Felix Zhang

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Education

University of Toronto Sept. 2021 – May 2025

Honours Bachelor of Science; Specialist in Computer Science, Major in Mathematics *3.95/4.0 cGPA*

- **Coursework:** Operating Systems; Neural Networks and Deep Learning; Probabilistic Learning and Reasoning; Intro. to Image Understanding; Algorithm Design, Analysis and Complexity; Advanced Algorithm Design; Computational Complexity and Computability; Complex Analysis I; Real Analysis I; Mathematical Probability
- **Awards:** University of Toronto Scholar ($7 500), Malcolm Wallace Scholarship ($4 500), Louis Savlov Scholarships in Sciences And Humanities ($500), Dean's List Scholar

Technical Skills

Languages	C, C++, Python, Rust, Bash, Java
Frameworks	PyTorch, TensorFlow, scikit-learn, NumPy, Pandas, SciPy, Matplotlib, MuJoCo, Eigen3
Tools	Git, Google Colab, gdb, Linux, shell, Jupyter, Anaconda, WSL, Slurm, CMake

Experience

Machine Learning Researcher July 2023 – Present

BMO Lab, University of Toronto

- Worked under Prof. David Rokeby to integrate motion-capture suits and diffusion models into live performances
- 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
- Explored the use of reinforcement learning to imitate input movements from motion capture suits in real-time

Research Assistant May 2023 – Present

Biological Physics Group, University of Toronto

- Worked under Prof. Anton Zilman to model receptor signalling via soluble ligands with a high degree of cross-talk
- Built a feed-forward network in **PyTorch** that predicts the cytokine dynamics of T-cells in response to antigens
- Showed two variables are sufficient to determine cytokine concentrations (as predicted by previous theoretical work) because the model predicted the correct outputs with *0.01%* error using two hidden variables

Research Student May 2022 – Sept. 2022

Physics Education Group, University of Toronto

- Worked with Prof. Carolyn Sealfon to develop suggestion extraction models for feedback from physics courses
- Produced 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 extracting 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

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

Volunteer Activities

Director of Internal Relations Apr. 2023 – Present

Computer Science Student Union, University of Toronto

- Organized orientation for the ~500 undergraduate students entering the computer science (CMP1) stream
- Facilitated 10+ events in collaboration with various partners in industry (such as AMD and Google) and students organizations (such as UTMIST and WiCS) so far