👁)
  - **Other Non-Science & Engineering** (2 👁)
  - **Physics** (16 👁)
  - **Science & Engineering-related** (1 👁)
  - **Social and Behavioral Sciences** (30 👁)