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)

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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:**

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 AIN.
- UV Excimer lasers on Aluminum Nitride to form continuous conductive fi lms 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 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)