

William Ward, MS, B.Eng.

APPLIED PHYSICS PH.D. CANDIDATE | ELECTRICAL ENGINEER | PHYSICIST

☎ 947-260-5298 | ✉ wardw@umich.edu | 🏠 quantum-desert.github.io/ | 🌐 william-ward010101/

Education

University of Michigan

PH.D. APPLIED PHYSICS

Ann Arbor, MI

Sep. 2023 - Current

- Quantum Engineering Laboratory; PI: Dr. Zheshen Zhang
- PhD Candidate as of September 2025

University of Michigan

MS APPLIED ELECTROMAGNETICS AND RF CIRCUITS

Ann Arbor, MI

Sep. 2023 - April 2025

- Overall GPA 3.96

McMaster University

B.ENG. ENGINEERING PHYSICS

Hamilton, Ontario

Aug. 2018 - May 2023

- Overall GPA of 3.99

Skills

Lab-Based Vacuum Systems, Cryogenic Systems, Free-Space + Fiber Optical Alignment, PID Feedback, RF Locking, Single Photon Detection

Software Embedded C & C++, Python, Java, C# & .NET, Linux, Git, MATLAB

Hardware Cryogenic Mechanical Design, Cryogenic PCB Design, Digital + Analog Electronic Design & Analysis, 3D Printing

Programs Keysight ADS, Altium Designer, Autodesk Inventor, D.S. SolidWorks, Fusion360, NI Multisim, Zemax OpticStudio, EasyEDA

Theory E&M, Quantum Mechanics, Quantum + Nonlinear Optics, RF E&M, Quantum Information, Resonant MEMs, Color Centers

Selected Publications

Entanglement Enhanced Neyman-Pearson Target Detection

Ann Arbor, Michigan

APPLIED PHYSICS - UNIVERSITY OF MICHIGAN

October 2025

W. Ward, et al. (2025). Physical Review A. <https://doi.org/10.1103/cxl9-ljn8>

Research Experience

Quantum Multi-Access Channel

Ann Arbor, Michigan

QUANTUM ENGINEERING LABORATORY - UNIVERSITY OF MICHIGAN

January 2025 - Present

- Led the conception, construction, and characterization of multi-access channel quantum-optics experimental platform, enabling high-precision investigations and discoveries in optical quantum science.

Quantum Optomechanics

Ann Arbor, Michigan

QUANTUM ENGINEERING LABORATORY - UNIVERSITY OF MICHIGAN

February 2025 - Present

- Conceptualized, built and evaluated cryogenic electromechanical test platform; establishing proficiency in cryomechanical design
- Managed procurement and oversaw end-to-end assembly and validation of a \$600k dilution refrigerator system
- Responsible for continuous operation of Bluefors LD-400 Dilution Refrigerator at base temperature of 7 mK

Entanglement Enhanced Neyman Pearson Target Detection

Ann Arbor, Michigan

QUANTUM ENGINEERING LABORATORY - UNIVERSITY OF MICHIGAN

June 2023 - January 2025

- Configured and aligned continuous wave entanglement source based on nonlinear crystal
- Designed and implemented lock-in amplification + PID control electrical feedback to stabilize the system
- Developed theory model to accurately predict measurement statistics based on quantum optics principles
- Demonstrated near-optimum quantum advantage in Entanglement-Enhanced Neyman-Pearson target detection scheme

Industry Experience

MIT Lincoln Laboratory

SRP INTERN: OPTICAL & QUANTUM COMMUNICATIONS

Lexington, MA, USA

May 2026 - Aug. 2026

- I will be joining Group 67: Optical and Quantum Communications, to work on cryogenic measurement optimization of silicon vacancy centers in diamond for quantum memory applications

KLA Corporation - FastScan R&D Group

SOFTWARE ENGINEER INTERN

Milpitas, California

May 2022 - Aug. 2022

- Validated performance of a PN junction detector in an electron-beam column stack to meet custom specifications
- Implemented a multi-threaded application to operate a test bench with Python
- Wrote hardware driver libraries in Python to control coupled linear translation stages, an oscilloscope, a pulse generator, and an optical source
- Developed a baseline understanding of scanning electron microscopy & electron optics
- Assembled laser & associated optical components; performed coarse optical alignment

Mesomat Inc.

CO-OP RESEARCH & DEVELOPMENT SCIENTIST

Hamilton, Ontario

Sep. 2020 - Sep. 2021

- Designed 15 unique PCBs utilized by Mesomat's data acquisition platform and robotic production line system
- Spearheaded performance analysis of 2 unique event detection algorithms with Python
- Designed & built an automated electromechanical production robot on a \$5k budget
- Increased the reliability & efficiency of the sensor production process by 50%
- Developed desktop application for software version control, decreasing software distribution time by 25% for management team
- Used C# to implement a real time signal processing algorithm for event detection
- Utilized Git for version control of 32 different collaborative software projects
- Improved robustness of existing production robotic system before overhauling the entire system; reduced downtime by 40%

McMaster Biophotonics Research Group

UNDERGRADUATE RESEARCH ASSISTANT

Hamilton, Ontario

May 2020 - Aug. 2020

- Developed a C++ GUI and associated back-end to control a high power ultra-fast pulsed fiber laser system
- Replaced outdated electronics and associated software controlling the laser system shutter

Extracurricular Activity

McMaster Interdisciplinary Satellite Team (NEUDOSE)

COMMAND & DATA HANDLING TEAM LEAD

Hamilton, Ontario

Aug. 2021 - Jul. 2022

- Managed a team of 7 people + continuous systems engineering integration to facilitate development of satellite flight software
- Led technical development of the Command & Data Handling Finite State Machine with over 180 commits

Honors & Awards

2026	NSF QuEST Student Leader , University of Michigan, Quantum Research Institute	<i>Ann Arbor, Michigan</i>
2023	Optics & Photonics Education Scholarship , SPIE, University of Michigan	<i>Ann Arbor, Michigan</i>
2022	H.L Hooker Academic Scholarship , McMaster University	<i>Hamilton, Ontario</i>
2021 - 2022	Provost's Honour Roll , McMaster University	<i>Hamilton, Ontario</i>
2019 - 2022	Dean's Honour List , McMaster University	<i>Hamilton, Ontario</i>
2019	NSERC USRA , McMaster University Biophotonics Group NSERC	<i>Hamilton, Ontario</i>
2017	Eagle Scout Award , Boy Scouts of America	<i>Birmingham, Michigan</i>