

Opportunity Title: Polymer Scientist for Development of 3D Printed Energetic Formulations

Opportunity Reference Code: ARL-C-WMRD-300149

Organization DEVCOM Army Research Laboratory

Reference Code ARL-C-WMRD-300149

Description About the Research

The Science of Extreme Materials Division of the Army Research Laboratory (ARL) is seeking a candidate with expertise in polymer science to develop materials for additive manufacturing of energetic materials. The primary focus of the researcher will be to develop polyurethane formulations that are printable via reactive extrusion with a range of mechanical, thermal, and combustion properties to identify optimum formulations. An aspect of the research is to prepare and scale up chemical reactions and separations to produce polymerizable oligomers for reactive extrusion additive manufacturing. The researcher would then characterize these oligomers using FTIR, NMR, GPC, and other techniques. The researcher would characterize the thermal and mechanical properties of the resulting polymer via DSC, DMA, ASTM mechanical testing, and microscopy. The researcher would work within the team to transition the materials to others to enable energetic characterization of relevant materials. A primary research objective of the researcher would be to improve cohesive properties of the material, enable high particle loading, high resolution, and high production rates while being able to tune the resin formulation to manipulate failure of the material. It is not expected that the researcher have experience with all of these methods, but expertise in at least one of these areas is expected. Training will be available to teach the researcher any lacking techniques and instrumentation. The candidate must have good verbal skills in order to disseminate findings within ARL. The candidate must be willing and able to work in a team environment. Seeking a candidate who is working on their B.S. degree or higher in chemistry, physics, materials science, polymer science, mechanical engineering, or chemical engineering, although other related degrees would also be considered. In all cases, the mentor(s) will be working with the researcher on a regular basis at a frequency dependent on the candidate's experience.

ARL Advisor: Alice Savage

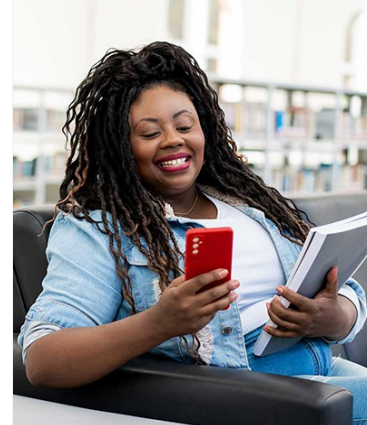
ARL Advisor Email: alice.m.savage2.civ@army.mil

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.



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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.

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@oraui.org.

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| Eligibility | <ul style="list-style-type: none">• Citizenship: U.S. Citizen Only |
| Requirements | <ul style="list-style-type: none">• Degree: Doctoral Degree.• Academic Level(s): Any academic level.• Discipline(s):<ul style="list-style-type: none">◦ Chemistry and Materials Sciences (1 )◦ Engineering (4 )◦ Physics (4 ) |