

Education

University of British Columbia

BASc Electrical-Biomedical Engineering, Minor in Physics

Year 4, graduating May 2022

Cumulative GPA: 3.92 (A+)

- **Awards:** Jim and Helen Hill Memorial Service Award in Electrical Engineering (February 2020), Trek Excellence Scholarship for top 5% standing in faculty (September 2018, 2019, 2021), NSERC Undergraduate Student Research Award (July 2019)

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 (Compute Canada)

Experiences

Software Development Engineering Intern

June 2021 - August 2021

Amazon Canada

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

May 2020 - January 2021

Flex Artificial Intelligence Inc.

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

Summer Research Student

May 2019 - August 2019

Sunnybrook Research Institute - Physical Sciences

Toronto, ON

- Used deep learning and computer vision techniques to analyse digitized breast cancer whole-slide images for cancer detection and classification with **PyTorch**
- Achieved **91% accuracy** on slide-level segmentation task by innovating cancer detection pipeline, model **obtained 3rd place** on 470-participant breast histology competition: BreastPathQ

Machine Learning Technical Lead and Electrical Designer

October 2018 - Present

UBC Biomedical Engineering Student Team (BEST)

Vancouver, BC

- Led the Multifaceted Innovations in NeuroTechnology (MINT) ML subteam to create a data-acquisition pipeline and factored convolution model in **PyTorch** to analyse EEG inputs for a user-centric **EEG controlled home automation** application

Publications

- Ciga, O., **Xu, T.**, Nofech-Mozes, S. et al. Overcoming the limitations of patch-based learning to detect cancer in whole slide images. Sci Rep 11, 8894 (2021). <https://doi.org/10.1038/s41598-021-88494-z>
- Ciga, O., **Xu, T.** & Martel, A. Self supervised contrastive learning for digital histopathology. arXiv preprint arXiv:2011.13971 (2020).

Project Highlights

Neureka 2020 - EEG Seizure Detection github.com/Tonyxu74/eeg-seizure-detection

April 2020 - May 2020

- **4th place** on Neureka 2020 Epilepsy Challenge: an international competition on EEG seizure classification
- Implemented classifier with pretrained ResNet to determine seizure start and end in scalp EEG data using **PyTorch**
- Created full preprocessing pipeline using signal processing with a Short Time Fourier Transform to convert signal to a denoised heatmap of frequency versus time for model input

Famous Author Natural Language Generation github.com/Tonyxu74/famous-author-nlg

March 2020 - May 2020

- Final project for EE4497 - Pattern Recognition in Machine Learning course during exchange at NTU on investigating increasingly complex language models on generating a text in the style of a famous historical author
- Implemented Markov Chains, RNN, and LSTM in **PyTorch**, fine-tuned on pretrained GPT-2