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# Mariam Walaa

## MSc Applied Mathematics

[github.com/mariamwalaa](https://github.com/mariamwalaa)  
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### EDUCATION

**Master of Science in Applied Mathematics (cGPA 4.13/4.33)**, *Toronto Metropolitan University* 09/2023 — 04/2025  
*Thesis: Analysis & Predictability of Centrality Measures in Competition Networks (published in WAW'25)*

**Honours Bachelor of Science in Mathematics**, *University of Toronto* 09/2018 — 04/2023  
*Minors & Courses: Statistics, GIS, Computer Science*

### TECHNICAL SKILLS

<b>Languages &amp; Tools</b>	Python, SQL, R, Git, Jupyter, PowerBI, Anaconda, $\text{\LaTeX}$
<b>Cloud &amp; MLOps</b>	Azure (Azure ML, Databricks), AWS (S3, SageMaker, Lambda), GCP (BigQuery, Airflow), Docker
<b>Software Packages</b>	pandas, NumPy, Matplotlib, Scikit-Learn, xgboost, PyTorch, statsmodels, spaCy, PySpark, Tidyverse

### INDUSTRY EXPERIENCE

**AI Researcher** 05/2024 — 05/2025  
*Unilever*  
Toronto, Ontario

- Awarded a Mitacs Accelerate internship to apply a heterogeneous Graph Neural Network in PyTorch Geometric to recommend sustainable substitutions for 27k+ ingredients, boosting greenhouse gas emissions reduction by over 400%.
- Built Azure ML pipeline with GPT-4 Turbo to validate 427 GNN recommendations against nutritional and environmental constraints, improving evaluation precision by 20% through iterative few-shot prompt optimization.

**Data Science Analyst** 01/2022 — 08/2022  
*Loblaw Companies Limited*  
Brampton, Ontario

- Enhanced Joe Fresh Markdown Optimization adoption rate by over 20%, by turning business requests into actionable features.
- Developed a time-series dashboard in PowerBI, a heuristic for Seasonal Product Identification to maximize sell-through, and investigated regression for price elasticity.

**Machine Learning Engineer** 05/2019 — 08/2021  
*Altair Engineering*  
Toronto, Ontario

- Built help documentation recommender engine, and prototypes for question answering, topic modeling, & document classifier.
- Developed novel [Simpson's Paradox automatic detection](#) feature for use in proprietary Altair KnowledgeSTUDIO ML/AI software.
- Led predictive modelling for marketing campaign using Altair KnowledgeSTUDIO, supporting [electric vehicle adoption analytics](#).

### TECHNICAL PROJECTS

**Open-Source AI & Data Science Projects**

*Tools: LangChain, FAISS, Streamlit UI, OpenAI API, Tkinter*

- Developed a [RAG chatbot](#) with a vector database to retrieve user-specific experience data and generate context-aware responses.
- Developed a [recommendation system](#) GUI for arXiv research papers using NLP machine learning techniques (TF-IDF+Cosine).
- Developed a [stock portfolio optimization tool](#) with visualization capabilities and risk-return criteria selection.

### ACADEMIC EXPERIENCE

**Graduate Teaching Assistant** 09/2023 — 04/2025  
*Toronto Metropolitan University*  
Toronto, Ontario

- MTH110/210/314 Discrete Math I & II, MTH140/240 Calculus I & II, MTH141 Linear Algebra I, and MTH380 Probability & Statistics I.

**Teaching Assistant** 01/2022 — 04/2023  
*University of Toronto Scarborough*  
Scarborough, Ontario

- Assisted in running labs and grading MATB61 Linear Programming & Optimization, MATA22 Linear Algebra I, CITC01 City Studies.

**Research Assistant** 11/2020 — 01/2022  
*University of Toronto*  
Toronto, Ontario

- Wrote 15 R tutorials and survey paper on reproducible data science workflows using LearnR, TidyModels, GitHub Actions, Targets.

### SCHOLARSHIPS & AWARDS

2023/2025 TMU Graduate Scholarships & Funding	\$39,500
2022 Loblaw Companies Limited National Scholarship	\$2,500
2018 Schulich School of Business Innovative Startups Award	\$1,000
2016 Schulich School of Business Entrance Scholarship	\$2,500
2016 Home Depot Orange Scholars Homer Award	\$2,500
2015 Jr. Economic Club of Canada Scholarship	\$5,000

### ACTIVITIES

Data Science Writer, KDnuggets	09-2020 — 02-2023
Member, University of Toronto Data Lab	11-2020 — 01-2022