Michael Liu

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Education

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

- Math/CS Major Average: 94% — Cumulative Average: 93%
- 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 99.17% 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 *Waterloo, ON*
WAT.ai (University of Waterloo Artificial Intelligence Design Team) *Sept 2025 - Present*

- Conducted applied research on diabetic retinopathy lesion segmentation using fundus images with a small team of students.
- Designed, trained, and evaluated deep learning models, including Swin-UNet and CMAC-UNet variants.
- Developed and maintained data preprocessing and augmentation pipelines for medical image–mask pairs.
- Designed and evaluated task-specific loss functions and metrics to address class imbalance and small-lesion detection.
- Co-authoring a research paper analyzing architectural and loss-function tradeoffs for retinal lesion segmentation.

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

Project See-DR @ WAT.ai *github/ProjectSeeDR*

- Implemented Swin-UNet and CMAC-UNet architectures for multi-class retinal lesion segmentation.
- Designed training pipelines with controlled ablations at 512×512, 768×768, and 1024×1024 resolutions.
- Evaluated Focal Tversky Loss Function hyperparameters to address extreme class imbalance and small-object segmentation.
- Built a PyTorch data pipeline supporting numerous augmentations on image–mask pairs.
- Conducted quantitative evaluation using F1, IoU, and Recall to analyze architectural tradeoffs.