Opportunity Title: Characterizing the Impact and Detection of Microbiome/Microbiota Modifications
Opportunity Reference Code: ICPD-2022-40

Organization Office of the Director of National Intelligence (ODNI)

Reference Code ICPD-2022-40

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:**

The links between changes to the human gut microbiota, the expression of genes in the gut and health and disease have become increasingly apparent in the 21st century, with a range of complex diseases such as cancer and autoimmune diseases linked to aberrant changes to the gut microbiome. With these changes, the value in understanding the phenotype of microorganisms expressed in the gut, how gene expression is regulated and the pathways they use to signal changes to the rest of the body have become of increasing interest.

With changes to the human microbiome/microbiota implicated in the initiation and facilitation of disease progression, an ongoing area of research is how the microbiome could be modified to reduce the risk of disease development. However conversely, this also presents a biosecurity risk that the human microbiome could be accidentally or deliberately modified to cause disease within a given individual, with beneficial research leveraged nefariously to cause intended effects. The biosecurity risks related to this growing area of research are poorly understood, including the potential range of impacts that might occur following changes to the microbiome. A better understanding of the risks is necessary to support defense by being able to detect when changes have occurred, if they are natural, accidental or deliberate, and if necessary, attribute any changes.

This proposal seeks to further characterize the potential causes of microbiome changes and understand the range of impacts that could be triggered following microbiome changes in order to support mitigations, detection and if necessary attribution.

Example Approaches:

A possible approach may include:

Opportunity Title: Characterizing the Impact and Detection of Microbiome/Microbiota Modifications
Opportunity Reference Code: ICPD-2022-40

- Reviewing and exploring existing and novel microbiome research to characterize the range of possible effects and impacts that could occur following changes to the human microbiome;
- Characterizing how changes to the microbiome can be directly linked to physiological changes;
- Characterizing the differences between natural and deliberate microbiome changes, including signatures and phenotypic markers of natural and deliberate changes to support detection;
- Developing a set of criteria or detection frameworks/assays including required capabilities to identify when microbiome modifications have taken place;

Relevance to the Intelligence Community:

Modification of the human microbiome presents a biosecurity risk as changes to the microbiome can have a range of effects on a human host, both positive and negative, including being a risk factor for a range of naturally occurring diseases. In order to mitigate this risk, additional information is needed to characterize the range of impacts that could be elicited, including how to identify and detect natural and deliberate changes to the microbiome to better enable potential attribution

Key Words: Microbiome; Microbiota; Biosecurity; Detection; Attribution; Disease

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 👁)

Opportunity Title: Characterizing the Impact and Detection of Microbiome/Microbiota Modifications
Opportunity Reference Code: ICPD-2022-40

- **Science & Engineering-related** (1 👁)
- **Social and Behavioral Sciences** (27 👁)