




Felix Zhang

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EDUCATION

Honours Bachelor of Science, University of Toronto

Sept. 2021 – May 2025

Specialist in Computer Science, Major in Mathematics

3.95/4.0 cGPA

TECHNICAL SKILLS

Languages Python, C, C++, Rust, Java

Frameworks PyTorch, TensorFlow, scikit-learn, NumPy, Pandas, SciPy, Matplotlib, MuJoCo, Eigen3

Tools Git, shell, ssh, Unix, CMake, Anaconda, Google Colab, QEMU, Jupyter, WSL, Slurm

EXPERIENCE

Research Assistant; PRISM Lab, Bloorview Research Institute

June 2024 – Present


Supervisors: Erica Floreani and Prof. Tom Chau; Funded by: FUSRP

- Curated deep-learning models from the literature on denoising electroencephalogram (EEG) data in a team of 4 and benchmarked them on the **EEGDenoiseNet** dataset
- Investigated the applicability of end-to-end transformer models to denoise EEG signals and the impact of using signals' time-frequency representation as input

ML Runtime Engineer; Cerebras Systems

May 2024 – Present


- Implemented a runtime virtual memory system in **C++** which pre-emptively loads data immediately before it is accessed, enabling off-chip memory to be used for the first time with only a **%10** performance penalty
- Triaged and addressed **20+** failing tests within a high-priority test suite which is run nightly
- Developed a test variant which enabled performance testing of a single runtime node for the first time and decreased testing overhead by avoiding the generation of unnecessary input tensors

Research Assistant; University of Toronto 

May 2024 – Present

Supervisor: Prof. Jack Sun


- Worked on a team of 11 to implement a pedagogical kernel *KidneyOS* in **Rust** to be used in an introductory operating systems course with **500+** students annually
- Built the process control system and integrated the user thread handling into our context switching module
- Implemented kernel/user thread differentiation and the **exit**, **fork**, **read**, **write**, and **waitpid** system calls

Machine Learning Researcher; BMO Lab, University of Toronto 

July 2023 – May 2024

Supervisor: Prof. David Rokeby


- Applied forward dynamics in real-time on motion-capture data using **MuJoCo**, providing joint-level control of the model and the option to extract physical data using inverse dynamics
- Used imitation learning to enable humanoid models to copy movements from motion capture suits in real-time

Research Assistant; Biological Physics Group, University of Toronto 

May 2023 – May 2024

Supervisor: Prof. Anton Zilman

- Reimplemented a data pre-processing pipeline which processes raw cytokine data and extracts integral features
- Built a feed-forward network in **PyTorch** that predicts the cytokine dynamics of T cells in response to antigens
- With a team of 4, showed two variables are sufficient to determine cytokine concentrations because our model predicted the correct output concentration with **0.01%** error using a bottleneck with 2 dimensions

Research Student; Physics Education Group, University of Toronto 

May 2022 – Sept. 2022

Supervisor: Prof. Carolyn Sealfon

- Created a dataset of **~11 000** sentences from student feedback which labels whether they contain suggestions
- Compared the effectiveness of statistical and deep-learning classifiers at identifying suggestions using **scikit-learn** and **TensorFlow** respectively
- Demonstrated the efficacy of a BERT classifier at addressing this problem with it achieving an F_1 score of **0.823**

PROJECTS

Image Domain Adaption

Sept. 2023 – Dec. 2023

- Worked with Joaquin Sanchez-Garcia on applying the theory of optimal transport to domain adaption within the context of image classification.
- Used **Python Optimal Transport** to compute various functions which transform the **EMNIST** dataset of handwritten digits such that its distribution and priors match those of the **MNIST** dataset.
- Found that the accuracy of a fully-connected feed-forward classifier trained on the **MNIST** dataset was improved from *17%* to *73%* on the **EMNIST** dataset, demonstrating its usefulness.

Student Response Classifier

Mar. 2023 – Apr. 2023

- Developed a 3-parameter logistic item response theory classifier in **PyTorch**, using alternating gradient descent for training, to predict the correctness of student answers to multiple-choice questions
- Obtained an accuracy of **72%** on the *NeurIPS 2020 Education Challenge* dataset (within 5% of the best solution)

MNIST Classifier

Dec. 2022 – Jan. 2023

- Implemented a softmax classifier with stochastic gradient descent (SGD) from scratch in **C++** using only the linear algebra library **Eigen3**
- Achieved **92%** accuracy on the **MNIST** dataset of handwritten digits (within 2% of the top classifier using SGD)
- Built in the ability to save trained weights, perform batch training, and track the training error in real-time

Image Restoration with Convolutional Neural Networks



Sept. 2020 – June 2021

- Combined the models RIDNet and DeepDeblur using **PyTorch** to determine the ability of convolutional neural networks to deblur and denoise images
- Artificially generated a dataset of **~5 000** noisy, blurred images using a Poisson-Gaussian noise model
- Discovered that integrating the two models offers marginal improvements over their individual performance

STUDENT LEADERSHIP

Director of Internal Relations; Computer Science Student Union, University of Toronto

Apr. 2023 – Apr. 2024

- Organized orientation for the **~500** undergraduate students entering the computer science stream
- Planned **20+** events in collaboration with various partners in industry (such as AMD and Google) and student organizations (such as UTMIST  and WiCS )
- Hosted **5+** talks with professors in the Department of Computer Science at the University of Toronto

First-Year Academic Officer; Math Union, University of Toronto

Sept. 2021 – Apr. 2022

- Facilitated discussions between **20** mentor-mentee pairs in the *First-Year Mentorship Program* by providing guidance to the upper-year mentors
- Organized “Coffee and Chat” events which allowed for informal discussions between students and math professors

Registered Study Group Leader; Sidney Smith Commons, University of Toronto

Sept. 2021 – April 2022

- Led study groups for *Foundations of Computer Science I* and *Enriched Introduction to the Theory of Computation*
- Headed weekly meetings for first-years students that reviewed content covered in the previous week’s lecture
- Developed example problems to clarify and reinforce important concepts through group discussion

AWARDS & SCHOLARSHIPS

Fields Undergraduate Summer Research Program (FUSRP), University of Toronto

June 2024 – Present

Louis Savlov Scholarships in Sciences And Humanities (\$500), University of Toronto

Nov. 2023

Dean’s List Scholar, University of Toronto

Sept. 2021 – Present

Second Malcom Wallace Scholarship (\$4 500), University of Toronto

Sept. 2021 – Present

University of Toronto Scholar (\$7 500), University of Toronto

Sept. 2021

B.C. Achievement Scholarship (\$1 250), Government of British Columbia

Aug. 2021

District/Authority Scholarship (\$1 250), Government of British Columbia

Aug. 2021

SELECTED COURSEWORK

Code	Title	Term
CSC324	Principles of Programming Languages	Winter 2024
CSC412 [†]	Probabilistic Learning and Reasoning	Winter 2024
CSC413 [†]	Neural Networks and Deep Learning	Winter 2024
CSC473	Advanced Algorithm Design	Winter 2024
MAT357	Real Analysis I	Winter 2024
APM462	Nonlinear Optimization	Fall 2023
CSC369	Operating Systems	Fall 2023
CSC420	Introduction to Image Understanding	Fall 2023
MAT354	Complex Analysis I	Fall 2023
MAT377	Mathematical Probability	Fall 2023
CSC373	Algorithm Design, Analysis and Complexity	Winter 2023
CSC384	Introduction to Artificial Intelligence	Winter 2023
CSC463	Computational Complexity and Computability	Fall 2022

[†]Cross-listed graduate courses