Opportunity Title: High-Throughput Structural Alloy Development
Opportunity Reference Code: ARL-R-WMRD-300108

Organization DEVCOM Army Research Laboratory

Reference Code ARL-R-WMRD-300108

Description

About the Research

Research opportunities exist in high-throughput structural alloy development integrating computational and experimental techniques in length-scales from atomistic to macroscale. The high-throughput construct for alloy development promotes tiered research with low-cost techniques to be broadly applied initially, followed by down-selection of compositions and/or processing conditions to access higher value (and cost) tests and characterization. This construct is achieved through a combination of experimental and computational tools in an integrated computational materials engineering (ICME) approach. Frequently applied computational methods include high throughput density functional theory (DFT) for discovery of novel stable and metastable phases and calculation of phase diagrams (CALPHAD) for prediction of thermodynamic phase stability ranges. Experimental methods may include but are not limited to 1) metal alloy synthesis and processing, 2) mechanical testing, and 3) characterization of phases and microstructures. Database mining of previously generated computational and experimental data and data science methods to aid in screening selections and identification of unexplored regions are also critical parts of the high-throughput framework. Materials systems of interest include but are not limited to: steel, aluminum, titanium, cermets, and multiprinciple element alloys (MPEAs) / high entropy alloys (HEAs).

Applicants are sought for a range of projects in this high-throughput structural alloy development space and include applicants with experience levels from current B.S. students to senior researchers. Project duration will be determined on a case-by-case basis.

ARL Advisor: Krista Limmer

ARL Advisor Email: krista.r.limmer.civ@army.mil

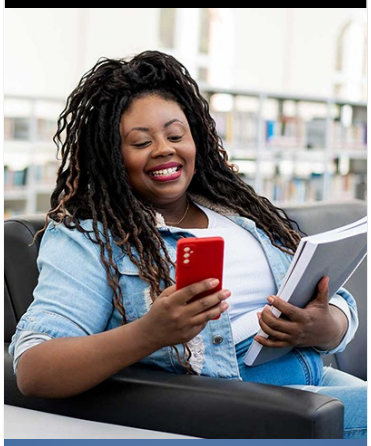
About WMRD

The goals of the Weapons and Materials Research Directorate (WMRD) are to enhance the lethality and survivability of weapons systems, and to meet the soldier's technology needs for advanced weaponry and protection. Research is pursued in energetic materials dynamics, propulsion/flight physics, projectile warhead mechanics, terminal effects phenomena, armor/survivability technologies, environmental chemistry, and advanced materials (energetic, metals, ceramics, polymers, composite/hybrids, and mechanics) for armor, armament, missiles, ground vehicles, helicopters, and individual soldier applications necessary for maintaining and ensuring supremacy in future land warfare.

About ARL-RAP

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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

Point of Contact ARL-RAP

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Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree.
- **Academic Level(s):** Any academic level.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Engineering** (27 👁)
  - **Mathematics and Statistics** (10 👁)
  - **Physics** (16 👁)
- **Age:** Must be 18 years of age