

Nathan Pacey

npacey01@gmail.com

+1 226-988-3313 +41 76 823 93 32

Waterloo, Canada · Lausanne, Switzerland

Career Experience

Research Assistant

University of Waterloo
Institute for Quantum
Computing (IQC)

May 2024 - Current

- Researched fault-tolerant quantum computing with optomechanical systems, utilizing noise-biased error correction, long lifetimes, and minimal crosstalk to enhance scalability and stability.
- Established the theoretical framework to realize pair-cat quantum codes in a dissipative system across two mechanical modes by deriving reduced master equations with Schrieffer-Wolff transforms and adiabatic elimination.
- Simulated and validated these models by solving master equations using Python-based QuTiP software and optimized experimental parameters to enhance coherence times and fidelity.

Software Engineering Intern

CERN openlab
European Organization for
Nuclear Research

June 2023 - September 2023

- Selected as one of 30 worldwide CERN Openlab students, leading the aggregation of computing resources from industry leaders like IBM, Nvidia, and Intel for cutting-edge physics research.
- Demonstrated full-stack development expertise, crafting a Flask-based web portal for data collection and visualization using Python, Jinja, JavaScript, HTML and CSS.
- Collected and parsed machine data using Bash, Puppet, Ansible, and Python, ensuring reliability through rigorous testing on virtual Linux machines before production.
- Published peer-reviewed paper and presented results to CERN senior management and scientists.

Build and OS Software Engineering Intern

Lockheed Martin
CMS 330 & JSS

January 2022 - September 2022

- Enhanced Linux server installations with Kickstart file updates for 30% faster file compression.
- Applied Agile Methodology with Docker, Jenkins, and SVN for code review and testing.
- Developed Bash scripts and configuration files to enhance development tools and backend infrastructures.
- Automated tasks with Gradle and Jenkins; wrote Python scripts for data encoding/decoding.
- Managed Radar, Electro-Optical and Infrared sensor systems project schedules and communicated requirements with stakeholders.

R&D Engineering Intern

Magna International
New Technology & Innovation

May 2021 - January 2022

- Developed UV laser animations and CAD models for a Quantum Dot lighting project.
- Created an Android Smartwatch app in Java, Kotlin and XML to open and close trunk/doors using sliders or voice activation in 3 different languages utilizing Google Speech-to-Text AI.
- Programmed in C/C++ and worked on the electrical design for several sensors and embedded devices for large automotive companies.
- Led a team of co-ops in creating robotic systems for occupancy testing using the ROS framework.

Robotic Systems Engineering

Vision Spatial Technologies

March 2020 - September 2020

- Designed and built a battery system meant to operate in -30 °C, for an outdoor traffic light that uses computer vision to monitor dangerous zones at ski hills.
- Created a compliance mechanism using CAD to ensure internal parts of the battery system could withstand major impacts and harsh environmental conditions.
- Produced marketing materials leading to a successful University of Waterloo Concept and Dragons Den pitch.

Education

M.Sc. Quantum Science and Engineering École Polytechnique Fédérale de Lausanne (EPFL) <i>Graduating Class of 2025</i>	Specialization in Quantum Information and Computation. Honours Academic GPA of 5.03 / 6 Working under Prof. Nicolas Macris on the <u>Effects of Stochastic Noise Models on Surface Codes</u> using IBM Qiskit, in collaboration with CERN's Quantum Technology Initiative (<u>noisy-gates library</u>).
B.A.Sc. Engineering Physics and Computing Queen's University Canada <i>Graduated May of 2024 with First Class Honours</i> <i>Awarded Excellence Scholarship</i>	Stockdale, P. Excellence Award in Physics, Academic GPA of 3.84 / 4.3 Bachelor's Thesis (with Distinction), <u>Developing Machine Learning Algorithms for American Style Stock Options</u> . Capstone on Development of a <u>Web Application for Automated Clean Energy Feasibility Studies</u> Using Global Data Sources.

Skills

- Programming in Python, Java, Kotlin, C, C++, JavaScript, SQL, Bash, MatLab, and Labview
- Quantum mechanics and computing in Python using Qutip, PennyLane or Qiskit Libraries
- Machine Learning Applications using OpenCV, SciKit-Learn, Pytorch and TensorFlow
- Data Science in Python and Jupyter using NumPy, Pandas, Matplotlib, Seaborn, IterTools
- Front-end development using XML, HTML, Markdown and CSS
- DevOps tools (Jenkins, Gradle, Docker, Bitbucket, Git, and SVN)
- Embedded software development on Arduino, Raspberry Pi or other Linux devices
- Hardware and PCB design using OrCAD, PSpice, Cadence and VHDL
- Excellent communicator
- Strong analytical skills
- Creative problem solver
- Hardworking and Dependable
- Collaborative leader
- Very Organized and timely

Relevant Courses

Quantum Computing, Quantum Information Processing, Machine Learning, Deep Learning, Mathematical Methods in Physics, Computational Engineering Physics, Production Software Development, Quantum Information Theory, Computer Architecture, Data Structures and Algorithms, Quantum Mechanics I & II, Electronics for Engineering Physics, Management of Experimental Data, Operating Systems, Solid State Systems for Quantum and Computer Integrated Surgery.

Personal Interests

- Learning about the applications of mathematical models in fields like quantum computing and cosmology.
- Developing full-stack desktop and mobile applications using Java, C++, Python and Kotlin.
- Travelling the world and learning about new cultures.
- Enjoying the outdoors through windsurfing, climbing, hiking, skiing, and snowboarding.

References

Professor Bradley Hauer Supervisor - University of Waterloo IQC bhauer@uwaterloo.ca	Luca Atzori Computing Systems Lead - CERN luca.atzori@cern.ch	Jeff Domenchini Lead Engineer - Magna jeff.domenchini@magna.com
--	--	--

Further Information

Portfolio Website npacey01.wixsite.com/website	GrabCAD grabcad.com/nathan.pacey-1	GitHub github.com/NathanPaceydev	LinkedIn linkedin.com/in/nathan-pacey
---	---	--	--