

**Opportunity Title:** Pathogen roles in complex diseases and unattributable infections, diagnosis and mitigation

**Opportunity Reference Code:** ICPD-2019-27

**Organization** Office of the Director of National Intelligence (ODNI)

**Reference Code** ICPD-2019-27

**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:  
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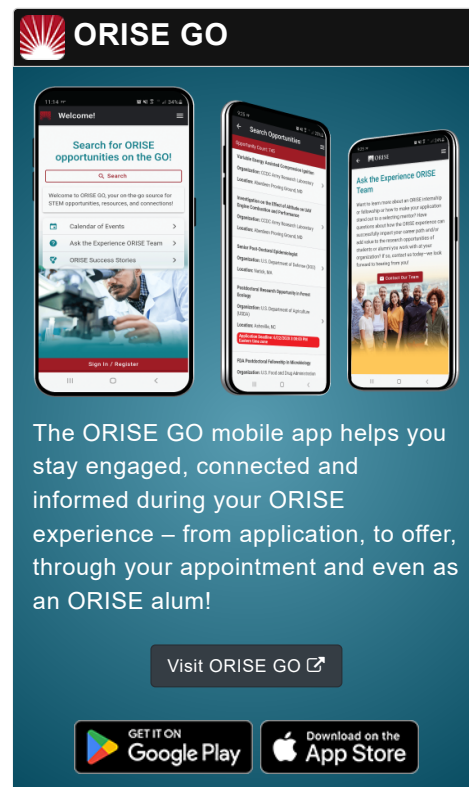
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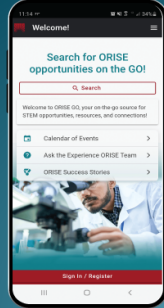


**Application Deadline** 3/1/2019 6:00:00 PM Eastern Time Zone

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

- I) Attributing disease to infection:
  - A range of pathologies borne from infections by pathogenic organisms have complex aetiologies which render the identification of their pathogenic origins challenging and complex. These are often multifactorial diseases which occur as a result of gene-environment interactions. In such cases, at worst the infections leading to pathological symptoms may go undetected medically, particularly when these symptoms are non-specific or disease is associated with numerous additional risk factors; at best, the pathogen is identified and acknowledged as a corollary disease-causing factor that is present, but there is no ability to causatively and definitively identify it as the single source of disease initiation.
- ii) Attributing infection from natural versus intended exposure, and wild-type versus synthetic causes:
  - While it may be that a disease, whether with multifactorial or causal origins, is the result of a naturally occurring infection, this may not always be the case. Identifying the cause, however, is a challenge. In contrast to certain biological or chemical toxins that are rarely encountered in the surrounding environment and whose attribution following third-party introduction is more easily isolated, many pathogens are naturally occurring within populations or geographical regions. In such cases it is more difficult to characterize how the pathogen was encountered; the context of exposure, through either natural or intended routes. This is further clouded by an indistinguishable symptomatic phenotype following infection by the same agent through opposing routes of exposure. An additional layer of complication to be considered is





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genetic engineering of pathogens, and the effects of this on modulating onset and severity of symptoms.

- The purpose of this research topic is to address and characterize the two related attribution topics above through literature, modelling and experimental methods where required. A response to this topic would seek to explore the field of disease origins by pathological organisms, exposure routes and infection likelihood, and applications of engineered variants and their implications.

**Example Approaches:**

- There is extensive and exhaustive literature describing the molecular mechanisms and pathways that pathological agent infection facilitates disease progression. However, there is more sporadic and limited understanding of (i) the contribution of pathogenic infection to complex diseases, and ii) the ability to provide attribution from naturally occurring vs. intentional exposure routes, and wild-type versus synthetic pathogens.
- An approach would be to conduct a broad-spectrum review and analysis of the potential pathogens, diseases and methods that fall into these two areas of interest. Following this, focus would be on prioritizing and assessing viability of these methods as targets to cause unattributable harm, identifying knowledge gaps, and where necessary conducting experiments to fill these.
- Another key aspect to be considered is diagnostic and protective mitigations. A wealth of medical and physical diagnostic and protective methods exist against pathogen infections and symptoms. There is space to characterize these methods in the context of known versus unknown and natural versus intended exposures, whilst exploring future strategic methods of mitigating unattributed infection risk.

**Key Words:**

Multifactorial disease; complex disease; pathology; pathogen; virus; exposure; infection attribution; detection; mitigation; virus; genetic engineering.

## 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

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**Eligibility  
Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **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** (5 )
  - **Physics** (16 )
  - **Science & Engineering-related** (1 )
  - **Social and Behavioral Sciences** (28 )