

Research Fellow / Research Associate (Quantum Hacking
and Practical Quantum Security Evaluation)
Nanyang Technological University

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Posted Nov. 5, 2025, set to expire May 6, 2026

Job Title	Research Fellow / Research Associate (Quantum Hacking and Practical Quantum Security Evaluation)
Department	Fraunhofer Singapore Research Centre
Institution	Nanyang Technological University Singapore, , Singapore
Date Posted	Nov. 5, 2025
Application Deadline	Open untill filled
Position Start Date	Available Immediately
Job Categories	Research Scientist/Associate
Academic Field(s)	Physics - General
Job Website	https://ntu.wd3.myworkdayjobs.com/Careers/job/NTU-Main-Campus-Singapore/Research-Fellow---Research-Associate--Quantum-Hacking-and-Practical-Quantum-Security-Evaluation-_R00022463
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Apply By Email	
Job Description	

Research Associate / Research Fellow – Quantum Hacking and Practical Quantum Security Evaluation (Fraunhofer@NTU)

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The Fraunhofer Singapore Research Centre FSR@NTU is an independent research centre established at Nanyang Technological University (NTU). It forms part of the Fraunhofer-Gesellschaft (www.fraunhofer.de), one of the world's leading applied research organizations with around 32,000 employees, predominantly scientists and engineers.

In Singapore, Fraunhofer operates two closely linked but legally independent entities: Fraunhofer@NTU (FSR@NTU) and Fraunhofer Singapore Research Ltd — the first Fraunhofer affiliate in Asia. Both work in joint facilities to advance applied R&D bridging academia and industry in cutting-edge technological domains.

We invite applications for a Research Associate / Research Fellow (full-time) focusing on quantum hacking and quantum key distribution (QKD) security evaluation. You will work in an interdisciplinary and international team of quantum security experts, QKD system engineers, optical physicists, quantum information theorists, and cryptographic evaluation specialists. The joint mission: to build and validate next-generation frameworks for testing, evaluating, and certifying QKD systems and components in both laboratory and production environments.

This position will directly contribute to applied quantum communication security programmes in collaboration with academic and industrial partners. The role combines deep experimental work, hands-on system engineering, and methodical vulnerability analysis of practical QKD systems and components.

Key Responsibilities

- Conduct advanced R&D in the practical security evaluation and side-channel resistant design of QKD and countermeasures for quantum cryptography implementations.
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Systematically conduct vulnerability analysis and side-channel exploitation studies of QKD.

- Develop and execute characterization and metrology procedures for quantifying security-relevant parameters of QKD components and protocols
- Implement and reproduce known and investigate novel quantum hacking scenarios under controlled conditions to assess the security and robustness of QKD systems.
- Build and test prototypes and proof-of-concept systems that demonstrate practical evaluation in physical testbeds.
- Design and develop dedicated hardware and software security evaluation instruments, including the design and implementation of modular testbed architectures for QKD testing and evaluation.
- Prepare technical reports, test procedures, and datasets supporting standardization, certification, and benchmarking efforts.
- Translate research insights into tools, methodologies, and frameworks for quantum security testing and certification in interdisciplinary and international teams
- Contribute to publications in leading international conferences and journals in quantum communication, simulation, and cybersecurity.
- Prepare technical documentation, reports, and system design descriptions to support ongoing projects.

Job Requirements

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PhD or MSc/MEng in Physics, Electrical Engineering, or Quantum Technology, with a focus on experimental quantum optics or quantum communication systems.

- Strong foundation in QKD theory and protocols, particularly Discrete Variable (DV-QKD), including implementation details and known attack vectors.
- Laboratory expertise in optical alignment, calibration, and quantum component setup, ideally with prior experience in implementing or reproducing attacks on QKD sources or single-photon detectors.
- Experience with microelectronics, fast signal processing, and circuit design, including FPGA-based control, real-time acquisition, and hardware description languages (HDL).
- Proficiency in scientific programming and laboratory automation
- Experience developing control and analysis software for instrumentation and optical measurements.
- Strong analytical, independent problem-solving, and project execution skills under time constraints.
- Excellent communication and collaboration skills, with the ability to bridge domains (quantum theory, hardware, security engineering) in a multidisciplinary, international team.
- Familiarity with the quantum technology policy and standardization landscape is an advantage.

We regret that only shortlisted candidates will be notified.

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Contact Information

Please reference Academickeys in your cover letter when
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Contact

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