

Opportunity Title: Integrated Optics for Communications and Phased Array

Antenna Control

Opportunity Reference Code: ARL-C-SEDD-2269696644

Organization DEVCOM Army Research Laboratory

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Description About the Research

Sophisticated functionality can be achieved with monolithic integration of waveguide couplers, delay lines, modulators, and detectors. For example, we are investigating a time integrating delay line for microwave phased array antenna beamforming. Fabrication process simplicity and compatibility is significant to the realization of such integrated optical architectures. We are developing InP based, monolithically integrated, waveguide couplers, splitters, amplifiers, and modulators for photonic integrated circuits using selective area epitaxial growth. We are also studying novel opto-electronic devices such as photonic bandgap devices, micro-resonator devices, and optical MEMS devices. Sophisticated RF photonic systems can be built by integrating these novel devices with integrated waveguide circuits.

This research focuses on the design, fabrication, and characterization of novel waveguide architectures for applications in communication (de)multiplexing and phased array antenna control. Key technical issues include modeling and fabrication of broadband (>20 GHz) novel RF-photonic devices, as well as developing the integration technology of these photonic devices. Our objective is to demonstrate a monolithic module that can perform sophisticated functionality for RF photonic systems.

ARL Advisor: Weimin Zhou

ARL Advisor Email: Weimin.zhou@us.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.

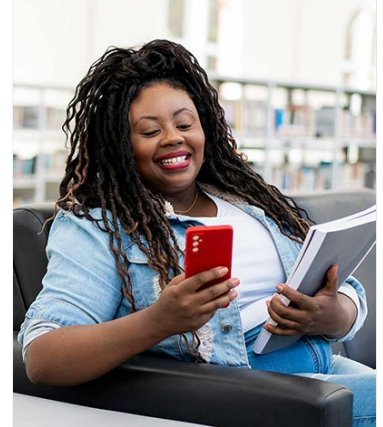
In addition, SEDD is responsible for improving the technology base for electron devices and materials related to sensors and power devices. Research is conducted in related aspects of physics, electrical engineering, computer science, solid-state physics, chemical engineering, material sciences, and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

About ARL-RAP

The [Army Research Laboratory Research Associateship Program](#) (ARL-RAP) is designed to significantly increase the involvement of creative and



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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 received within the last 60 month(s).
 - **Academic Level(s):** Any academic level.
 - **Discipline(s):**
 - **Chemistry and Materials Sciences** ([12](#) )

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- **Computer, Information, and Data Sciences** ([16](#) 👁)
- **Engineering** ([27](#) 👁)
- **Mathematics and Statistics** ([10](#) 👁)
- **Physics** ([16](#) 👁)
- **Science & Engineering-related** ([1](#) 👁)
- **Age:** Must be 18 years of age