

**Opportunity Title:** Technologies for Integrated Photonic Oscillators

**Opportunity Reference Code:** ARL-R-PEQS-300167

**Organization** DEVCOM Army Research Laboratory

**Reference Code** ARL-R-PEQS-300167

**How to Apply** **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 project will support our ongoing efforts to bring the exciting field of optical frequency division to the form factor of an integrated chip. Optical frequency division uses optical frequency combs (OFCs) to divide the frequency of an optical frequency reference (such as an optical resonator or optical atomic transition) to a microwave output signal, whose frequency is usable in conventional circuits. One of the enduring challenges in bringing this technology to the chip scale is generating on-chip OFCs with repetition rates that are sufficiently small (e.g., <40 GHz) to work with conventional electronics while simultaneously minimizing the required power (i.e., optical power in the case of microresonator OFCs and RF power in the case of electro-optic modulator OFCs). In this project, the student will contribute towards research in generating microwaves with frequencies <40 GHz using on-chip OFCs that require practical amounts of



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power. This project may involve characterizing OFC devices, building fiber-optic characterization circuits, making precision frequency noise measurements, and other related tasks.

Advisor:

*James Cahill*

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*Weimin Zhou*

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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 Photonics, Electronics, & Quantum Sciences (PE&QS)**

Materials (and related manufacturing methods) and devices intended for achieving photonic, electronic, and quantum-based effects.

**Questions about this opportunity?** Please

email [ARLFellowship@ora.u.org](mailto:ARLFellowship@ora.u.org)

**Qualifications** Seeking students pursuing Bachelor's Degree, Master's Degree, or Doctoral Degree

**Point of Contact** [ARL](#)

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- Eligibility Requirements**
- **Citizenship:** LPR or U.S. Citizen
  - **Degree:** Any degree .
  - **Academic Level(s):** Any academic level.
  - **Discipline(s):**
    - **Chemistry and Materials Sciences** ([12](#))
    - **Communications and Graphics Design** ([2](#))
    - **Computer, Information, and Data Sciences** ([17](#))
    - **Earth and Geosciences** ([21](#))
    - **Engineering** ([27](#))
    - **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](#))