

Michael Liu

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Education

University of Waterloo

BMath in Mathematics

Sept 2025 - Apr 2030

- Intended Major in Applied Mathematics with Scientific Computing and Scientific Machine Learning
- Activities: Varsity Cross-Country Athlete, WAT-ai (Artificial Intelligence) Design Team

Bill Crothers Secondary School

Ontario Secondary School Diploma

Aug 2021 - Jun 2025

- Graduated 2nd in Class of 2025 with 99.167% Top 6 Grade 12 Average
- Awards: Academic Accomplishment Award, Excellence in Mathematics Award, 8x University of Waterloo Mathematics Contest School Champion + Certificate of Distinction, 6 Additional Academic Course Awards
- Activities: Cross-Country Captain, Track & Field, 4x OFSAA, Peer Tutoring, Half-Marathon

Technical Skills

Programming Languages: Python, SQL

Data/ML Libraries: Pandas, NumPy, scikit-learn, Matplotlib/Seaborn/Plotly, PyTorch

Databases/Tools: PostgreSQL, MySQL; Git, GitHub; Jupyter Notebook, VS Code; Excel, Tableau

Job Experience

Machine Learning Engineer

WAT.ai (University of Waterloo Artificial Intelligence Design Team)

Waterloo, ON

Sept 2025 - Present

- Developed custom Swin-UNet and CMAC-UNet architectures for diabetic retinopathy semantic segmentation.
- Engineered data augmentation pipeline for fundus image and segmentation masks.
- Wrote custom loss functions (Focal Tversky, Dice Loss).

Tennis Instructor & Tennis Racquet Stringer

Unionville Tennis Club/Premier Racquet Clubs Markham

Markham/Unionville, ON

Apr 2022 - Aug 2025

- TPA (Tennis Professionals Association) Certified Instructor.
- Over 500 hours of on-court instruction across 4 summers leading group camps and private hitting sessions for athletes of varying ages and skill levels.
- Built a personal racquet-stringing service for local tennis players from my basement.

Personal Projects

Tennis Stroke Multi-Class Classification

[github/TennisStroke](#) ↗

- Developed a deep learning pipeline to classify tennis strokes using PyTorch and transfer learning with ConvNeXt, ResNet-18, and MobileNetV3, achieving 94.18%, 94.96%, and 95.98% test accuracies on a 2,000-image dataset.
- Implemented a data-augmentation workflow (rotations, flips, affine transforms) to reduce overfitting.
- Applied GradCAM to produce heatmaps to interpret and visualize model decisions.
- Deployed to Streamlit for real-time upload and predictions.

Python & PostgreSQL Secure Login System

[github/SQL/login_app](#) ↗

- Built a user authentication system with PostgreSQL and bcrypt, enforcing strong password rules using regex, and secure storing using salted hashing.
- Developed front-end using Streamlit to support account creation and error handling.