

Opportunity Title: Computational Model of the V1 Human Visual System

Opportunity Reference Code: ICPD-2023-11

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.ora.gov/icpostdoc/index.html>.

If you have questions, send an email to ICPostdoc@ora.gov. Please include the reference code for this opportunity in your email.

Application Deadline 2/28/2023 6:00:00 PM Eastern Time Zone

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

Despite advances in computer vision and artificial neural networks, extracting salient information from satellite images and then reasoning about it in ways people are able to understand remains a challenge. Current methodologies rely heavily on statistics learned from large and extensive training sets, or on one shot techniques that attempt to derive information from a decomposition of imagery into feature spaces. These techniques still face challenges in being explainable AI approaches, due to limitations in communicating effectively how each part of an image contributed to the model's classification.

Example Approaches:

Construction of a computational model of a simplified retina (i.e. a subset of neurons) firing from a visual stimulation, and mimic the encoding of cognitive primitives (e.g. boundaries and shapes) from these neuron firings.

Relevance to the Intelligence Community (IC):

Advances in neuroscience and cognitive science have increased our understanding of how the visual system actually processes visual stimuli. Building a computational model of how satellite images trigger neural activation to formation of shape primitives would advance our understanding of the visual system as well as provide a model to build explainable AI.



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Key Words: #AI, #Deep Neural Networks, #Computer Vision

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** (3 )
 - **Computer, Information, and Data Sciences** (17 )
 - **Earth and Geosciences** (21 )
 - **Engineering** (27 )
 - **Environmental and Marine Sciences** (14 )
 - **Life Health and Medical Sciences** (48 )
 - **Mathematics and Statistics** (11 )
 - **Other Non-Science & Engineering** (2 )
 - **Physics** (16 )
 - **Science & Engineering-related** (1 )
 - **Social and Behavioral Sciences** (29 )