

**Opportunity Title:** Design And Modeling of Self-Assembled Biological Structures

**Opportunity Reference Code:** ICPD-2022-11

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

**Reference Code** ICPD-2022-11

**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

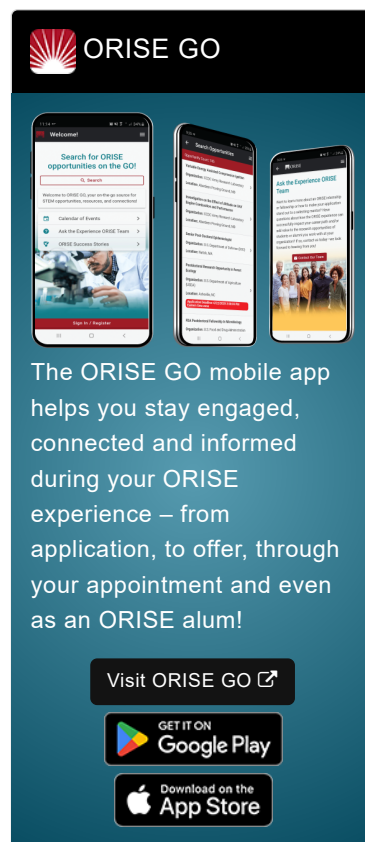
**Description** **Research Topic Description, including Problem Statement:**

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. In-silico design and modeling tools underly advances in these technologies and enable the prediction of physical properties, self-assembly kinetics, and conformational space and kinetics of complex nanostructures before physical structures are manufactured. As applications mature and nanotechnologies move from the laboratory to industrial-scale manufacturing, the computational ecosystems must also mature into include the entire design pipeline, from nanostructure design to multi-scale simulations of individual structures and further to higher-scale interactions, such as those between multiple structures and/or those between individual structures and conjugated functional materials (e.g., carbon nanotubes, quantum dots, biomolecules) or surfaces. This research topic will investigate novel approaches to in-silico design and modeling of self-assembled biologic nanostructures that offer compelling solutions to issues associated with modeling higher-order structures.

**Example Approaches:**


- 10.1093/nar/gkaa417
- 10.1021/acsnano.0c07717
- 10.1101/865733
- 10.1101/2020.05.28.119701


**Relevance to the Intelligence Community:**




**ORISE GO**

The ORISE GO mobile app helps you stay engaged, connected and informed during your ORISE experience – from application, to offer, through your appointment and even as an ORISE alum!

Visit ORISE GO 

GET IT ON  
 Google Play

Download on the  
 App Store

**Opportunity Title:** Design And Modeling of Self-Assembled Biological Structures

**Opportunity Reference Code:** ICPD-2022-11

Biologically templated nanofabrication technologies, while a nascent, have the potential to set the IC on a path toward continuous exponential improvements across its national security mission space. Contributing to the development of domestic supply chains for functional devices enabled by these technologies will enhance this capability.

**Key Words:** Molecular Dynamics, Coarse Grain Model, Software Design Tool, Computer Aided Design, Computer Aided Engineering

### **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

### **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](#))