

## TECHNICAL SKILLS

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- **Languages:** Python, C++, C, MATLAB, SQL, Shell scripting
- **Libraries:** NumPy, SciPy, Pandas, Matplotlib, Flask, OpenCV, CTypes
- **Tools/Environments:** Git, Vim, JetBrains IDEs, gdb, Make, CMake, Visual Studio, Linux, Windows

## EDUCATION

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### University of Waterloo

*Candidate for Bachelor of Mathematics, Computer Science*

Waterloo, ON

2020 - Present

### Westmount Collegiate Institute

*Ontario Secondary School Diploma*

Vaughan, ON

2016 - 2020

## EXPERIENCE

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### York University

*Research Assistant*

Toronto, ON

January 2019 - August 2019

- **Measles Research:** Conducted original epidemiological research to model the dynamics of measles in secondary schools
  - Implemented a deterministic ordinary differential equation model that models the population compartmentalization of students in secondary schools during a measles outbreak (MATLAB, Python)
  - Designed and developed an Agent-Based Model (ABM) alternative to the ODE model with improved accuracy and realism.
  - Improved execution time by a factor of over 17,000 (C++17, Python)
  - Documented findings in an epidemiological report co-authored by supervisor
- **Typesetting:** Typeset course notes for supervisor using  $\text{\LaTeX}$
- **SMB Conference:** Helped plan 2019 Annual Society for Mathematical Biology meeting
  - Aided in scheduling hundreds of speakers and presentations in a quick and efficient manner
  - Developed Python and Shell scripts to automate repetitive tasks

### Research in Flows, Inc

*Software Engineer*

Brampton, ON

February 2018 - Present

- **Research, Architecture, and Development:** Responsible for the ground-up design and development of digital phase demodulation system for high frequency signals, including purchasing OEM hardware, and production software development
- **Exceptional Performance:** Developed a high-throughput, multi-threaded Python application for acquisition and processing of high frequency analog signals within strict operational requirements
- **Scientific Collaboration:** Collaborated with team of scientists to develop and implement novel digital phase demodulation algorithm
- **Cost-saving Innovation:** Worked within strict budget requirements to create an effective low-cost solution, demonstrated in an ultrasonic flow-measurement application

## PROJECTS

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- **Agent Based Model:** An agent based model for the spread of measles in secondary schools  
*C++ (STL), Python (NumPy, Pandas), MATLAB*
  - Designed extremely extensible model of agents in a secondary school environment
  - Engineered to process one day (over 15,000 randomly generated actions) in less than 60 milliseconds, saving days of compute time
  - Verified against custom, independently constructed ODE SVEIR model
- **Object detection web app:** Multimedia object detection software powered by deep learning  
*Python (NumPy, SciPy, Flask, OpenCV)*
  - Lead a team of developers to create a complex compute-intensive service
  - Implemented Mask-RCNN object detection algorithm in an easy-to-use web application
  - Capable of GPU hardware acceleration for even faster object detection
  - Achieved 100% as final project in ICS4U Computer Science course
- **Trading Bot:** Python implementation of custom stock trading algorithm that outperforms market by as much as 220%  
*Python (NumPy, Pandas, Matplotlib)*
  - Investigated and evaluated various technical analysis techniques
  - Designed custom strategy testing framework for easier evaluation
  - Invented mathematical method of predicting scale of stock growth
  - Tested performance of strategy against market growth – performs at or above market levels in almost all cases