

Zaheer MacDonald

zkmacdon@gmail.com | zkmacdon.github.io | github.com/zkmacdon

TECHNICAL SKILLS

Languages: Java, Python, R, SQL, JavaScript/TypeScript, HTML, CSS, L^AT_EX

Libraries & Frameworks: Matplotlib, NumPy, Pandas, React, Bootstrap, Scikit-Learn, TensorFlow, Keras, Jax

Developer Tools: Git, Power BI, RStudio, Visual Studio, PyCharm, IntelliJ, Jupyter Notebook

EDUCATION

University of Ottawa

May 2025

Honours Bachelor of Science, Computer Science & Statistics

Ottawa, ON

- Selected Coursework: Calculus III, Linear Algebra II, Foundations of Probability, Stochastic Processes, Computational Statistics, Regression Analysis, Machine Learning for Chemistry, Algorithm Design & Analysis
- Activities & Societies: *Competitor - Putnam Mathematics Competition (2023)*
- Graduated Cum Laude

EXPERIENCE

Research Assistant - Quantum Computing

May 2024 – Sept. 2024

University of Ottawa

Ottawa, ON

- Studied the application of quantum strategies to non-local games alongside 2 other students.
- Designed simulations of the quantum strategies for variant CHSH games, using Python, Sympy & Qiskit to successfully run quantum simulations with over 1000+ trials for each game variant.
- Created educational materials on the CHSH game, presented to students and researchers.
- Assisted in facilitating lessons for 30+ students across 4 separate sessions.

Software Developer Intern

Jan. 2023 – Dec. 2023

Canadian Bank Note Company

Ottawa, ON

- Wrote a program in Python and JavaScript to format and filter data in Excel files, reducing size of files 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 a digital lexicon of scientific terms for 5+ Asian languages.
- Contributed to both front-end and back-end development, using Python, Django, JavaScript, and React.
- Applied knowledge of OOP & databases to build table relationships between languages, words, and lexicon entries.
- Architected the project, designed its database, and wrote documentation to communicate best practices for future development.

Operations Analyst Intern

May 2019 – Aug. 2019

ISNA Canada

Toronto, ON

- Cleaned, sorted, preserved & digitised data from over 50 years of the organisation's history.
- Created a database in Microsoft Access, centralising food certification data for 100+ clients.
- Designed, modified, and deployed surveys to 100+ community members in order to assess and analyse community engagement, event satisfaction, and programming preferences.
- Assisted with bank reconciliations on complex corporate accounts.

PROJECTS

The Minimax Algorithm (CSI 4103 Project) | *L^AT_EX*, *HTML*, *CSS*, *JavaScript*

- Worked as part of a group of 4 to study the Minimax algorithm for our Great Algorithms group project, researching its benefits and applications in adversarial games as well as its advantages over alternative algorithms.
- Wrote a paper in collaboration with group members, and gave a 10 minute presentation on the topic.
- Following the project, developed Minitac – an implementation of the Minimax algorithm in the form of an opposing agent in Tic-Tac-Toe using JavaScript, HTML, and CSS.

Mealer (SEG 2105 Project) | *Java*, *Gradle*, *XML*, *Firebase*, *OAuth*

- Worked with a partner to develop a Skip the Dishes clone for our class on Software Engineering.
- Developed UML and class diagrams to design the software system, mapping out the behaviour and properties of users and their representations.
- Used OAuth and Firebase to store user information and provide account authentication.
- Designed the UI in Figma, and implemented the designs in XML.

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 model the Collatz Conjecture for numbers up to 50,000.
- Discovered regularity in distances between contiguous sets of “Collatz numbers” when considered as 2D vectors.
- Added static image generation of vector plots through Matplotlib to improve analysis and learning.

EXTRACURRICULARS

Community Volunteer

Various

Sept. 2020 – Present

Ottawa & Toronto, ON

- Assisted with programming & event logistics across 5+ organisations, serving 1000's of community members.
- Mentored over 15 adolescent community members, assisting with tutoring, career and academic guidance, and providing peer spiritual and mental health support.
- Provided advice and insight on program design and delivery to community leaders.

Club Member

University of Ottawa Math Club

May 2023 – April 2024

Ottawa, ON

- Attended regular presentations on a variety of topics in mathematics and statistics provided by the faculty.
- One of 7 at the university to compete in the 84th annual Putnam Mathematics Competition.

Core Member - Operations Committee

University of Ottawa MSA

Sept. 2022 – April 2023

Toronto, ON

- Produced an Excel spreadsheet to track and record granular information for over 80 sponsorship leads.
- Collaborated with sponsors over 8 months to deliver funding for 3 events with 100+ attendees.
- Contributed to the development of organisational strategy document alongside 5 other members for future years.

Founding Member

Muslim Chaplaincy of Waterloo

Oct. 2017 – Nov. 2020

Waterloo, ON

- Collaborated with 8 other members of the Waterloo community to launch a chaplaincy program, regularly serving 50+ community members with 2 chaplains.
- Worked with 4 other core members to develop our organisational strategy and marketing documents.
- Assisted in the setup and execution of monthly programming over the course of 2 years.