

**Opportunity Title:** Postdoctoral Fellow in Machine Learning for Materials

**Opportunity Reference Code:** ARL-C-WMRD-2082569118

**Organization** DEVCOM Army Research Laboratory

**Reference Code** ARL-C-WMRD-2082569118

**Description About the Research**

The Energetic Materials Science Branch at the Army Research Laboratory has multiple openings for outstanding postdoctoral or senior research fellows in the cross-disciplinary area of machine learning for materials. This research will involve application of machine learning methods to energetic materials and you will perform close collaboration with experts in computational chemistry, computational physics, computational solid mechanics, experimental chemistry, and mechanical engineering. Machine learning and data science efforts have made wide impact in modern chemistry research, but the study of propellants and explosives has not seen significant contribution from work leveraging those techniques.

We are pursuing two main problems of interest. One track will focus on the development of machine learned models for chemical reactions relevant to energetic materials, building upon advances in that area relevant to the pharmaceutical industry. The other track will focus on the development of predictive models for propellant and explosive formulation properties, including both performance and physical properties. Candidates may have the opportunity to research both tracks, as according to available time and interest. This research is expected to be published in open literature journals.

Seeking postdoctoral candidates as well as Senior Research Fellows with a PhD in one of the following fields: chemistry, physics, biochemistry, computer science, chemical engineering, or mechanical engineering. The candidate must have significant programming experience in one of the following languages: python, Fortran, C, C++, Java. The candidate must be a U.S. citizen.

Skill with at least one of the following is preferred, but not necessary: unix / linux, random forests, graph theory, neural networks, kernel ridge regression, Gaussian process regression, git, bash / shell scripting, parallel programming (MPI / OpenMP), organic chemistry, and energetic materials. The candidate should have a track record of publication in peer-reviewed journals or conference proceedings and be able to provide at least two letters of recommendation upon request.

*ARL Advisor:* Brian Barnes

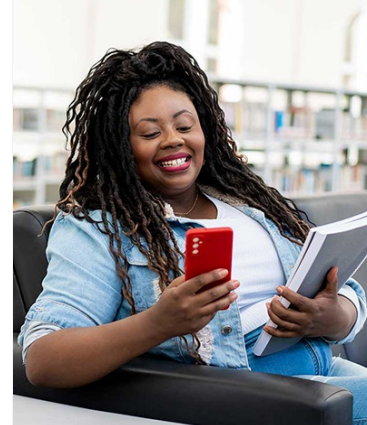
*ARL Advisor Email:* brian.c.barnes11.civ@mail.mil

**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



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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**

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

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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**

- **Citizenship:** U.S. Citizen Only
  - **Degree:** Doctoral Degree received within the last 60 month(s).
  - **Academic Level(s):** Faculty.
  - **Discipline(s):**
    - **Chemistry and Materials Sciences** ([12](#) 👁)
    - **Computer, Information, and Data Sciences** ([16](#) 👁)
    - **Engineering** ([27](#) 👁)
    - **Life Health and Medical Sciences** ([6](#) 👁)
    - **Mathematics and Statistics** ([10](#) 👁)
    - **Physics** ([16](#) 👁)
    - **Science & Engineering-related** ([1](#) 👁)
  - **Age:** Must be 18 years of age