# Brayden Freitas

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## EDUCATION

### 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

### 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

## Languages
**Programming**—Java, C++, C, VBA

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

**Markup**—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

## 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.