

Opportunity Title: Quantum secure communication

Opportunity Reference Code: IC-18-37

Organization Office of the Director of National Intelligence (ODNI)

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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://orau.org/icpostdoc/>.

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

Application Deadline 3/12/2018 11:59:00 PM Eastern Time Zone

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

- Quantum secure communication (also called quantum key distribution) refers to the use of quantum effects to establish a communication channel secure against eavesdropping or tampering. Practical implementations of such channels have been developed for some time and technological solutions for free space channels are emerging. There are current initiatives in academia and industry to develop and deploy commercial QKD systems.
- The focus of current research and development is on implementation rather than embedding security principles at the design stage and this approach seems to be introducing a whole new set of potential avenues for attack that are not yet well understood. At this point in time there is little research into the vulnerabilities of practical implementations of QKD systems. However, a body of knowledge is needed pm how to defend commercial QKD systems. We would also like to encourage more research into how to accurately assess the security of real-world devices that operate imperfectly and the development of methods for quantifying and validating the security claims of real-world QKD systems.
- Although QKD claims to provide guaranteed security, its responsible use must not introduce new vulnerabilities into real-world systems. This means that communication systems involving QKD should be designed with fail safe mechanisms that continue to operate securely even when the quantum part becomes compromised.

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Example Approaches:

- Development of a mature body of practical QKD vulnerability research accompanied by development of methods for quantifying and validating the security claims of real-world QKD systems.
- Development of security methodologies for the design stage of QKD. A systematic taxonomy of attack vectors, costing of attacks of risk mitigation measures. One important and little-understood attack is denial-of-service.

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](#))