Opportunity Title: Broad SOW for ORAU Researchers in DEVCOM ARL Flight Sciences Branch

Opportunity Reference Code: ARL-R-WS-300169-F1

Organization	DEVCOM Army Research Laboratory
Reference Code	ARL-R-WS-300169-F1
How to Apply	Applications must be submitted in [Zintellect](#).

A complete application includes:

1. **Curriculum Vitae or Resume**
   - List relevant coursework and lab experience as well as all papers, presentations, or publications you may have authored or co-authored. Include any reprints or abstracts if they are available.
2. **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)
3. **Transcripts**
   - Transcript verifying receipt of degree or current enrollment in an undergraduate or graduate program at an accredited university or technical institute. Student/unofficial copy is acceptable
4. **Research Proposal**
   - Research topic should relate to a specific opportunity at ARL
   - The objective of the research topic should be clear and have a defined outcome
   - Explain the direction you plan to pursue
   - 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

Description DEVCOM Army Research Laboratory (ARL) Flight Sciences Branch (FSB) is soliciting researchers to contribute to our ongoing research in aeroballistics and its application to guided and unguided Army munitions.

As an overview, our Flight Dynamics and Control research area involves the study of the response of a munition to aerodynamic forces and moments, and how to control them to increase range, evade counterfire, and to hit targets with high accuracy. For unguided flight, research involves detailed study of stability, drag, and delivery errors related to fire control, aim, jump, and dispersion. For guided flight, research involves control actuation systems (CASs) that drive maneuver surfaces such as fins and canards. Maneuver research also involves rocket techniques such as thrust vectoring. This also involves research in advanced control to reliably maneuver Army projectiles to the target despite limited state information, control authority, and changing flight environments. Flight Dynamics and
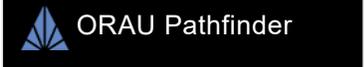
Control research makes significant usage of 6-DOF guided flight models to connect component flight, control, and sensor models and understand their performance as a system. Hardware-in-the-loop (HIL) is used to study prototype CASs, developmental control algorithms, and their ability to provide the required maneuvers throughout the flight envelope. Coupled CFD/RBD models are used to understand and develop models of the flight of complex projectiles, particularly in cases of unsteady flow conditions.

In line with the above research, there has been a recent drive to increase autonomy in Army weapon vehicles requiring an additional level of decision-making in flight control computing tasks. This specific project will investigate novel methods of using intelligent control to achieve autonomous abilities necessary for weapon-target assignment, such as path planning, cooperative networking, and fault-tolerance. In addition, a simulation environment will be developed to implement and showcase the novel control methods.

Research Advisors:

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About Army Research Directorate (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 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 [Army Research Laboratory Research Associateship Program](#) (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.

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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.

Point of Contact [ARL](#)

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree or Doctoral Degree.
- **Academic Level(s):** Master's Degree (Journeyman Fellow), Master's Degree 7+ years (Senior Fellow), Doctoral Degree (Postdoctoral Fellow), or Doctoral Degree 5+ years (Senior 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 👁)