

**Opportunity Title:** Materials Science for Quantum Information Science

**Opportunity Reference Code:** ICPD-2022-31



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

**Reference Code** ICPD-2022-31

**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** 2/28/2022 6:00:00 PM Eastern Time Zone

**Description** **Research Topic Description, including Problem Statement:**

The goal of this research effort is to advance the fundamental connection between the physical properties of materials and qubit performance. Of interest to this effort is a specific focus on detailed materials synthesis and analysis in order to advance the connections between materials, defects, and quantum device performance. The primary aim of this research is to address the current limitations of engineering knowledge to understand the chemical and physical properties that can advance quantum information science technology. Proposals should lay out plans of defining optimization metrics related to measurements of quantum devices and material properties.

**Example Approaches:**

Many possible topics may satisfy the research statement including but not limited to computational or experimental research focused on the microscopic origins of charge and flux noise; identifying correlations between the relative abundance of certain chemical bonds and variations in qubit performance. Exploring the efficacy of quantitative comparisons between room temperature physical properties and low-temperature qubit performance that can act as screening protocols; detailed failure analysis of highly performing and poorly performing quantum devices fabricated with the same fabrication procedure and toolset.

**Relevance to the Intelligence Community:**

Quantum Information Science (QIS) has great technological promise as outlined and recognized by the National Quantum Initiative Act. National investments in many areas of QIS are needed; including materials science aspects highlighted in this research statement, that may lead to advances in the general fabrication and characterization techniques relevant to qubit devices may elevate the research field as a whole, and help define a path toward higher qubit device performance by a larger number of research groups

**Key Words:** Materials Science, Quantum Information Science, Quantum Computing, Qubit, Synthesis, Fabrication, Characterization

**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

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- 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 )