Opportunity Title: Assessing Collective Intelligence
Opportunity Reference Code: ICPD-2021-09

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 3/1/2021 2:00:00 PM Eastern Time Zone

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

Overview: Complex adaptive systems—from bacterial colonies to societies to the Earth's ecosystem—are adaptive networks that operate as collective intelligences. However, our understanding of how multiple levels of networks coalesce to work as a cohesive entity is disparate and nascent. Developing a better understanding of how entities are able to specialize, develop interdependencies, and adapt has far-reaching consequences for understanding how populations, organizations, governments, and militaries operate, behave, and evolve.

Discussion: Research in this area should involve looking at approaches from multiple disciplines. For example, bacterial colonies represent simple organisms that coalesce and then adopt specialized functions that produce a coherent entity linked with interdependencies and can dissolve this cohesion as circumstances change. Anthropologists, archaeologists, and psychologists have observed the same specialization and cohesion in everything from families to the emergence and functioning of societies and civilization. Business and organizational specialists have researched ways to optimize how organizations specialize in tasks and how information flows maximize profits or efficiencies. Each entity develops a homeostasis in which they function and adapt. However, perturbations over time result in an entity's approach losing its competitive advantage and requiring either adaption or dissolution. Researching the similarities and differences across disciplines, using broadly applicable abstractions like network science, and applying computation tools have the potential to provide generalizable approaches that improve the understanding of how entities function and how their function drives their behavior.

Problem Statement: The Intelligence Community (IC) needs scientifically rigorous approaches to:

- Assess the cohesiveness of foreign entities to operate as a collective intelligence;
- Assesses how foreign entities are processing information and resources as a cohesive intelligence;
- After assessing the dynamics of the entity, determine its fragility and resilience;
- After assessing the dynamics of the entity, determine possible adaptions that can effectively influence its emergent behavior.

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The IC needs interdisciplinary research into the functioning of collective intelligence at multiple levels and then to test this understanding against real world dynamics in order to develop effective approaches to assess the collective intelligence of entities of interest.

Example Approaches:

Due the Interdisciplinary nature of this topic there is no shortage of approaches; however, some examples are:

- Network simulations;
- Machine learning;
- Agent-based models;
- Microbial experimentation.

Relevance to the Intelligence Community:

This research will provide approaches to more effectively understand the dynamics of complex systems and develop approaches to assess entity cohesiveness and entity behavior driven by its internal interdependencies. These approaches have the potential to help the IC more effectively understand the functioning and behavior of societies, organizations, and governments and then identify more effective policy interventions.

Key Words: Complex Systems, Adaptive Networks, Collective Intelligence, Multilevel Networks, Multiscale

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** (17 👁)
  - **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 👁)

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- **Science & Engineering-related** (1 👁)
- **Social and Behavioral Sciences** (28 👁)