

William Ward

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

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Education

University of Michigan

PH.D. APPLIED PHYSICS

Ann Arbor, MI

Sep. 2023 - Current

- Quantum Engineering Lab; PI: Dr. Zheshen Zhang
- Received 2023 SPIE Optics & Photonics Education Scholarship

University of Michigan

MS APPLIED ELECTROMAGNETICS AND RF CIRCUITS

Ann Arbor, MI

Sep. 2023 - April 2025

- Overall GPA 4.0

McMaster University

B.ENG. ENGINEERING PHYSICS

Hamilton, Ontario

Aug. 2018 - May 2023

- Achieved an overall GPA of 11.8 on a 12.0 scale
- Received NSERC USRA Scholarship for an undergraduate research placement
- Received the Provost's Honour Roll Medal
- Received the H.L. Hooker Scholarship for High Academic Standing
- Completed 24 months of relevant engineering work placements

Skills

Software	Embedded C & C++, Python, Java, C# & .NET, Linux, Git, MATLAB
Hardware	PCB Design, Digital + Analog Electronic Design & Analysis, 3D Printing
Programs	Keysight ADS, Autodesk Inventor, D.S. SolidWorks, Fusion360, NI Multisim, Zemax OpticStudio, EasyEDA, Confluence + JIRA
Lab-Based	Optical Alignment, Free-Space Optics, Fiber Optics, PID Control, Lock-In Amplification
Theory	E&M, Quantum Mechanics, Quantum Optics, Statistical Mechanics, Computational Physics, Mathematical Physics

Research Experience

Quantum Illumination

QUANTUM ENGINEERING LABORATORY - UNIVERSITY OF MICHIGAN

Ann Arbor, Michigan

June 2023 - Present

- Configured + aligned continuous wave entanglement source based on nonlinear crystal
- Built and aligned phase conjugate receiver
- Built and optimized balanced homodyne detection setup in extremely weak power regime
- 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

Industry Experience

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.

Hamilton, Ontario

CO-OP RESEARCH & DEVELOPMENT SCIENTIST

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 the 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%

Integrated Biomedical Engineering - McMaster University

Hamilton, Ontario

INSTRUCTIONAL TEACHING ASSISTANT

Sep. 2020 - Present

- Spent 7 academic semesters assisting students in a laboratory environment, encouraging further development of computing, computer-aided design & professional communication skills as a support teaching assistant

COURSE DEVELOPER

May 2019 - Aug. 2019

- Prepared & delivered labs to teach first-year engineering students the basics of computer-aided design and programming on a weekly basis as an instructional teaching assistant

McMaster Biophotonics Research Group

Hamilton, Ontario

UNDERGRADUATE RESEARCH ASSISTANT

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)

Hamilton, Ontario

COMMAND & DATA HANDLING TEAM LEAD

Apr. 2022 - Jul. 2022

- As team lead, I was head of software development for the Command & Data Handling sub team. I managed a team of 7 people and continuously worked with systems level engineers to facilitate development of satellite flight software
- Led technical development of the Command & Data Handling Finite State Machine with over 180 commits
- Performed and submitted code reviews on a weekly basis

EMBEDDED SOFTWARE SPECIALIST

Aug. 2021 - Apr. 2022

- Assisted in development of embedded software with Gomspace SDK & custom libraries / packages to control the satellite's On-Board Computer
- Designed a finite state machine to control satellite interactions between subsystems
- Successfully integrated CubeSat Space Protocol (CSP) communication architecture with 3 existing sub-services
- Collaborated with a team of 7 software specialists on a team repository using Git

Academic Projects

Passive RF Data Acquisition Unit Capstone Project

Hamilton, Ontario

McMASTER UNIVERSITY - ENGINEERING PHYSICS

Fall 2022

- Designed and implemented a radio-frequency power-harvesting unit to passively power our data acquisition solution
- Optimized the power harvesting module based on anticipated system-level integration requirements
- Demonstrated passive operation of the device at free space distances up to 1 meter
- Performed project management and electrical design in tandem throughout duration of the 8-month project

Ultrasonic Range Finder

Hamilton, Ontario

McMASTER UNIVERSITY - ENGINEERING PHYSICS

Dec. 2021

- Cooperated with a team of other engineers to successfully design and build an ultrasonic range finder
- Succeeded in building a device with an accuracy to within 1 cm up to 99 cm
- Constructed the device using 40 base-level analog and digital components such as amplifiers & logic gates

Honors & Awards

2023	Optics & Photonics Education Scholarship , SPIE	<i>Bellingham, Washington</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>