

**Opportunity Title:** Optical Clock Integration  
**Opportunity Reference Code:** ICPD-2023-07

**Organization** Office of the Director of National Intelligence (ODNI)

**Reference Code** ICPD-2023-07

**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](mailto: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:**

Optical clocks can outperform traditional microwave clocks by factors of 100 to 1000 in stability and have become some of the most precise measurement devices ever built. However, current precision optical clocks are mostly laboratory-sized. While recent work by multiple groups around the world attempts to reduce the size of fieldable systems, the concepts being pursued are still trailer-size or full-instrument-rack in scale, at best. Significant miniaturization is necessary to achieve scalable, portable devices needed for future applications. Recent demonstrations have shown that ion optical clocks are particularly well suited to an integrated platform.

**Example Approaches:**

Research for this topic may include a variety of methods to demonstrate a path to a fully integrated portable ion clock.

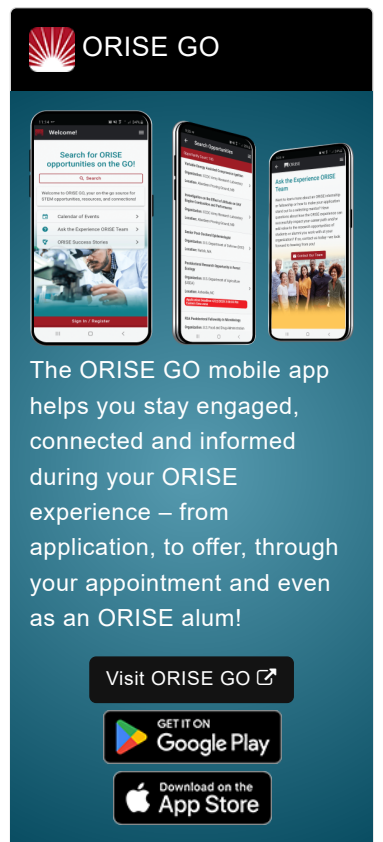
**Relevance to the Intelligence Community (IC):**

Maintaining precise timing in the absence of GPS is a serious challenge. One approach to address this is via portable and ultra-stable clocks. We aim to develop a clock capable of holding nanosecond stability for a one month duration. The envisioned sensor will provide quality data at the resolution capable of supporting Alternative Positioning, Navigation and Timing applications.

**Key Words:** #Quantum Sensor; #Integrated Photonics; #Atomic Sensors; #Ion; #Optical Clock


**Qualifications** **Postdoc Eligibility**


- U.S. citizens only
- Ph.D. in a relevant field must be completed before beginning the appointment and within five




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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** ([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-Science & Engineering** ([2](#))
  - **Physics** ([16](#))
  - **Science & Engineering-related** ([1](#))
  - **Social and Behavioral Sciences** ([29](#))