Opportunity Title: High Volume Biomanufacturing of Three-Dimensional Structures from Self-Assembled Biological Polymers
Opportunity Reference Code: ICPD-2022-16

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 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. 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:

Biologic nanotechnology (e.g., DNA origami, slats and bricks; proteins) enables the self-assembly of micron-scale three-dimensional structures with nanometer-precise features composed entirely from biologic polymers (e.g., DNA, proteins).These structures have shown utility in a wide variety of laboratory scale demonstrations in application areas such as drug delivery, biosensing, nanomachines, and biologically templated nanofabrication. These demonstrations have been limited in that current production methods are limited to at best milligram quantities, with most in the microgram range, at relatively poor yield and purity, and high cost per unit weight. There is a need to develop high-volume manufacturing approaches that produce functional nanostructures at the gram scale with high yield and purity and low cost, with the potential for future scaling to the kg range. Recent work has shown that liter scale stirred tank reactors can begin to address these needs, but future scaling could be assisted by the integration of in-line process controls, sensors, and purification modules. This research topic will investigate novel approaches to high-volume biomanufacturing of self-assembled biologic nanomaterials that offer compelling solutions to issues associated with mass, yield, purity and cost.

Example Approaches:

- 10.1038/nature24650

Relevance to the Intelligence Community:

Biological nanotechnologies, while a nascent, have the potential to set the IC on a path toward continuous exponential improvements across its national security mission space. Contributing the development of domestic supply chains for the raw materials that enable these technologies will enhance this capability.

Key Words: Nanoscale Shapes, Folding Biopolymers, Biomanufacturing, Biological Self-Assembly

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
- Eligible candidates may only receive one award from the IC Postdoctoral Research Fellowship Program

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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 👁)