Matthew Lam

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Professional Experience

Graduate Researcher Aug 2023 – Present

Maternal Fetal Imaging (MFI) Lab, Toronto Metropolitan University (TMU)

Automatic Triage Diagnosis Algorithm | PyTorch

- Led development of **EndoAI**, a rapid deep-learning system for diagnosing endometrial cancer from gigapixel slides
- Designed efficient **multi-instance learning (MIL) augmentation method** for training AI models
- Achieved a **AUC improvement of 4–5%** over standard MIL baselines across benign vs. non-benign and subclassification tasks without pathologist annotations.
- Developed a full **preprocessing and training pipeline**, including covering tissue detection, patching, feature extraction, and slide-level classification.
- Submitted to peer-reviewed medical imaging conference.

Digital Pathology Web Platform | Cloud Object-Storage

- Implemented key components of a full-stack web platform for AI-assisted histopathology diagnosis, integrating **Node.js/TypeScript services with Python ML pipelines**.
- Developed the **end-to-end multi-model inference pipeline** that executes five pretrained pathology models on each uploaded slide and delivers class predictions with confidence scores.
- Built an interactive **image viewer** and heatmap overlays with annotations

Undergrad Internship: Machine Learning Engineer Sept 2022 – Jul 2023

Maternal Fetal Imaging Lab, Toronto Metropolitan University (TMU)

- Implemented a preprocessing step that subdivides images of cancer cells
- Collaborated closely with researchers and a supervising professor to refine methodology and validate results

Academic Credentials

Toronto Metropolitan University Expected Dec 2025

Masters of Applied Science, Biomedical Engineering *CGPA: 4.0/4.0*

- *Thesis*: Web-Integrated AI Platform for Endometrial Biopsy Pathology Classification Using Multiple Instance Learning
- Engineering Teaching Assistant: Signals and Systems I, Introduction to Software & Human-Computer Interactions

Toronto Metropolitan University April 2023

Bachelor of Engineering, Biomedical Engineering *CGPA: 3.7/4.0*

Projects

Enhancing Polyp Segmentation in Colorectal Cancer using Attention U-Net Model Dec 2024

- Built a **full segmentation pipeline** including data preprocessing, augmentation, model training, evaluation metrics, and visualization.
- Evaluated deep learning architectures (U-Net, R2U-Net, Attention U-Net) for polyp segmentation using the **Kvasir-SEG dataset**, achieving **Dice of 71.363%** with the attention-enhanced model.

Conference Submission

ObGyn: EndoPathAI: A Web-Based AI Platform for Automated Endometrial Biopsy Analysis 2025

GT x ImNO Joint Symposium: Designing an Endometrial Pathology Slide Classification User Interface 2025

ObGyn: Classification of Endometrial Greyscale Pathology Slide 2024

Technical Skills

Languages: Python, C, C++, JavaScript, TypeScript, Shell Script, SQL, HTML/CSS
Frameworks: TensorFlow/Keras, PyTorch, FastAPI, Node.js, REST APIs
Tools: AWS (S3, Lambda, EC2), LocalStack, Docker, GitHub Actions, VS Code, Hugging Face