

**Opportunity Title:** Developing and Expanding Machine-Readable Knowledge Models for Object Based Production

**Opportunity Reference Code:** ICPD-2021-43

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

**Reference Code** ICPD-2021-43

**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** 2/26/2021 6:00:00 PM Eastern Time Zone

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

Massive (and rapidly expanding) volumes of data residing in disparate information processing systems require analysts to spend significant time and effort searching for and collating the data they need to do higher-level analysis. This challenge makes it difficult for analysts to follow object based production (OBP) tradecraft, which organizes around objects of interest such as vehicles, facilities, organizations, and events. OBP is the foremost organizing principle for image-centric analysis, but it requires a framework that models the objects in a computable format to accomplish computationally assisted analysis and overcome the challenges of dealing with expanding data holdings.

**Example Approaches:**

A top-down and bottom-up approach to semantic integration leverages the most general classes and subclasses in a computable top-level ontology (TLO), while simultaneously aligning them with specific entities found in applications where data are used to solve real-world problems. The basic formal ontology (BFO) is a small, upper level ontology designed to support information retrieval, analysis, and integration in scientific and other domains. BFO-ISO is both an upper ontology and an International Organization for Standardization (ISO) standard. A useful approach to addressing modeling and implementation problems to support OBP would be to build upon BFO to create application-level knowledge models for areas such as targeting, adversary course of action analysis, and collection management. These models would be linked directly to data, both collection and production-related, and then integrated with community applications to deal with expanding data challenges.

**Relevance to the Intelligence Community:**



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A successful project in this area will greatly reduce the challenges currently faced by Intelligence Community intelligence producers and analysts to access, share, and integrate domain data. Successful projects will increase operability and the ability to link data without forcing all data owners to adhere to a single term and definition regime. Research into employing techniques such as named graphs and resource description framework (rdf\*) modeling also will reduce challenges to achieving accurate confidence levels of aggregated and fused intelligence assessments. A successful project will result in a greater ability to share intelligence with cleared individuals in a timely manner by more precisely classifying data holdings.

**Key Words:** Object Based Production, Semantic Integration, Computationally Assisted Analysis, Basic Formal Ontology, Data Analysis

## 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.
- **Academic Level(s):** Postdoctoral.
- **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 )
  - **Science & Engineering-related** (1 )
  - **Social and Behavioral Sciences** (27 )