

## Education

### University of Toronto

PhD Student in Medical Biophysics

Year 2, expected May 2026

Cumulative GPA: 4.00 (A+)

- **Awards:** Canada Graduate Scholarships-Master's (Sept. 2022), Vector Scholarship in Artificial Intelligence (Sept. 2022), Ontario Graduate Scholarship (Sept. 2023), Postgraduate Scholarships – Doctoral Program (April 2024)

### University of British Columbia

BASc Electrical-Biomedical Engineering, Minor in Physics

Graduated May 2022

Cumulative GPA: 3.92 (A+)

## Skills

**Languages:** Python, JavaScript/TypeScript, C, SQL, MATLAB

**Deep Learning:** PyTorch, Keras/TensorFlow, scikit-learn, Pandas

**Tools and Frameworks:** Git, Linux, Docker, AWS, React, HPC

## Experiences

### Graduate Research Assistant

UofT Medical Biophysics

September 2022 - Present

Toronto, ON

- Supervised by Dr. Anne Martel and Dr. Maged Goubran, working on **self-supervised** methods applied to huge *terapixel* 2D and 3D medical images to learn useful image representations from **unlabelled data**
- Aiming to reduce reliance on expert-generated labels to train machine learning algorithms for medical applications

### Computational Scientist Intern - Think Tank Team

Samsung Research America

June 2022 - September 2022

Mountain View, CA

- Ideated, researched, and designed experiments to push the frontier of Samsung technology (<https://thinktankteam.info/>)
- Learned and implemented efficient signal processing, computer vision detection and Simultaneous Localization and Mapping (SLaM) algorithms as proof of concept for possible new products using **Python**

### Software Development Engineering Intern

Amazon Canada

June 2021 - August 2021

Vancouver, BC

- Designed and built an operational dashboard to **consolidate** and **securely manage** team workflows and system performance
- Created and deployed solution using **AWS Services** including: Lambda Step Functions, CDK, DynamoDB, S3, CloudFront
- Created an authenticated UI using **React/TypeScript**, infrastructure code using **AWS CDK in TypeScript**, and implemented security measures using **AWS Cognito** to properly secure access of confidential data

### Machine Learning Engineering Intern

Flex Artificial Intelligence Inc.

May 2020 - January 2021

Vancouver, BC (Remote)

- Developed an end to end patented **computer vision pipeline** to detect fine-grained form errors in real world exercise videos, such as raising toes during deadlift, to provide insight on a user's exercise performance
- Researched and implemented cutting-edge approaches to **3D video data**, including: 3D pose detection, spatio-temporal attention, self-supervised temporal alignment, 3D deformable convolutions, and triplet models for anomaly detection
- **Improved frame-level error classification accuracy by 17.3%** with fully completed pipeline

## Publications

- T. Xu et al., "Masked image modeling for label-efficient segmentation in two-photon excitation microscopy," Medical Image Learning with Limited and Noisy Data, pp. 117–127, 2023.
- O. Ciga, T. Xu, S. Nofech-Mozes, S. Noy, F.-I. Lu, and A. L. Martel, "Overcoming the limitations of patch-based learning to detect cancer in whole slide images," Scientific Reports, vol. 11, no. 1, 2021.
- O. Ciga, T. Xu, and A. L. Martel, "Self supervised contrastive learning for digital histopathology," Machine Learning with Applications, vol. 7, p. 100198, 2022.

## Project Highlights

### SemiCOL Challenge <https://www.semicol.org/>

February 2023 - June 2023

- **2nd place** on arms 1 and 2 in SemiCOL: a challenge on using semi-supervised learning for colorectal cancer detection
- **Presented algorithm** at ECDP 2023: the 19th European Congress on Digital Pathology
- Created efficient **tissue segmentation pipeline** using an ensemble of UNet and UNETR models respectively using PAWS and DINO **semi and self-supervised** pretrained ResNet50 and Vision Transformer encoders