ROBBIE ELBERTSE

MD, United States of America

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RESEARCH PROFILE

Experimental physicist specializing in the design and commissioning of quantum measurement systems, with expertise in translating physical insight into robust experimental architectures. Experienced in defining measurement strategies under extreme cryogenic, RF, and noise constraints, from single-atom spin systems to Josephson junction–based devices. Proven track record of building and upgrading complex platforms, diagnosing non-ideal behavior, and driving measurable improvements in system performance and reliability.

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher — National Institute of Standards and Technology (NIST) [2024-]

- Commissioned and upgraded a dilution-refrigerator-based quantum measurement platform, integrating cryogenic RF switching and attenuation through detailed transmission measurements
- Designed and executed voltage-biased and current-biased Josephson junction experiments toward phase qubit control under low-temperature, low-noise conditions
- Identified and quantified non-ideal RF transmission paths through inactive switches and unused electrodes, revealing parasitic coupling mechanisms impacting system-level noise performance
- Implemented automated data acquisition, live remote system monitoring, and improved operational practices to reduce human-induced error and support long-duration cryogenic experiments and platform and hardware stability

PhD Researcher / Postdoctoral Researcher — Delft University of Technology [2018-2023]

- Led international ultra-high-vacuum, cryogenic STM experiments on single atoms and engineered atomic structures, driving projects from concept through publication via system preparation, automated data acquisition, data analysis, and manuscript preparation
- Designed and implemented RF components for ESR-STM experiments enabling coherent spin control
- Proposed and implemented a novel STM-based technique for detecting nanomechanical motion in metallic and superconducting membranes
- Implemented system-level monitoring, diagnostics, and standardized documentation to support long-term experimental stability and rapid onboarding

SELECTED PUBLICATIONS

- Elbertse et al., *Long-lived magnetization in an atomic spin chain tuned to a diabolic point*, Phys. Rev. Lett., 2024 ★
- Elbertse et al., *Remote detection and recording of atomic-scale spin dynamics*, Communications Physics, 2020

TECHNICAL SKILLS

Quantum & Cryogenic Hardware:	Dilution refrigerators, cryogenic wiring, low-noise design, RF systems
Measurement & Instrumentation:	STM, ESR-STM, UHV
Data Analysis, Automation, Modeling:	Python, LabVIEW, MATLAB, COMSOL Multiphysics

EDUCATION

PhD in Quantum Physics — Delft University of Technology, 2022
MSc in Applied Physics — Delft University of Technology, 2018
BSc in Applied Physics, BSc in Applied Mathematics — Delft University of Technology, 2014

AWARDS & INVITED TALKS

Invited Talk	American Vacuum Society 71st Yearly Conference (2025)
Award	Most Outstanding Poster Presentation, Sigma Xi Early Career Poster (2024)

★: Editor's Choice