

# Brayden Freitas

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## EDUCATION

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### Graduate

University of Ottawa—Ottawa, ON

2022–Current

Physics PhD Student in Experimental Photonics co-supervised by Dr. Jeff Lundeen and Dr. Benjamin Sussman. Focus on non-linear applications in quantum sensing through the Canadian National Research Council.

### Undergraduate

University of Pittsburgh—Pittsburgh, PA

2016–2020

Bachelor of Science in Physics (senior thesis in soft condensed matter simulation), Bachelor of Science in Mathematics, Minor in Computer Science, Cum Laude.

## EXPERIENCE

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### Professional

The Canadian National Research Council—Ottawa, Ontario, Canada

2022–Current

Research assistant working in the Joint Center for Extreme Photonics lab. Responsibilities include devising and conducting novel experiments for quantum sensing and quantum computing utilizing non-linear optics within photonics, as well as assisting other researchers in managing their setups and conducting experiments.

ASML—Wilton, Connecticut

2020–2021

Integration engineer working on developing quick response algorithms and MATLAB functions for analyzing data from a highly-interconnected, complex system.

The French Alternative Energies and Atomic Energy Commission—Grenoble, France

2019

Researcher for a theoretical condensed matter group. Worked on developing software for the KWANT quantum simulation Python package.

The University of Pittsburgh Physics Department—Pittsburgh, Pennsylvania

2017–2019

Researcher for a computational physical chemistry group. Worked on simulations in the field of computational soft matter physics.

### Notable Course Work

Quantum Physics at the Nanoscale Lab—University of Pittsburgh

Fall, Junior Year

A specialized lab course focused on learning techniques for producing quantum bits with the intent of use in quantum computing. Worked with a small team of five students to produce a nanowire based qubit from design to production to testing.

Quantum and Solid State Physics—University of Pittsburgh

Fall/Spring, Senior Year

Two courses focusing on the topics of quantum and solid state physics from a theoretical point of view. The solid state course was taught at the graduate level.

Computational Methods in Physics—University of Pittsburgh

Fall, Junior Year

An upper-level physics course consisting of projects carried out using the Jupyter Python suite. Culminated in a 2D electric field solver which can be found on my GitHub. Project based class using Python with SciPy.

Algorithm Implementation—University of Pittsburgh

Spring, Senior Year

An upper-level computer science course dealing with designing and implementing algorithms. Project based class using Java.

Numerical Analysis—University of Pittsburgh

Fall/Spring, Senior Year

Two upper-level math courses dealing with algorithm design for problems relating to data modeling in  $n$ -dimensions as well as with problems in linear algebra. Project based classes using MATLAB.

# TECHNICAL SKILLS

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## Languages

**Programming**—Java, C++, C, VBA

**Scripting**—Python, MATLAB, Shell, C#

**Markup**— $\text{\LaTeX}$ , Markdown, HTML

**Packages**—SciPy, KWANT, Matplotlib

## Computer programs

**Software**—Microsoft Office, Teams, Siemens Teamcenter, VSCode, Vim, Git, SolidWorks, Jupyter

**Operating systems**—Linux, Windows, Unix

## Laboratory techniques

**Clean Room**—Class 100 clean room training, nanofabrication, characterization, nanowire placement.

**Dry Lab**—Electron beam lithography, optical microscopy, transmission electron microscopy.

**Wet Lab**—Thin film deposition, animal handling.

# PUBLICATIONS

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## Papers

**Co-Author**—Ozmaian, M., **Freitas, B.**, & Coalson, R.. **Controlling the Surface Properties of Binary Polymer Brush Coated Colloids via Target Nanoparticles.** *J Phys. Chem. B.* 2019, 123, 1, 258-265.

## Posters

**Author**—Controlling the Surface Properties of Polymer Coated Colloids via Targeted Nanoparticles. *PQI's Kauffman Lecture.* 2018. Pittsburgh, PA.

**Author**—Docking Multiple Proteins Into Botulinum Toxin Type A Using Computational Methods. *Science and Math Academy Gallery Walk.* 2016. Aberdeen, MD.

## Other

**Author**—**Freitas, B.**, McDonough, L., & Mead, J.. **34BF1.14 WSSP Duckweed cDNA Library Landoltia Puncata cDNA Similar to ADP-ribosylation factor, mRNA Sequence.** *NCBI* 2015.