

Andrew Cheng

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Education

McGill University & Montreal Institute of Learning Algorithms (MILA)

Thesis-Based Master's in Mathematics and Statistics

September 2021 - May 2023

- **cGPA: 4.00/4.00** | **Coursework:** Advanced Probability 1 & 2, Random Matrix Theory, Convex Optimization
- Graduate Excellence Scholarship plus stipend from MILA: \$30,000
- FQRNT Scholarship: \$23,500 and MITACS Scholarship: \$15,000
- Research area lies in the intersection of machine learning, large-scale optimization, algorithm design, random matrix theory, and high dimensional statistics
- **Talks:**
 1. Presented a proof of Polyak momentum using Chebyshev polynomials to the Montreal Optimization Seminar (2021)
 2. Presented our paper (see publication) at 2022 INFORMS Annual Meeting
- **Publication:**
 1. Kiwon Lee, Andrew N. Cheng, et al. Trajectory of Mini-Batch Momentum: Batch Size Saturation and Convergence in High Dimensions. (2022) arXiv: <https://arxiv.org/abs/2206.01029> (submitted to NeurIPS 2022).

McGill University

BSc. Joint Honours Statistics and Computer Science & Minor in Physics

September 2016 - May 2021

- **CS, Stats, & Physics GPA: 3.86** | **cGPA: 3.78** (First Class Honours)
- **Master's coursework:** Time Series Analysis; Sampling Theory; Matrix Computations; Honours Linear Regression; Generalized Linear Models; Applied Machine Learning
- **PhD-level coursework:** Mathematical Techniques in Machine Learning; Computation Intensive Statistics; Probabilistic Analysis of Algorithms (achieved highest grade in all master's and PhD-level courses)

Work Experience

Deep Learning Research Intern

Valence Discovery

May 2022 - Present

- Designing unsupervised and semisupervised learning methods inspired by variational autoencoders and the notion of disentanglement to navigate the molecular space to generate novel molecular compounds
- Biotechnology startup focusing on drug discovery

Research Intern

Computational Statistics, McGill Department of Computer Science

May 2020 - Present

- Created an **R** package using **C++** to predict the risk of recurring heart attacks and post-kidney transplant failures (recurrent survival analysis)
- Implemented SVRG, SAGA and k -SVRG into BigSurvSGD's framework (Tarkhan et al. 2020), effectively reducing variance and improving convergence.
- Worked on two computational statistics papers which will be submitted for publication (first author)

Research Intern

Deep Learning Survival Analysis Methods, McGill Department of Mathematics

June 2019 - December 2019

- Generated synthetic data-sets in **Python** to test the robustness of the *DeepHit Algorithm* (Lee et al. 2018) which is based in a **Tensorflow** environment (honours mathematics thesis)

Research Intern

Quantum Machine Learning, McGill Department of Physics

May 2018 - December 2018

- Applied convolutional neural networks in **MATLAB** to solve quantum mechanical systems
- Showcased results at an international physics conference

Application Development

Wilson Orbit Imaging, Summer Intern

May 2017 - August 2017

- Developed the workflow for an application aimed to digitize medical prescriptions given by doctors
- Analyzed work dynamic between radiologists, patients, and receptionists at the clinic and streamlined the workflow of the app based on their needs

Awards and Scholarships

Quebec Merit Scholarship for Computer Science

Government of Quebec: \$1,000

June 2021

Kaplan Family Summer Undergraduate Research Award

McGill Department of Mathematics and Statistics: \$7,500

May 2020

- Based on academic and research merit to conduct research in machine learning

Languages and Programming Languages

- English; Cantonese
- C++; Python; R