# Collin A. Joseph

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## Summary

- Substantial knowledge of **machine learning** and **digital signal processing** from work and research.
- Substantial knowledge of **optimization** and **algorithm design** from research and coursework.
- Proficient in **Python** from research and coursework.
- Proficient in **Matlab** from work and research.

## Education

**McGill University** **Montreal, Quebec, Canada**
*Masters of Engineering in Electrical Engineering (with thesis)* *2017–Present*

- Expected graduation: October 2019
- Relevant Coursework: Applied Machine Learning, Optimization, Generalized Linear Models

**University of Waterloo** **Waterloo, Ontario, Canada**
*Bachelor of Applied Science in Electrical Engineering (with co-op)* *2012–2017*

- Graduated with distinction.
- Relevant Coursework: Adaptive & Cooperative Algorithms, Algorithm Design & Analysis, Digital Signal Processing

## Research Experience

**McGill University** **Montreal, Quebec, Canada**
*Master's Thesis* *2017–2019*

Research was focused on statistical analysis, signal processing and development of machine learning algorithms for a microwave radar breast cancer screening system with the McGill RF Breast Cancer Screening Group.

- Implemented ensemble cost-sensitive SVM classifier for microwave radar scans using Python.
- Reduced ensemble training time using genetic algorithms, particle swarm optimization and simulated annealing.
- Improved predictive performance by proposing new time-frequency decomposition features.
- Established flexible data processing and analysis framework for future data sets.
- Performed extensive statistical analysis on radar scans of human subjects.

**Technology Used**: Python, Matlab, Git, Linux

## Work Experience

**ON Semiconductor** **Waterloo, Ontario, Canada**
*Signal Processing Algorithm Developer (co-op)* *Sept.'16 – Dec.'16*

- Prototyped an environmental classification algorithm for low-resource digital hearing-aids.
- Optimized an acoustic noise reduction algorithm extensively, improving (decreasing) power consumption by 20%.
- Executed rigorous regression testing on algorithm to ensure performance equaled or exceeded previous iteration.
- Leveraged fixed point arithmetic operations to maximize algorithm efficiency.

**Technology Used**: Matlab, Assembly Language, CVS version control, Windows

**ON Semiconductor** **Waterloo, Ontario, Canada**
*Signal Processing Algorithm Developer (co-op)* *Jan.'16 – Apr.16'*

- Developed a digital equalizer firmware module in assembly language.
- Simulated and performed experimental analysis on digital equalizer using Matlab.
- Executed and documented extensive test procedures for acoustic feedback cancellation algorithm.
- Documented and presented analysis and test results to firmware and software development team.

**Technology Used**: Matlab, Assembly Language, CVS version control, Windows

**ON Semiconductor** **Waterloo, Ontario, Canada**
*Signal Processing Algorithm Developer (co-op)* *May'15 – Aug.'15*

- Evaluated performance of an static noise reduction algorithms using Matlab.
- Developed functional simulations to evaluate performance of various digital signal processing algorithm configurations.
- Performed experimental analysis on multiple noise estimation methods for enhancement of noise reduction algorithm.
- Developed and executed automated acoustic tests for directional noise reduction algorithm using Matlab & C.

**Technology Used**: Matlab, Assembly Language, C, CVS version control, Windows

**University of Waterloo** **Waterloo, Ontario, Canada**
*Teaching Assistant, Fundamentals of Programming* *Sep.'14–Dec.'14*

- Tutored engineering students in C# programming fundamentals.
- Presented course content to students on an individual basis and in classes of up to 100.
- Consistently completed administrative tasks ahead of deadlines.
- Cooperated effectively with teaching team of 18 members to ensure smooth running of the course.

**Technology Used**: C#, Windows

**University of Waterloo** **Waterloo, Ontario, Canada**
*Research Assistant, (4 months full-time, 4 months part-time)* *Jan'14–Aug.'14*

- Developed and evaluated a ray tracing simulation tool for radio wave propagation using C++ and Matlab.
- Reduced runtime by over 60% using CUDA parallel computing platform on Nvidia GPU hardware.
- Designed an electromagnetic simulation GUI using Matlab.

**Technology Used**: C++, Matlab, Windows

## Volunteer Experience

**Couple Six Inc.** **Bridgetown, Barbabdos**
*Developer* *Jan.'15 – Jul.'15*

- Collaboratively developed adventure game prototype using Unity game engine and C# scripting.
- Coordinated development remotely with project team using Git version control.

**Technology Used**: C#, Unity, Git, Windows

## Awards

**Faculty of Engineering, University of Waterloo** **Waterloo, Ontario, Canada**
*Sandford Fleming Foundation Award, Co-op Proficiency* *Jul.'17*
For outstanding performance during co-op work terms.

**Faculty of Engineering, University of Waterloo** **Waterloo, Ontario, Canada**
*Sandford Fleming Foundation Award, Work Report Proficiency* *Jul.'16*
For excellence in written communication.

## Hobbies & Interests

- Interest in video game design and development
- Athletics and martial arts enthusiast.