**Opportunity Title:** Ceramic Synthesis and Processing
**Opportunity Reference Code:** ARL-R-WMRD-300034-SEM

**Organization** DEVCOM Army Research Laboratory

**Reference Code** ARL-R-WMRD-300034-SEM

**Description** **About the Research**

Opportunities exist for foundational and early applied research and development (R&D) efforts towards enabling the next generation ceramics and ceramic composites for Army systems. Research activities include: 1) novel synthesis and processing techniques for opaque and transparent ceramics and composites with optimal structure/properties for extreme environments and high-rate impact, 2) advanced manufacturing science for development of heterogeneous multi-scale ceramics and interfaces with high fracture and failure tolerance, 3) high-throughput simulation, machine learning and design optimization for processing-structure-property relationships, and 4) high-throughput non-destructive evaluation and characterization for materials discovery.

Candidates of interest are U.S. Citizens with a Ph.D. or M.S. (B.S. or student may be considered with suitable background) in Ceramic Engineering, Materials Science & Engineering, Chemistry, Mechanical Engineering or a related engineering and science discipline.

Preferred attributes include a strong knowledge of ceramic engineering principles and analytical and mechanical characterization techniques. Specialized expertise also desired in areas of ceramic synthesis methods, inorganic chemistry, colloidal particle suspension dispersion and rheology, advanced microscopy and spectroscopy techniques, high-rate mechanisms, advanced manufacturing, process control and modeling, and AI/ML techniques.

Keywords: ceramics, glasses, transparent ceramic synthesis, ceramic processing, characterization, advanced manufacturing, high-rate, machine learning

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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.

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**About Science of Extreme Materials (SEM)**

Materials and related manufacturing methods focusing on mechanical response and performance extremes, including active, adaptive, and flexible/soft materials; novel manufacturing science for energetic materials.

**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
- 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

**Point of Contact** ARL-RAP

**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** (9 👁)
  - **Engineering** (6 👁)