

**Opportunity Title:** Optimization and Characterization of Metals

**Opportunity Reference Code:** ARL-R-WMRD-300008

**Organization** DEVCOM Army Research Laboratory

**Reference Code** ARL-R-WMRD-300008

**Description About the Research**

Near-net-shape production technologies, such as additive manufacturing (AM) and powder metallurgy (PM), hold great promise as innovative means to significantly increase the cost-efficiency of manufacturing through improved feedstock-to-product yields as well as improve design-to-product lead times through rapid prototyping and direct digital manufacturing. Furthermore, these processes enable topological optimization of the design by taking advantage of the complex geometric and multi-material production capabilities. However, the unique processing histories produced by these technologies create new challenges for understanding and controlling the underlying microstructure and corresponding mechanical properties. Exceptional candidates are sought in the area of metallurgical processing and characterization, particularly pertaining to AM and PM processes. The project will require working as part of a large application-driven research team to engineer new processes and microstructures with the goal of improving performance. The main focus will be the development of processes and characterization tools to understand and optimize the process-structure-property relationship of metal components produced via advanced manufacturing technologies.

This research opportunity aligns with the ARL S&T Campaign in the areas of Metals Additive Manufacturing in an effort to improve the performance, reliability, and versatility of future Army systems.

Required qualifications: Applicants should have a degree (B.S. or M.S.) or be currently matriculated in a degree-seeking program in Metallurgical Engineering, Materials Science and Engineering, Mechanical Engineering, or a closely related discipline. Candidates should demonstrate a strong academic background with research experience in material processing and mechanical testing of materials. Additional experience with metallography and metallurgical characterization are highly desirable.

For full eligibility requirements by fellowship type, please visit: <https://orau.org/arlfellowship/applicants/eligibility.htm>

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**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,



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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**

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

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advisor has made their selection.

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

- Eligibility**

**Requirements**
- **Citizenship:** U.S. Citizen Only
  - **Degree:** Bachelor's Degree or Master's Degree.
  - **Academic Level(s):** Any academic level.
  - **Discipline(s):**
    - **Chemistry and Materials Sciences** ([12](#)👁)
    - **Engineering** ([27](#)👁)