

**Opportunity Title:** Computational Modeling of Aviation Systems

**Opportunity Reference Code:** ARL-R-WS-400040-F1

**Organization** DEVCOM Army Research Laboratory

**Reference Code** ARL-R-WS-400040-F1

**Description** Next-generation Army aviation platforms will need to integrate novel technologies in multiple areas including aerodynamics, acoustics, structural dynamics, and flight controls. The technologies will be evaluated in computational and experimental environments to evaluate them for real-world applications. Fundamental modeling and analysis capabilities for these new technologies also need to be developed at different degrees of fidelity from low fidelity for conceptual design and trade space exploration to high fidelity for detailed design or scientific exploration.

DEVCOM ARL seeks proposals to develop novel technologies for the next generation Army aviation platforms, including both next-generation manned platforms and unmanned aerial systems. Associated modeling and simulation approaches for these technologies will be required at varying degrees of fidelity to accommodate assessments at different stages of design and analysis processes including conceptual, preliminary, and detailed design stages. Topics of interest include:

- Aerodynamics, acoustics, structural dynamics, flight controls for Army aviation platforms, including component designs or concepts and software or algorithms for computational modeling of those technology areas.
- Both physics-based and data-driven techniques for modeling and simulation
- Design methodologies for these new technologies
- Methods to incorporate complex physics such as interactional aerodynamics or electric powertrain models at a low computational cost suitable for conceptual or preliminary design.

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**About ARD**

ARL's Army Research Directorate (ARD) focuses on exploiting concept development, discovery, technology development, and transition of the most promising disruptive science and technology to deliver to the Army



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fundamentally advantageous science-based capabilities through laboratory's 11 research competencies. This intramural research directorate also manages the laboratory's essential research programs, which are flagship research efforts focused on delivering defined outcomes.

#### **About ARL-RAP**

The [Army Research Laboratory Research Associateship Program](#) (ARL-RAP) is designed to significantly increase the involvement of creative and highly trained scientists and engineers from academia and industry in scientific and technical areas of interest and relevance to the Army. Scientists and Engineers at the CCDC Army Research Laboratory (ARL) help shape and execute the Army's program for meeting the challenge of developing technologies that will support Army forces in meeting future operational needs by pursuing scientific research and technological developments in diverse fields such as: applied mathematics, atmospheric characterization, simulation and human modeling, digital/optical signal processing, nanotechnology, material science and technology, multifunctional technology, combustion processes, propulsion and flight physics, communication and networking, and computational and information sciences.

#### **About WEAPON SCIENCES (WS)**

Internal, transitional, and external ballistics; launch, flight, control, and navigation of guided weapons and aerial systems; development of novel weapon concepts.

#### **A complete application includes:**

- **Curriculum Vitae or Resume**
- **Three References Forms**
  - An email with a link to the reference form will be available in Zintellect to the applicant upon completion of the on-line application. Please send this email to persons you have selected to complete a reference.
  - References should be from persons familiar with your educational and professional qualifications (include your thesis or dissertation advisor, if applicable)
- **Transcripts**
  - Transcript verifying receipt of degree must be submitted with the application. Student/unofficial copy is acceptable

If selected by an advisor the participant will also be required to write a **research proposal** to submit to the ARL-RAP review panel for :

- Research topic should relate to a specific opportunity at ARL (see [Research Areas](#))
- The objective of the research topic should be clear and have a defined outcome
- Explain the direction you plan to pursue

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- Include expected period for completing the study
- Include a brief background such as preparation and motivation for the research
- References of published efforts may be used to improve the proposal

**Questions about this opportunity?** Please email [ARLFellowship@ora.u.org](mailto:ARLFellowship@ora.u.org).

**Point of Contact** [ARL-RAP](#)

- Eligibility Requirements**
- **Citizenship:** U.S. Citizen Only
  - **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree.
  - **Academic Level(s):** Bachelor's Degree (Journeyman Fellow), Master's Degree (Journeyman Fellow), or Doctoral Degree (Postdoctoral Fellow).
  - **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** ([51](#))
    - **Mathematics and Statistics** ([11](#))
    - **Physics** ([16](#))
    - **Science & Engineering-related** ([2](#))
    - **Social and Behavioral Sciences** ([29](#))