Opportunity Title: Multi-site Pattern-of-Life Irregular Time-Series Modeling
Opportunity Reference Code: ICPD-2022-22

Organization	Office of the Director of National Intelligence (ODNI)
Reference Code	ICPD-2022-22
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.
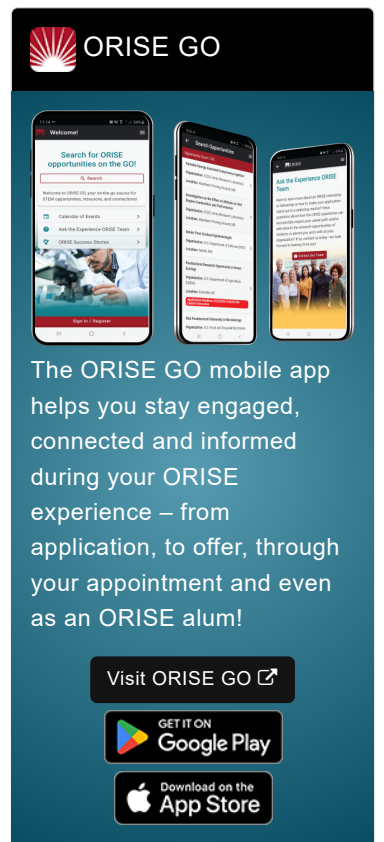
Application Deadline	2/28/2022 6:00:00 PM Eastern Time Zone
Description	**Research Topic Description, including Problem Statement:**

Human and animal population monitoring is an important application area in civilian and military sectors. Remotely monitoring specific areas of interest or surveying large areas require automated processing and extraction of objects. Using this knowledge, repeated measurements over longer periods of time can be used to build an understanding of pattern-of-life of a group of areas of interest. With the ever-expanding dataset of many locations, reduction in knowledge expertise, and complexity of patters, such important tasks are becoming a challenge to determine. Though the current process of finding repeating patterns or relationships in the data is a manually and time intensive operation where experts in the field have the historical context to determine such patters, a need to develop such automated models is imperative. In addition, because the times between sample instances may vary considerably, a pattern-of-life model that incorporates this information in a meaningful way is central. In short, the purpose of this research project is to develop a pattern-of-life model of determining correlation between object detections over a set of multiple areas where population sampling is irregular.

Example Approaches:

This project is looking for novel pattern-of-life models that can of determine correlation between population-fluctuation of multiple class object detections over a set of multiple areas where population sampling is irregular. Such techniques that could be exploited are computer vision implemented with discrete-time models, Continuous-time Markov Chains (CTMC), or parametric approaches with time-evolving set of parameters. A successful project will develop a model with bespoke metrics to find patters between different population counts over multiple locations where population sampling is sporadic.

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Relevance to the Intelligence Community:

Understanding and the correlating between object detection population fluctuations over multiple sites is important in determining the pattern-of-life of areas of interest and finding anomalies that might trigger further detailed analysis that might have been missed. Determining such correlation will allow the IC to provide national leaders important information and anomaly activity indicators to make relevant and educated future decisions of an area.

Key Words: Irregular Time-Series Modeling, Object Detection, Multi-site Pattern-of-Life Modeling

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 👁)