

# Burke Brockelbank

## *Cirriculum Vitae*

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## Education

**BSc Physics with Honors, First Class, University of Calgary, Calgary, Alberta, GPA: 3.9. 2013–2017**

Graduated April 2017.

**Thesis:** *Maximally entangled multipartite symmetric states*

Supervised by Gilad Gour. Characterization of maximal entanglement in pure multipartite qubit states with symmetry under exchange of qubits.

**Classes:** *Special classes taken during BSc*

- Solid state physics
- Introduction to Optimization
- Introduction to Nanoscience and Nanotechnology

## Work Experience

**Research Assistant, Nasser Moazzen-Ahmadi, Calgary, 2017–2018**  
University of Calgary.

Investigating the feasibility of upgrading of bitumen with lasers

- Executing and analyzing gas chromatography (GC) and mass spectrometry (MS) on a GCMS analyzer
- Analysis of nuclear magnetic resonance (NMR) data
- Extensive log keeping (written and video), writing reports, presentations

**Summer Researcher, Nasser Moazzen-Ahmadi, Calgary, 2015–2017**  
University of Calgary.

Study of infrared (IR) rovibrational spectroscopy of molecular clusters. Included lab and computational work.

- High and low vacuum systems
- Lasers and optics
- Electronic maintenance including design and soldering
- Network maintenance
- Cryogenics (liquid nitrogen, dry ice)
- Data calibration
- Poster presentation at Quantum Alberta Workshop 2016

**Freight Associate, The Home Depot, Calgary, Alberta. 2014**  
Overnight stocking

## Computer skills

**Programming:** In order of familiarity: Python (Scipy, Numpy, Pytorch), LabVIEW, Fortran 77 and 90, Matlab, SQL, Shell and Batch scripts, Makefiles

**Word Processing:** Proficient with LaTeX as well as WYSIWIG editors such as MS Word

**Spreadsheets:** Translatable experience with data analysis

**OS:** Experience on Windows and Linux, as well as Mac OS.

## Other skills

**Machine learning:** Machine learning with neural nets has been a hobby of mine for some time now. I am working on passion project where a user-defined AI is used to supervise a neural net to train a prior which is refined with Deep-Q learning.

**Website design:** I wrote my own website in html using Bootstrap 4 as well as some custom css. It is linked at the top of this page.

## Awards and Scholarships

**NSERC Undergraduate Student Research Award:** 2016

**Louise McKinney Scholarship:** 2015

**University of Calgary Undergraduate Merit Award:** 2015

**Physics and Astronomy Book Award:** 2015

**Physics and Astronomy Undergraduate Scholarship:** 2015

**Jason Lang Scholarship:** 2014

**President's Admission Scholarship:** 2013

**Alexander Rutherford Scholarship:** 2013

## Publications

**unpublished:** Use of quantum-correlated twin beams for cancellation of power fluctuations in a continuous-wave optical parametric oscillator for high-resolution spectroscopy in the rapid scan mode

**unpublished:** Absolutely Maximally Entangled Multipartite Symmetric States

**2017:** Three new infrared bands of the He-OCS complex