

# Thomas Alexander

thomasalexander2718@gmail.com | 226.505.1869 | t4alexan@uwaterloo.ca

## EDUCATION

### UNIVERSITY OF WATERLOO

PHD IN QUANTUM

INFORMATION/PHYSICS

Jan 2018 - Deferring | Waterloo, ON

### UNIVERSITY OF WATERLOO

MSC IN QUANTUM

INFORMATION/PHYSICS

Sept 2014 - Dec 2017 | Waterloo, ON

GPA: 89%

### MOUNT ALLISON UNIVERSITY

HONOURS IN PHYSICS

DOUBLE MINOR

MATHEMATICS/COMPUTER SCIENCE

Sept 2010 - May 2014 | Sackville, NB

First Class Honours

GPA: 3.7

## LINKS

Github:// [whitewhim2718](#)

LinkedIn:// [thomasalexander2718](#)

Quora:// [Thomas-Alexander-4](#)

## COURSEWORK

### GRADUATE

Quantum Information Theory

Open Quantum Systems

Nanoelectronic Devices

Experimental Quantum Computing

Quantum Mechanics

### UNDERGRADUATE

Object Oriented Programming

Data Structures and Algorithms

Algorithm Analysis

Vector Analysis

Advanced Linear Algebra

Statistical Mechanics

Statistics

Discrete Mathematics

Complete Physics Curriculum

## SKILLS

### PROGRAMMING

Over 5000 lines:

Python • Mathematica

$\text{\LaTeX}$

Over 1000 lines:

Java • Scala • Javascript/Node

Familiar:

C • Matlab • HTML • Shell

Tensorflow • MongoDB • MySQL

## RESEARCH

### IQC/TQT CORY LAB | RESEARCHER

Sep 2014 - Dec 2017 | Waterloo, ON

Studied under **Prof David Cory** director of the Transformative Quantum Technologies program in the field of experimental Quantum Information.

- Developed new Bayesian adaptive experimental design algorithms for continuous outcome parameter estimation and demonstrated near order of magnitude in wall clock experiment time.
- Obtained conclusive evidence in favor of proposed hyperpolarization mechanism in phosphorus defects in silicon-28.
- Contributed to development and release of **QInfer** a Bayesian parameter estimation library using particle filtering.
- Proposed new metric for direct comparison of arbitrary neutron interferometer configurations information content.

### IQC CORY LAB | UNDERGRADUATE RESEARCHER

May 2013 - August 2013 | Waterloo, ON

- One of thirty students out of 400 applicants selected to attend the Undergraduate School on Experimental Quantum Information Processing.
- Led the development and implementation of NI-Engine, a software library used to interface with hardware, design, schedule and execute experiments for the neutron interferometer at the NIST research nuclear reactor.
- Designed Bayesian adaptive experiment selection strategies for Hamiltonian parameter estimation for use with neutron interferometers.

## EXPERIENCE

### MOUNT ALLISON UNIVERSITY | BACKEND DEVELOPER

May 2014 - August 2014 | Sackville, NB

- Developed RESTful API for Android application **Iron Tracker** with Python/Flask.
- Developed Python CLI for interaction with API and easy integration with Android application.

### G2 RESEARCH (TRACK GROUP) | SOFTWARE ENGINEERING INTERN

June 2012 - Sep 2012 | Halifax, NS

- Developed prototype software for tracking cellular users via confidential Telecom tower data in C#.
- Correlated timestamped calls with tower locations, headings, signal strengths.

## SELECTED AWARDS

2017	1 <sup>st</sup> /30 place Citadel Correlation One Datathon, Waterloo
2014-2017	CREATE NSERC scholarship
2014-2016	UW Varsity Athlete (Rugby)
2012	4 <sup>th</sup> /30 ACM Atlantic regional qualifiers

## SELECTED TALKS

*Optical hyperpolarization and inductive readout of  $^{31}\text{P}$  donor nuclei in natural abundance single crystal  $^{29}\text{Si}$*  **DAMOP | 2016 | Providence, RI**

*Ionization and Inductive Detection of Phosphorus Defects in Isotopically Purified Silicon*

**Google-IQC Conference | 2015 | Kitchener, ON**

## PUBLICATIONS

- [1] C. Granade, C. Ferrie, I. Hincks, S. Casagrande, T. Alexander, J. Gross, M. Kononenko, and Y. Sanders. QInfer: Statistical inference software for quantum applications. *Quantum*, 1:5, Apr. 2017.