Michael Liu

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Education

University of Waterloo *Sept 2025 - Apr 2030*
BMath in Mathematics (Undeclared)

- First-year student intending to declare major in Data Science or Applied Mathematics with Scientific Computing and Scientific Machine Learning and Minor in Economics
- Activities: Varsity Cross-Country Athlete, WAT-ai (Artificial Intelligence) Design Team

Bill Crothers Secondary School *Aug 2021 - Jun 2025*
Ontario Secondary School Diploma

- 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 & Data Member with Project See-DR *Waterloo, ON*
WAT.ai (University of Waterloo Artificial Intelligence Design Team) *Sept 2025 - Present*

- Preprocessed and augmented large-scale medical imaging datasets to support diabetic retinopathy classification and segmentation tasks.
- Leveraging transfer learning and CNN ensembling (ResNet, EfficientNet, MobileNet) to optimize accuracy.
- Collaborating with a small team of students on model training, evaluation, and documentation.

Tennis Instructor & Tennis Racquet Stringer *Markham/Unionville, ON*
Unionville Tennis Club/Premier Racquet Clubs Markham *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.