

# Michael Liu

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## Education

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### University of Waterloo

Sept 2025 - Apr 2030

*BMath in Mathematics*

- Major Average: 94% — Cumulative Average: 93%
- Activities: Varsity Cross-Country, Varsity Track, WAT.ai (Artificial Intelligence) Design Team

### Bill Crothers Secondary School

Aug 2021 - Jun 2025

*Ontario Secondary School Diploma*

- Graduated 2<sup>nd</sup> 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

## Technical Skills

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**Programming Languages:** Python, SQL, C  
**Data/ML:** PyTorch, scikit-learn, Pandas, NumPy, Matplotlib  
**Databases/Tools:** PostgreSQL, MySQL; Git, GitHub; Jupyter Notebook, VS Code; Excel, Tableau

## Job Experience

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### Machine Learning Engineer

Waterloo, ON

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

Sept 2025 - Present

- Worked on an applied medical imaging project focused on diabetic retinopathy with a small team of students.
- Led dataset curation, preprocessing, and experiment organization.
- Currently co-authoring a research paper titled “CNN vs. ViT-based U-Nets for Diabetic Retinopathy 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.

## Projects

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### Fundus Diabetic Retinopathy Lesion Segmentation @ WAT.ai

[github/fundus-image-segmentation](#) 

- Built a PyTorch data pipeline with image-mask augmentations for IDRiD and DDR fundus datasets.
- Designed and trained Swin-UNet and CMAC-Net models for multi-class lesion segmentation.
- Wrote task-specific loss functions (Focal Tversky) to address class imbalance.
- Led ablation study on input resolutions and loss function choice.
- Evaluated models using class-wise and mean F1, IoU, and Recall.

### Tennis Stroke Multi-Class Classification

[github/tennis-stroke-classification](#) 

- Built image classification models to identify tennis strokes from still images.
- Trained and compared pretrained CNNs (ResNet-18, MobileNetV3, ConvNeXt-Tiny).
- Applied Grad-CAM visualizations to interpret model attention.
- Deployed models on a Streamlit application.