

Opportunity Title: Mesoscale community detection

Opportunity Reference Code: IC-17-32



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 3/31/2017 11:59:00 PM Eastern Time Zone

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

Topological data analysis is emerging as a tool for the detection of medium scale structures in large data sets which are capable of being embedded in a suitable metric space. Applications to a wide variety of scientific and social topics are already under development.

The motivating problem is to identify communities within a complex heterogeneous network which are not identifiable by current techniques, either because the modes of interconnection are too complex to capture, or because there is an underlying attempt to conceal the community by unbundling of identities across various media.

Example Approaches:

This research could push the underlying topological methods in two directions. Firstly, to enrich the analysis by combining with modelling and unsupervised learning to provide a framework for statistical inference. It would answer questions such as whether the emergence of apparent structure in a dataset, or the difference between two datasets, was significant. Secondly, to allow for time-dependence in the connexions or distances within the dataset, in order to model the emergence and change of community structure.

Visualisation and decision support tools would be valuable in context.

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 )