

# ADAM TABACK

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## EDUCATION

### University of Toronto

September 2022 - May 2026

*B.A.Sc in Computer Engineering + PEY*

*GPA: 3.92/4*

- Data Structures and Algorithms (**C**), Final Mark: 100%, Programming Fundamentals (**C++**), Final Mark: 92%, Introduction to Deep Learning (**Pytorch**), Computer Organization (**Assembly, C, Verilog**): 96%

## SKILLS

Computer Languages	Python, C, C++, Verilog, CUDA, Nios II Assembly
Operating Systems	Linux, Mac OS, Windows
Packages	Scikit-Learn, Pytorch, Numpy, Pandas, Matplotlib, CMake
Tools	High Performance Computing (HPC), Quartus, Modelsim, L <sup>A</sup> T <sub>E</sub> X, Github, Git, Llama, Hugging Face, CUDA
Professional Skills	Collaboration, Problem Solving, Leadership, Effective Communication

## WORK EXPERIENCE

### Deep Learning Architecture Research Intern

May 2024 - Present

*Moshovos Lab - University of Toronto*

- Implemented Entropy Compression technique, Asymmetric Numeral Systems, in **Python** and **C**, using lookup tables
- Achieved compression rates of  $1.5 - 2.3\times$  when applied to weights and activations of pretrained **Pytorch** models, speeding up transfer of data from memory to CPU
- Applied technique to quantized **Llama** models via **Hugging Face**, to allow for  $1.5\times$  size reduction, while maintaining performance
- Optimized algorithm using **C** and **CMake**, as well as parallel processing, running testing scripts on HPC clusters
- Created **PyPi** package for Asymmetric Numeral System, from the code I developed

### Teaching Assistant

Fall 2023 - Present

*Introduction to Computer Programming (**Python**) & Data Structures and Algorithms (**C**)*

- Ran weekly labs, helping students complete lab assignments and assessing their performance
- Received positive feedback from students for clear communication and quick debugging

## PROJECTS

### FPGA Processor

January - May 2024

*Computer Organization (ECE243) - University of Toronto*

- Created a 16 bit processor in **Verilog** to run on a FPGA, with associated **Assembly language** and **Python** parser
- Ran programs written in **assembly** to add up numbers from 1 to 30 and find biggest element in an array

### Cartoon Image Generation Using Generative AI

May - August 2024

*Introduction to Deep Learning (APS360) - University of Toronto*

- Developed a Generative Adversarial Network and Variational Autoencoder to generate images of cartoon emojis, using **PyTorch**
- Achieved realistic new images that closely matched training images with the Variational Autoencoder architecture, with dimensions 128x128

### Synthesizer in Verilog

September - December 2023

*Digital Systems (ECE241) - University of Toronto*

- Created a musical Synthesizer using **Verilog**, that ran on an FPGA
- Generated square and sine waves, produced note based on keyboard input, modulated waves to produce ADSR, compression and overdrive effects, displayed visuals using VGA display

### **Using Machine Learning to Analyze Placentae Images for Preeclampsia**

May - June 2024

*Cox Lab - University of Toronto*

- Trained a pretrained **Pytorch** ImageNet model to classify images of Placentae, achieving an AUROC of 90

### **INTERESTS/COMMITMENTS**

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Skule StageBand (Guitar), Bass Guitar, Violin, Music Production, Running