

Opportunity Title: Nanoscale Materials and Devices
Opportunity Reference Code: ARL-R-WS-20260629-F1

Organization DEVCOM Army Research Laboratory

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How to Apply Applications must be submitted in [Zintellect](#).

A complete application includes:

1. Curriculum Vitae or Resume

- List relevant coursework and lab experience as well as all papers, presentations, or publications you may have authored or co-authored. Include any reprints or abstracts if they are available.

2. 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)

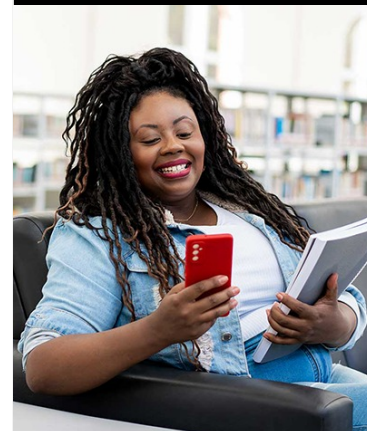
3. Transcripts

- Transcript verifying receipt of degree or current enrollment in an undergraduate or graduate program at an accredited university or technical institute. Student/unofficial copy is acceptable

4. Research Proposal

- Research topic should relate to a specific opportunity at ARL
- 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

Description This research project focuses on the growth, synthesis, metrology, functional property evaluation, and device concepts of semiconductor and metallic quantum dots, nanotubes, two-dimensional (2D) nanomaterials, and their heterostructures. Diverse synthesis methodologies—including wet chemistry, bio-templated growth, chemical vapor deposition (CVD), electron-beam (E-beam) evaporation, and sputtering deposition—are leveraged to engineer and assemble nanomaterials for advanced electronics, photonics, and magnetics applications. Material characterizations are performed via a suite of high-resolution imaging and analytical techniques such as HR -TEM, SAED, EDS, UHV-AFM, STM, X-ray crystallography, alongside a comprehensive suite of Raman, UV-Vis, and photoluminescence (PL) spectroscopies. Furthermore, the project investigates specialized physical phenomena, encompassing electrical and thermal transport, electron tunneling, spin-aligned electron transport, Hall



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and magneto-optical effects, linear and non-linear optical (NLO) responses, as well as plasmon/polariton-assisted strong light-matter coupling. To bridge foundational materials science with device-level applications, functional devices are fabricated using E-beam and focused-ion beam (FIB) lithography, wet and dry etching, and laser-assisted nano-structuring. Device performance is evaluated from room temperature down to cryogenic conditions utilizing four-probe measurements, STM, vibrating sample magnetometry (VSM), Physical Property Measurement Systems (PPMS), and magneto-optic Kerr effect setups.

ARL Advisor:

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About Army Research Directorate (ARD)

ARL's Army Research Directorate (ARD) focuses on exploiting concept development, discovery, technology development, and transition of the most promising disruptive science and technology to deliver to the Army fundamentally advantageous science-based capabilities through laboratory's 11 research competencies. This intramural research directorate also manages the laboratory's essential research programs, which are flagship research efforts focused on delivering defined outcomes.

About [Army Research Laboratory Research Associateship Program](#) (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.

About Weapon Sciences (WS)

Internal, transitional, and external ballistics; launch, flight, control, and navigation of guided weapons and aerial systems; development of novel weapon concepts.

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

Point of Contact [ARL-RAP](#)

- Eligibility**
- **Citizenship:** U.S. Citizen Only
- Requirements**
- **Degree:** Associate's Degree, Bachelor's Degree, Master's Degree, or Doctoral Degree.
 - **Academic Level(s):** Associate's Degree (Journeyman Fellow), Bachelor's Degree (Journeyman Fellow), Master's Degree (Journeyman Fellow), Master's Degree 7+ years (Senior Fellow), Doctoral Degree (Postdoctoral Fellow), or Doctoral Degree 5+ years (Senior Fellow).
 - **Discipline(s):**
 - **Chemistry and Materials Sciences** ([12](#) 👁)
 - **Communications and Graphics Design** ([2](#) 👁)
 - **Computer, Information, and Data Sciences** ([17](#) 👁)
 - **Earth and Geosciences** ([21](#) 👁)
 - **Engineering** ([29](#) 👁)
 - **Environmental and Marine Sciences** ([14](#) 👁)
 - **Life Health and Medical Sciences** ([51](#) 👁)
 - **Mathematics and Statistics** ([11](#) 👁)
 - **Physics** ([16](#) 👁)
 - **Science & Engineering-related** ([2](#) 👁)
 - **Social and Behavioral Sciences** ([29](#) 👁)