# Felix Zhang

felixfzhang | ff-zhang | felixf.zhang@utoronto.ca

## Education

**University of Toronto** Sept. 2021 – May 2025

*Honours Bachelor of Science 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:** Fields Undergraduate Summer Research Program (FUSRP) ($3 800), Louis Savlov Scholarships in Sciences And Humanities ($500), Malcolm Wallace Scholarship ($4 500), University of Toronto Scholar ($7 500), Dean's List Scholar, B.C. Achievement Scholarship ($1 250), District/Authority Scholarship ($1 250)

## 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**

## Technical Skills

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