

Opportunity Title: Use of Microwave Photonics for Lowering SWaP and Thermal Dissipation in Receivers and ESAs

Opportunity Reference Code: ICPD-2019-10

Organization Office of the Director of National Intelligence (ODNI)

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How to Apply **Create and release your Profile on Zintellect** – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not exceed 2 pages.**

Complete your application – Enter the rest of the information required for the IC Postdoc Program Research Opportunity. The application itself contains detailed instructions for each one of these components: availability, citizenship, transcripts, dissertation abstract, publication and presentation plan, and information about your Research Advisor co-applicant.

Additional information about the IC Postdoctoral Research Fellowship Program is available on the program website located at: <https://orise.orau.gov/icpostdoc/index.html>.

If you have questions, send an email to ICPostdoc@orau.org. Please include the reference code for this opportunity in your email.

Application Deadline 3/1/2019 6:00:00 PM Eastern Time Zone

Description **Research Topic Description, including Problem Statement:**

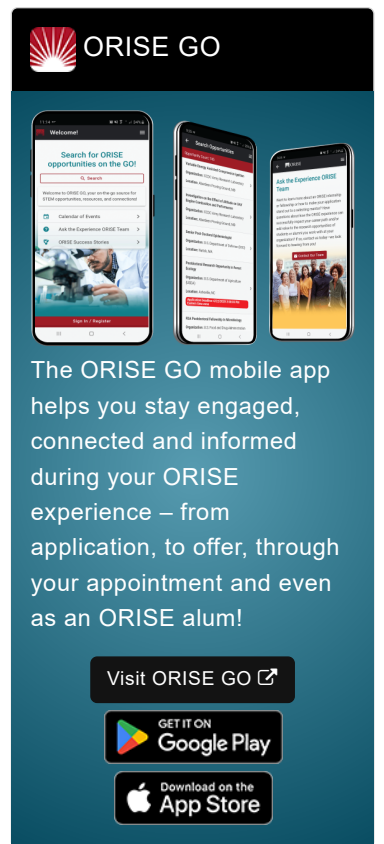
Studies have indicated savings in Size, Weight, Power (SWaP), and thermal dissipation can be realized when conventional RF electronic functions are implemented with microwave photonics. For SWaP constrained platforms, this can become a significant benefit. Photonic Integrated Circuits are rapidly maturing and may provide an additional savings in SWaP. In some applications, optical processing of signals may be more power efficient than digital signal processing. While RF performance of microwave photonics lags conventional RF electronics in certain instances, an investigation into multiple applications and the resulting SWaP savings or processing efficiency improvements of microwave photonics over conventional electronics is required.

Example Approaches:

- Research could compare of electronically steerable array (ESA) implementation with conventional electronics versus microwave photonic implementation
- Research could include use of integrated photonics in fiber optic connectors for remoting signals
- Research could include compressive sampling or Nyquist folding receiver designs to achieve lower power spectral awareness. Post compression recovery of signals should be included in this analysis.
- Research could compare optical processing techniques to digital implementations to quantify efficiencies.
- Research could include tomographic RF imaging implementations using microwave photonics and possible uses in the intelligence community.

Relevance to the Intelligence Community:

- Improve processing efficiencies and lowering SWaP is of great benefit for future platforms.



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Key Words: Microwave Photonics, Integrated Photonics, Photonic Integrated Circuits, PIC, Electronically Steerable Array, ESA, Compressive Sampling, Optical Processing, SWAP

Qualifications **Postdoc Eligibility**

- U.S. citizens only
- Ph.D. in a relevant field must be completed before beginning the appointment and within five years of the application deadline
- Proposal must be associated with an accredited U.S. university, college, or U.S. government laboratory
- Eligible candidates may only receive one award from the IC Postdoctoral Research Fellowship Program.

Research Advisor Eligibility

- Must be an employee of an accredited U.S. university, college or U.S. government laboratory
- Are not required to be U.S. citizens

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
 - **Chemistry and Materials Sciences** ([12](#) )
 - **Communications and Graphics Design** ([6](#) )
 - **Computer, Information, and Data Sciences** ([16](#) )
 - **Earth and Geosciences** ([21](#) )
 - **Engineering** ([27](#) )
 - **Environmental and Marine Sciences** ([14](#) )
 - **Life Health and Medical Sciences** ([45](#) )
 - **Mathematics and Statistics** ([10](#) )
 - **Other Non-Science & Engineering** ([5](#) )
 - **Physics** ([16](#) )
 - **Science & Engineering-related** ([1](#) )
 - **Social and Behavioral Sciences** ([28](#) )