Opportunity Title: Robotics and Artificial Intelligence
Opportunity Reference Code: ARL-R-USMA-400051

Organization DEVCOM Army Research Laboratory

Reference Code ARL-R-USMA-400051

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 **About the Research**

This research involves conducting fundamental and applied research in the field of Robotics and Autonomous Systems (RAS) and Artificial Intelligence/Machine Learning (AI/ML). The fellowship position is based at the United States Military Academy's Robotics Research Center in West Point, New York.

The following areas have the most opportunities (this is not an exhaustive list and is provided to convey scope):

- Design and development of robotic prototype systems for applied research
- Developing multi-agent systems in communications-limited environments
- Optimization, simulation, and modelling of robot behaviors and

embodied intelligence
- Sensor integration and fusion for distributed simultaneous localization and mapping (SLAM)
- Machine perception for object detection, identification, and tracking
- Test, Evaluation, Verification, and Validation of robotic and intelligent systems
- Develop tactics, techniques, and procedures for employing RAS in military formations
- Large Language Models with emergent reasoning capabilities
- Modeling hierarchical, contextual knowledge for complex multi-modal scene understanding
- Neuro-symbolic architectures for representation, learning, reasoning and inference
- Biologically-inspired metacognitive AI paradigms, such as hyperdimensional computing

Keywords: robot control, artificial intelligence, machine perception, human-robot interaction, statistical computing, deep learning, SLAM, information theory, edge computing.

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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 USMA and RRC

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The United States Military Academy's mission is to educate, train, and inspire the Corps of Cadets so that each graduate is a commissioned leader of character, committed to the values of Duty, Honor, Country. USMA is the oldest engineering school in the nation and is situated 55 miles north of New York City in the picturesque Hudson Valley. USMA's rigorous programs, quality faculty, and student-to-faculty ratio of 12:1 attract a student body of 4,400 of the nation's best.

The Robotics Research Center (RRC) is the Academy's premier resource for technical expertise and academic scholarship in the area of robotics and autonomous systems (RAS). The RRC interfaces with the broader Department of Defense (DoD) agencies and end-users to solve problems related to robotics and AI/ML.

ORAU Fellows at USMA-RRC conduct applied research and engineering on projects that are aligned with the Army's and DoD's modernization priorities while contributing to the broader scientific community. They gain significant practical exposure on aerial, ground, and aquatic robots.

Questions about this opportunity? Please email ARLFellowship@orau.org

Point of Contact ARL

Eligibility Requirements

- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree.
- **Academic Level(s):** Bachelor's Degree (Journeyman Fellow), 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)
  - **Computer, Information, and Data Sciences** (17)
  - **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** (30)