Opportunity Title: Acoustic and Electro-Optic Propagation
Opportunity Reference Code: ARL-C-MIS-400023-F1

Organization DEVCOM Army Research Laboratory

Reference Code ARL-C-MIS-400023-F1

Description **About the Research**

Research opportunities are available to study acoustic, seismic, and electro-optic propagation and/or imaging in complex battlefield environments. As signals propagate through the environment, they undergo effects due to atmospheric turbulence, atmospheric gradients, terrain, and other natural and manmade obstacles. Of particular interest at this time are: (1) Multidisciplinary investigations of the statistical moments of acoustic waves propagating in the atmosphere above an impedance ground. Here the atmosphere is to be characterized as a complex random medium with spatial-temporal fluctuations. Advanced computational techniques are needed. (2) Acoustic remote sensing of the atmosphere, particularly, estimation of the Green's function using time reversal and/or similar inverse techniques. Theoretical and experimental approaches are needed. (3) Long range acoustic propagation in littoral environments.

Of more general interests are the effects of atmospheric turbulence and gradients on source detection, localization, and classification, using both theoretical and experimental approaches; methods to mitigate these effects; modeling of wave propagation and scattering in urban and/or natural complex environments; environmental remote sensing; target remote sensing that incorporates the physical effects of the propagation environment; computational/numerical modeling using novel and standard approaches, such as, entropy maximization, immunology, and high performance parallel processing; and the development of image/signal processing algorithms from a multidisciplinary approach, to include multiple sensor modalities.

These multidisciplinary research opportunities incorporate theoretical and experimental physics, wave propagation theory, atmospheric science, signal processing, information theory, inverse theory, and mathematical, numerical, and computational modeling.

Computational facilities, ranging from high performance computers to desktop PCs, and experimental sites are available. This research is in collaboration with other government agencies and possible NATO participants. Foreign nationals may be considered from NATO and TTCP participating countries.

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ARL Advisor Email: sandra.l.collier4.civ@army.mil

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.

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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 Recommendations (does NOT apply to Senior or Faculty Fellowship applicants)**
  - 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 (does NOT apply to Senior or Faculty Fellowship applicants)**
  - 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:** Bachelor's Degree, Master's Degree, or Doctoral Degree.
- **Academic Level(s):** Faculty.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (17)

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- **Engineering** (3 👁)
- **Mathematics and Statistics** (1 👁)
- **Physics** (16 👁)

- **Age:** Must be 18 years of age