

Garrett MacDonald

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TECHNICAL SKILLS

Languages: Java, Python, SQL, JavaScript/TypeScript, HTML, CSS, R
Libraries & Frameworks: Tkinter, Matplotlib, NumPy, Pandas, Scikit-Learn, TensorFlow, PyTorch
Developer Tools: Git, Power BI, Visual Studio, PyCharm, IntelliJ, Jupyter Notebook

EDUCATION

University of Ottawa Sept. 2022 - May 2025 (expected)

Honours Bachelor of Science, Computer Science & Statistics Ottawa, ON

- Computer Science coursework: Data Structures & Algorithms, Databases, Software Engineering, UI Design
- Mathematics & Statistics coursework: Linear Algebra II, Calculus III, Probability Theory, Statistics, Regression Analysis, Computational Statistics, Applied Probability
- Life Science Coursework: Cellular Biology, Human Physiology, Physiological Psychology, Machine Learning for Biochemistry
- Activities & Societies: *Competitor - Putnam Mathematics Competition (2023)*

EXPERIENCE

Research Assistant - Quantum Computing May 2024 – Sept. 2024

University of Ottawa Ottawa, ON

- Studied the computational advantage of quantum strategies in the context of non-local games.
- Used knowledge of numerical computing, tensor & linear algebra to design simulations of alternate CHSH games.
- Successfully ran simulations via 1000+ trials on a quantum computer, validating hypotheses.
- Developed algorithms with Python, Sympy & Qiskit to run simulations on quantum circuits for $N \geq 2$ qubits.
- Created educational materials on mathematical foundations of quantum computing, presented to students and fellow researchers.

Software Developer Intern Jan. 2023 – Dec. 2023

Canadian Bank Note Company Ottawa, ON

- Wrote a program in Python and JavaScript to format and filter Excel data, reducing file size by 75%.
- Developed Power BI dashboards, capturing new insights for manufacturing analytics from 1,000,000+ datapoints.
- Conducted user interviews with 10+ users as part of the UI design process across 3 separate projects.
- Implemented a density-based clustering model using Scikit-Learn to cluster 10,000+ examples of production data.
- Created a Python program using sockets, multithreading & computer vision for real-time product verification, receiving updates every 25ms.

Web Developer Oct. 2021 – July 2022

University of Toronto Toronto, ON

- Led the development group of three to curate digital lexicon of scientific terms for 5+ Asian languages.
- Used Django & Python to build blog platform for communicating project updates, hosting the site on Heroku.
- Leveraged OOP and database knowledge to build table relationships between languages, words, and lexicon entries.
- Architected the project, designed its database, and wrote documentation to communicate best practices for working with the website's technology.

PROJECTS

Income Tax Calculator | *Java, Swing*

- Developed an income tax calculator in Java, calculating after-tax income for income from \$13,000 to \$200,000+.
- Adjusted algorithm for calculation error within \$200 as compared to similar applications.
- Implemented a reverse calculator, taking desired monthly post-tax income to derive annual pre-tax salary.
- Used the Swing library to implement a GUI with error-checking on invalid inputs.

Collatz Numbers! | *Python, Matplotlib*

- Created a recursive program in Python to mathematically model the Collatz Conjecture for numbers up to 5×10^5 .
- Discovered a linear relationship between clusters of "Collatz numbers" when considered as 2-dimensional vectors.
- Added static image generation of vector plots through Matplotlib to improve analysis and learning.