Opportunity Title: Research in Prognostics and Diagnostic for Total Material State Awareness and Condition Maintenance
Opportunity Reference Code: ARL-C-VTD-3000232

Organization	DEVCOM Army Research Laboratory
Reference Code	ARL-C-VTD-3000232
Description	**About the Research**

United States Army Research Laboratory conducts basic and applied research involving prognostics and diagnostics for Future Force Protection. The services performed under this request will improve Army vehicle technology resulting in lighter weight, improvement in vehicle lifetime, and cost. The research effort is a critical part of on-going mission programs toward developing advanced prognostics and diagnostics methodologies for future and current Army vehicles. Without such development, the mission research will be negatively impacted. Ongoing projects include development of computational models and experimental analysis to aid diffractive shielding to mitigate blast/stress waves, development of analytical models and experimental validation to define the acoustic ultrasonic wave interaction with microplasticity zone around cracks and conducting fundamental experimental and analytical research to identify major drivers of micro-damage precursors in composites under cyclic loading leading to development of self responsive engineered composite materials for total material state awareness. This research effort will focus on development of advanced experimental and analytical methods for total material state awareness in Army Vehicles. Research proposals are invited to develop improved prognostics and diagnostics (P&D) methods based upon the basic sciences, e.g. physics, material science based methods, and damage/fault diagnosis and prognosis. The areas of technical interest include, but are not limited to, damage precursors nucleation and propagation, prognostic methods for the prediction of remaining useful life of a component and/or system, advanced sensing and sensor arrays, advanced signal processing techniques, sensor optimization and placement, data fusion, component and/or system level reasoners and reasoning methods, advanced P&D hardware/software, Structural Health Monitoring, Self Responsive Engineered Composite Materials leading to total material state awareness that can reduce the logistics footprint and life-cycle costs while increasing vehicle availability.

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About VTD

The CCDCArmy Research Laboratory's Vehicle Technology Directorate (VTD) is the principal Army organization responsible for the pursuit of mobility-related science and technologies leading to advanced capabilities and improved reliability for Army air and ground vehicles. VTD leads the ARL Major Laboratory Program in mobility and the RDECOM Technology Focus Team in mobility and logistics. The technology focus areas within the ARL and RDECOM programs have been defined as platform, propulsion, intelligent systems and logistics.
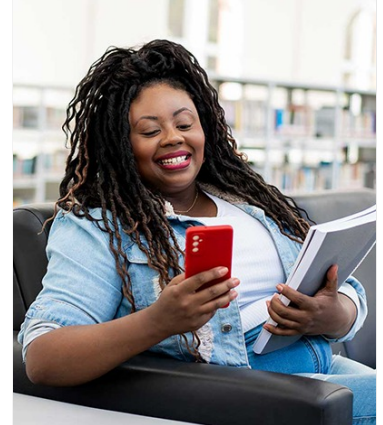
The VTD mission is accomplished through in-house basic and applied research, and from collaborations with other ARL functions, RDECOM, Navy, Air Force, academia and industry leaders. The mission is enhanced through teaming with and leveraging of research efforts associated with Collaborative Technology Alliances (CTAs) and Multidisciplinary University Research Initiatives (MURIs). For example, VTD is actively involved with two CTAs (Robotics and Micro Autonomous System Technologies), several cooperative agreements, and a unique partnership with the National Aeronautics and Space Administration (NASA) at the Langley Research Center in Hampton, VA and the Glenn Research Center in Cleveland, OH.

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.

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

- 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

A link to upload the proposal will be provided to the applicant once the advisor has made their selection.

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

Eligibility Requirements

- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree.
- **Academic Level(s):** Any academic level.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Computer, Information, and Data Sciences** (16 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)
  - **Mathematics and Statistics** (10 👁)
  - **Physics** (16 👁)
  - **Science & Engineering-related** (1 👁)
- **Age:** Must be 18 years of age