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**Opportunity Title:** Silicon Carbide for Solid-State Qubits, Opto-Electronics & Power Electronics
**Opportunity Reference Code:** ARL-C-PEQS-400021-F1

**Organization** DEVCOM Army Research Laboratory

**Reference Code** ARL-C-PEQS-400021-F1

**How to Apply** Although all applications must be processed through Zintellect, please feel free to reach out directly to the advisor, Brenda VanMil at Brenda.L.VanMil.civ@army.mil for more information or guidance.

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

A research opportunity is available with the U.S Army Research Laboratory's (ARL) Sensors and Electron Devices Directorate (SEDD) located in Adelphi, MD. SEDD is seeking a highly motivated candidate for a Postdoctoral Fellowship with a background in Physics, Materials Science, Electrical Engineering or related fields. Silicon Carbide is a well-established wide-bandgap semiconductor with demonstrated commercial uses primarily for power electronics and as a substrate for lighting. Current research at ARL is aligned to demonstrating point defects in silicon carbide as a viable candidate for quantum technologies. The potential for a solid state quantum network provides a prominent role for a silicon carbide qubit integrated with sensing capabilities. Research proposals are solicited in the following areas: (i) Epitaxial growth of low-strain, low defect density silicon carbide by CVD and relevant material characterization for use as solid-state spin qubits in different SiC polytypes and device structures, (ii) Modeling and fabrication of photonic crystal nanostructures in SiC for quantum device development and hybrid GaN/SiC optoelectronic sensors or (iii) Development and demonstration of hybrid devices that integrate quantum, opto-electronic, MEMS and/or power electronic components in SiC on the wafer scale.

Previous experience in at least two of the following areas is desirable: epitaxial semiconductor crystal growth (CVD, MBE), semiconductor processing (lithography, etching and deposition for photonic crystal structures, power and/oroptoelectronic devices), magnetic resonance (ESR, NMR, ODMR), optical characterization (PL, SE, FTIR, Raman), electrical characterization (capacitance-voltage, Hall) or structural characterization (XRD, AFM, SEM, XPS).

*ARL Advisor:* Brenda VanMil

*ARL Advisor Email:* Brenda.L.VanMil.civ@army.mil

***About SEDD***

*The Sensors and Electron Devices Directorate (SEDD) is the Army's principal center for research and development in the exploration and exploitation of the electromagnetic spectrum, which includes radio frequency, microwave, millimeter-wave, infrared (IR), visible, and audio regions. SEDD is responsible for advances in laser sources, RF sources, IR sensors, signature detection and decoding, target imaging and its interpretation, fusion of data derived from several sensors, and electromagnetic protection.*

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*In addition, SEDD is responsible for improving the technology base for electron devices and materials related to sensors and power devices. Research is conducted in related aspects of physics, electrical engineering, computer science, solid-state physics, chemical engineering, material sciences, and electrochemistry.*

***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@orau.org*

**Eligibility Requirements**

- **Degree:** Doctoral Degree.
- **Academic Level(s):** Any academic level.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Computer, Information, and Data Sciences** (16 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (2 👁)
  - **Mathematics and Statistics** (10 👁)
  - **Physics** (16 👁)
- **Age:** Must be 18 years of age