

Opportunity Title: Heterogeneous network analysis

Opportunity Reference Code: IC-16-47

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.

Application Deadline 4/15/2016 3:00:00 PM Eastern Time Zone

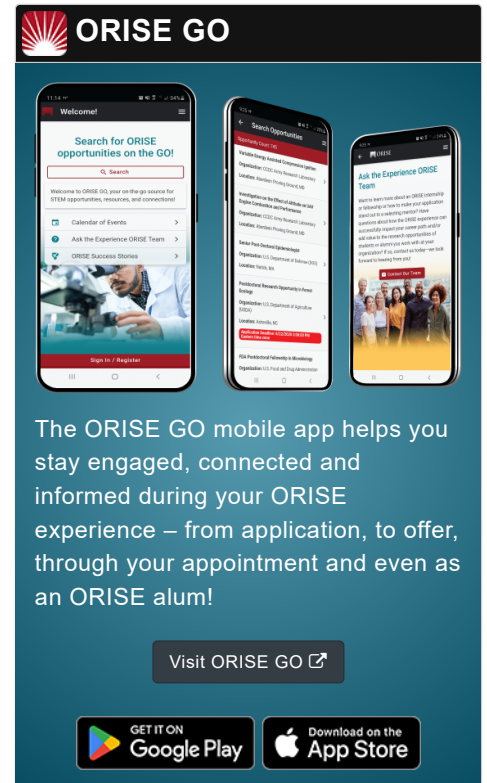
Description The rise of networks as a technology and as emergent phenomena in a connected world have outpaced our abilities to model and make sense of the data derived from them. Data about connections, relationships, and time-evolving behavior is available and very rich.

We see networks in a varieties of modes. There are relatively static networks such as the physical infrastructure of transport, energy and telecommunications. In network flow, there are questions of optimal routing, assignment and pricing. Network users (both people and devices) display emergent modes of behavior interacting with the network performance. Social network applications are instantiated on communication networks, and in turn both reflect and generate networks in the true society.

The requirements of modelling and design for networks are various. Network owners might prefer efficiency and predictability whereas a security engineer might view redundancy and flexibility as positive. The data derived from a network may be as profitable for its owner as the service it provides to the users.

Currently there is a need for models of heterogeneous networks which are sufficiently complex to capture the varieties of behavior at the various levels of the network abstraction and the interactions between the levels. Models should be rich enough to generate useful observations about behavior in the large, which simple enough to be computable and capable of largely unsupervised (untrutted) learning.

Example Approaches:

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Research proposals could consider one or more of the following examples, or identify one not listed below:

- Heterogeneous network modelling, informed by subject-matter experts but capable of supporting unsupervised parameter setting and machine learning.
- Models for community detection (k-tuples) in network activity. Inference for identification of anomalous activity.
- Tools for visualisation and down-sampling of network activity and enrichment of other analytic tools.

**Eligibility
Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
 - **Business** (11 )
 - **Chemistry and Materials Sciences** (12 )
 - **Communications and Graphics Design** (6 )
 - **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** (13 )
 - **Physics** (16 )
 - **Science & Engineering-related** (1 )
 - **Social and Behavioral Sciences** (28 )