

EDUCATION

- **Msc Mathematics (Applied)** Toronto, ON
University of Toronto *November 2023*
 - Research/Thesis topic: Induced geometries in image classification neural networks.
- **Hon. BSc in Mathematics & Physics (High Distinction, Dean's List)** Toronto, ON
University of Toronto *May, 2022*

SKILLS AND INTERESTS

- **Python** (Pytorch, Numpy, Scipy)
- **SQL, Apache Spark**
- **Machine Learning, Data Science**
- **Deep Learning** (Generative Networks, LLMs)
- **Audio processing**
- **Computer Vision**

RESEARCH

- **Pushing Boundaries: Mixup's Influence on Neural Collapse** Toronto, ON
Submitted to ICLR 2024 *October 2023*
 - Training various dataset and architecture combinations using the data augmentation method "mixup", we find that the last-layer activations predominantly converge to a distinctive configuration. [Paper available here.](#)
- **Optimal Transport of Diffusion Network Encodings** Toronto, ON
Supervised by Professor Vardan Papyan *April 2023*
 - Run experiments to discern whether the encoding/decoding map of a DDPM is an optimal transport.
 - Investigate the path between images and encodings for Denoising Diffusion Probabilistic Models. Using various metrics, we find that the evidence that the path was an optimal transport.
- **Mathematical Model of Opioid Addiction** Toronto, ON
Supervised by Professor Adam Stinchcombe *February 2021 - January 2022*
 - Use python to modify compartment model for prescription opiate addiction and examine transient behaviour. We fit the model to relevant Ontario opiate data in an attempt to gain insight into the rise in opioid related deaths during the COVID-19 pandemic.
- **Statistical Genetics Research** Toronto, ON
Supervised by Professor Osvaldo Espin Garcia *May 2021 - April 2022*
 - Write R and bash scripts to clean and implement quality control on genetic data as well as implement a multi-ancestry GWAS via a linear mixed effects model.

EXPERIENCE

- **University of Toronto (Mathematics Department)**

Machine Learning Researcher

Toronto, ON

May 2022 - Present

- Supervised by Professor Vardan Papayan.
- Write python scripts and submit jobs to Digital Research Alliance of Canada clusters.
- Read and write academic papers on experimental and theoretical findings indicated in the *Research* section above.

- **University of Toronto (Mathematics Department)**

Teaching Assistant

Toronto, ON

September 2022 - June 2022

- Courses: MAT223 (Linear Algebra), MAT133 (Calculus for Business).
- Lead tutorials, assist with lectures, grade homework/tests, and deliver office hours.

- **Capco**

Summer Data Science Intern

Toronto, ON

May 2021 - September 2021

- Use spark (pyspark) to create a machine learning model to categorize severity of event reports.
- Converted relational data to RDF. Used an ontology alignment software to determine correspondences.
- Map out technology architecture for clients looking to implement new products/features. Research and Present information to clients.

- **Greenhouse (Band)**

Musician/Manager

Toronto, ON

June 2016 - Present

- Write, produce, and record music as well as project manage. ([Listen here.](#))
- Communicated with musicians, venue owners, and press to organize shows and finances.
- Created plans and scheduled production and release of music/creative projects.