Opportunity Title: Enhancing the Effectiveness of Routine Security Scanning Checks at Border Crossings
Opportunity Reference Code: ICPD-2025-22

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 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:**

Security checks at border crossing points provide a crucial detection function for a wide range of items including weapons, explosives, liquids, sharp objects, pills, as well as many other objects that may be hidden on a person's body or in their luggage. A range of detection technologies are used at these security check points, including X-Ray and Computed Tomography (CT). Modern systems employ advanced technologies including Machine Learning (ML) and Artificial Intelligence (AI) to enhance performance of the tool and reduce the workload of the human operator. These tools analyze the scene and highlight areas of potential concern for the operator to scrutinize, ranked in priority according to a defined, yet adaptive risk profile.

Although these systems are highly effective, the reliable detection of evolving threats in a complex environment while avoiding excessive false positives, maintaining low latency and high throughput is a significant optimization problem.

While the effectiveness of these tools is beyond the scope of this research proposal, we seek to investigate and build understanding of the potential for improving the effectiveness of these tools through augmentation with external data analysis to increase the likelihood of threat detection.

Example Approaches:

External data analysis could include processing of a range of data sources to identify anomalous characteristics, including but not limited to:

- Ticketing data (routes, purchase lead times, payment system used, visas, passport type)
- Pose, gait, body language, biological indicators on approach to scanning systems

- Luggage and carried item object classification/ combinations

Relevance to the Intelligence Community:

Research into enhancing the effectiveness of routine security scanning checks will provide insights and assist the NIC in understanding the technological change required.

References:

- Cordova, A. (2022) 'Technologies for primary screening in aviation security', Journal of Transport Security https://doi.org/10.1007/s12198-022-00248-8

Key Words: X-Ray, Computed Tomography (CT) Scan, Behavioral Science, Artificial Intelligence (AI), Crowd Monitoring, Machine Vision, Machine Learning, Distributed Sensor Network, Pattern Recognition, Public Transport Ticket Information.

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)