Eric Zhu

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Experience

- University of Toronto | Toronto, ON • Research Assistant — September 2022 - April 2023

- Research project under **Professor Scott Schwartz** for STA497.
- Quantification of **aleatoric** (data) and **epistemic** (model) uncertainty in **deep neural networks**. Looks at using **generative (likelihood defining) neural networks** with **importance sampling** to produce reliable parameter posteriors.

- Amazon | Toronto, ON • SDE Intern — May 2022 - August 2022

- Software Development Engineer Intern on FBA (Fulfillment by Amazon) inbounding team.
- Created a scalable prototype for the next FBA seller experience, leveraging **GraphQL**, **AWS services** (Lambda, S3, AppSync, etc...), **Java**, and **TypeScript**. All fully managed by **custom infrastructure as code**, and integrated prototype into existing FBA website (front end).
- Provided actionable novel extensions for improved efficiency, e.g., latency reduction via service usage prediction and lambda warmers.

- Advanced Micro Devices (AMD) | Toronto (Markham), ON • SWE Intern — May 2021 - May 2022

- Language Runtime Team of Machine Leaning SW Engineering Unit
- Novel language features for **HIP-Compute** (analogous to CUDA), and novel infrastructure projects for HIP.
- Utilized C++ to **implement concurrency and image processing algorithms**, and wrote various **GPU kernels** for projects, while working on and utilizing the **ROCm tech stack**, in particular **HIP for compute tasks**.

- Watchtower Robotics | Boston, MA • SWE Intern (ML/Research) — May 2019 - August 2019

- Created and implemented procedure involving an **unsupervised label generation process** and **custom CNN**, synthesizing proprietary robot data with feature engineered audio data to predict to label pipe features, e.g., joints, with **90%+ test set accuracy. The procedure cut data analysis time by 50% and got AI VC firm attention (Innospark)**.
- Greatly leveraged Scipy, sklearn for statistical analysis, and implemented ML models using **Tensorflow and Keras**.

Skills

Languages — **Python, C++, C, C#, Java, GraphQL, PostgreSQL, R, Stan, CSS/CSS3, JSX, ES6, JavaScript, TypeScript**

Tools/Frameworks — **Git, AWS, CMake, CUDA, HIP, ROCm, Clang, Pytorch, Tensorflow, Scipy, Keras, Sklearn, Tidyverse, cmdstanr, rstanarm, lme4, React.js, .NET, Bootstrap, Figma, Sketch, Adobe CC**

Principles — **Scalable Architectures, OOP, Statistical Modelling, Deep Learning, Generative Modelling, Agile Development**

Education

- University of Toronto (UofT) — September 2018 - June 2023

- Honours Bachelor of Science, double major in Computer Science and Statistics, Dean's List Scholar
- Admitted as UofT Scholar - awarded to top ~4.5% of incoming class; graduated with High Distinction

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Publications

- Diffusion on the Probability Simplex — June 2023

- Published in **ICML** - SODS (**International Conference on Machine Learning**)
- Creates novel diffusion model that models discrete data on a probability simplex; probability simplex naturally creates an interpretation where points correspond to categorical probability distributions.