

Opportunity Title: Pressurised Fresh Water as a Conduit for Data Transmission.

Opportunity Reference Code: ICPD-2025-19

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:**

A widely used technical surveillance countermeasures technique is to scan for devices transmitting radio frequency (RF) energy. Other means of egressing data are possible and require a broader array of defensive measures. This research topic is an investigation of the use of plumbing systems (pressurized fresh water) as conduits for acoustic data transmission.

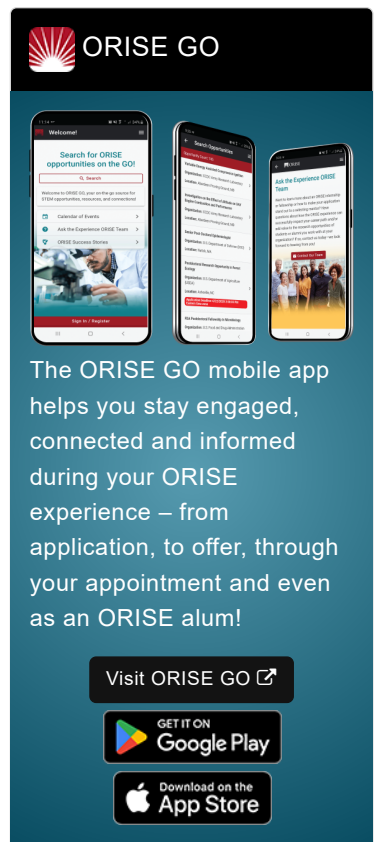
Sound waves may be unmodulated audio, modulated analogue audio (e.g. FM or AM) or modulated digital data (e.g. Binary Phase Shift Keying). The research should focus on potential techniques with respect to fidelity, data rates and leakage. Methods to detect and guard against such techniques is a primary objective. Also of interest are the properties of the potential channel – in particular attenuation, bandwidth and frequency response – and means of coupling in/out of the channel (hydrophones, etc.).

Example Approaches:

Proposals could approach this from a variety of science and engineering disciplines. The topic involves aspects of data science, fluid / acoustic engineering, systems engineering and electrical engineering. A literature review with respect to emerging technologies may suggest an experimental approach to explore and test potential use cases, detection and mitigation options.

Relevance to the Intelligence Community:

Sound waves can be used to carry any kind of information, from voice to digital data. Protecting government premises is an important NIC function. Identifying the possibility of other channels, enabled by emerging technologies, is prudent to ensure ongoing security.



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Key Words: modulation, audio, hydrophone, channel, sound waves.

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](#))