

**Opportunity Title:** Surface Chemistry of Short-pulse Laser Ablation on Exotic Materials for Circuit Fabrication

**Opportunity Reference Code:** ICPD-2025-35

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

**Reference Code** ICPD-2025-35

**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](mailto: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:**

Problem: Next generation microelectronics in defense systems will include heterogeneous integration (HI) of different technologies, and face challenges of SWAP. Using short-pulse laser catalysis, it is possible to enable HI and create 3D packaging, but more capability lies in process success on better RF and thermally dissipating substrates, and non-galvanic plating of metals other than copper. This research should advance understanding of laser parameters, substrates, and plating chemistry for a successful process.

**Example Approaches:**

- Picosecond infrared lasers on Copper Chromite doped polymers
- Nanosecond green lasers on light-colored alumina and Sapphire, SiC, and AlN.
- UV Excimer lasers on Aluminum Nitride to form continuous conductive films sans plating
- Non-galvanic autocatalytic plating of other metals (Aluminum, Ni, others?)
- Factors (wavelength and pulse width, material properties) contributing to minimum feature size

**Relevance to the Intelligence Community:**

2N 139 Develop/enhance high-performance computing capabilities

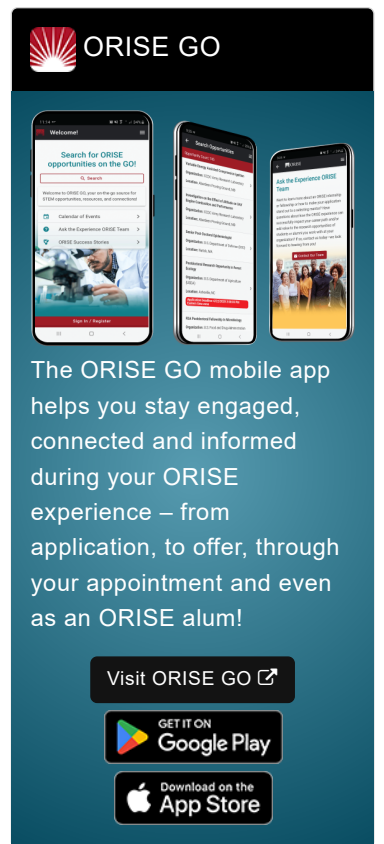
**Key Words:** laser direct structuring, surface chemistry, laser ablation, nongalvanic plating, emerging technologies

**Qualifications** **Postdoc Eligibility**

- U.S. citizens only





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- 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** • **Citizenship:** U.S. Citizen Only

**Requirements** • **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](#))