Opportunity Title: Advances in Whole-System, Untargeted, Multi-Omics Analytical Approaches—Software and Hardware
Opportunity Reference Code: ICPD-2021-21

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

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

Advances during the past decade have enabled drastic improvements in the capability for laboratories to characterize specific elements of the biological world. These approaches have enabled the wider world to better understand the genetic and physical makeup of an organism but often through a reductionist approach, focusing on a single biomolecule or target—such as DNA, RNA, protein, or lipids. New approaches—including regents, hardware, and software—for whole-omic, untargeted, systematic interrogation of the biological universe are necessary to capture and map the extensive networks of biological interactions that occur across all levels of biology. The intent of this call is to identify future postdoctoral researchers who are investigating novel approaches for integrated analysis of physical samples across entire biological systems or software tools to enable improved data overlay and extrapolation of datasets from reductionist approaches. References of interest include:

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6997344/
- https://www.frontiersin.org/articles/10.3389/fpls.2020.00944/full
- https://academic.oup.com/bib/article/17/5/891/2262240
- https://www.mdpi.com/2218-1989/9/4/76
- https://onlinelibrary.wiley.com/doi/abs/10.1002/smtd.201900595

Example Approaches:

Research at academic and commercial enterprises have investigated a variety of systematic multi-omics approaches. Often these approaches leverage newer analytical methodologies and focus instead on integrating the data outputs through software analysis to generate a system-wide model. From a hardware perspective, some approaches include nanopore-based sequencers, orbitrap mass spectrometry, and machine-learning based informatics models.

Relevance to the Intelligence Community:

The Intelligence Community often receives samples that have an unknown history or origination. The sample makeup may not be known, the biomolecule targets of interest may not be known, or both. This can be especially challenging when samples are limited, and current analytical

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approaches inherently limit the method of sample interrogation or result in the destruction of the sample following analysis. New approaches that enable whole-omic analysis, quantifiably and reliably, would greatly support these intelligence mission efforts.

Key Words: Multi-Omics, Sequencing, Nanopore, Mass Spectrometry, Orbitrap, Single-Cell, Metagenomics, Metaproteomics, Post-Translational Modifications, Transcriptomics, Immunomics, Systems Biology Mapping, Informatics, Single-Cell, Metabolomics

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** (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)