Opportunity Title: Computational Fluid Dynamics of Fast Moving Objects
Opportunity Reference Code: ICPD-2021-04

Organization	Office of the Director of National Intelligence (ODNI)
Reference Code	ICPD-2021-04
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.

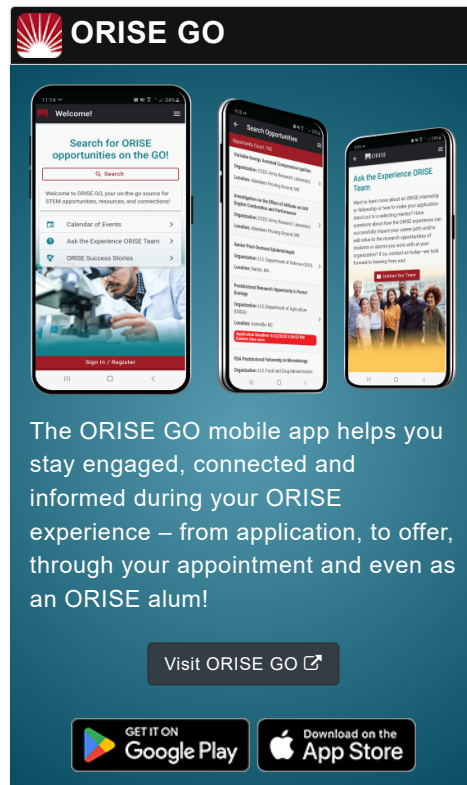|	
Application Deadline	2/26/2021 6:00:00 PM Eastern Time Zone
Description	**Research Topic Description, including Problem Statement:**

Problem statement: Current approaches for computational fluid dynamics (CFD) simulations of fast moving objects under high temperatures and high stresses are physics-limited and computationally intensive.

Topic Description: Modern aerodynamic CFD codes do not perform well under extreme conditions (i.e. high temperatures, high-stress forces, turbulence, ablation, etc.), are too computationally intensive to conduct iterative simulations and require too much manual time to create sophisticated grids. Improved CFD techniques that incorporate relevant physics effects are desired for high-fidelity modeling of fast moving objects. In addition, modern techniques and datasets need to be developed for verification and validation of simulations.

Example Approaches:

Improve CFD predictions under extreme conditions by developing methods and incorporating effects such as: turbulence, boundary layer transitions, high temperature, shock/boundary layer interactions, ablation, and structural interactions. One approach could be to add these physics effects to current CFD tools and compare with observations. Another approach could be to implement a systematic grid refinement around areas that need higher-fidelity to observe aerodynamic structures vs. areas that do not. Last, develop techniques and capabilities that enable assisted or automated grid generation for axis-symmetric systems. One approach for this could be the development of scripting that is based on a library of grid generation modules, specific for axis-symmetric objects.

Relevance to the Intelligence Community:

Opportunity Title: Computational Fluid Dynamics of Fast Moving Objects
Opportunity Reference Code: ICPD-2021-04

Improved ability to CFD model under extreme conditions will enhance the Intelligence Community's ability to characterize fast moving objects.

Key Words: Computational Fluid Dynamics, CFD, Computation, Simulation, Modeling, Physics, Chemistry, Aerodynamics, Fluid Mechanic, Grid, Grid-Generation, Axis-Symmetric

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** (29 👁)